Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required		MIL Illum.
Catalyst	P0420	Catalyst System Efficiency Below Threshold Bank 1	Ewma filtered normalized corrected Oxygen Storage Capacity (OSC) of catalyst, bank 1	<	1	-	primary A/F commanded lambda	<=	1.09009	-	Fast Init. Response / Response to Step Change modes: 3 samples over 2 trips Stabilized mode: 1 sample per trip	Once per driving cycle	1 Trip
							primary A/F commanded lambda	>=	0.8501	-			EWMA
					EWMA normalized Oxygen Storage Capacity threshold: (a) / (b) (a) measured OSC bank 1		engine runs	=	TRUE	-			
							(						
			(see Look-Up-Table #P0420-5)	=	0.1 to 0.205	g	Deceleration Fuel Cut-Off (DFCO)	=	FALSE	-			
			Corrected OSC: ((a) - (b)) * (c) / (d)				for time	>=	10	sec			
			(a) Measured OSC bank 1				Vehicle speed	>=	4.350528278	mph			
			(b) O2 mass for OSC correction using Sec. O2 performance diag. results				engine speed	<=	3520	rpm			
			(c) Correction map for transition and delayed response time				engine speed	>=	1000	rpm			
			(d) compensation time for OSC correction using Sec. O2 performance diag. results				engine load @ full engine mode (see Look-Up-Table #P0420-4)	>=	12 to 19.992	%			
							(engine load of full engine mode / 2) @ half engine mode (see Look-Up-Table #P0420-4)	>=	12 to 19.992	%			
							for time	>=	3	sec			
							Ratio total charge to charge in cylinder	<	1.00024	-			
							for time	>=	2	sec			
							Integrated air mass flow	>	60	g			
							measured ambient temperatuer	>=	-39.8	deg C			
							measured ambient pressure	>=	50	kPa			
							measured engine coolant temperature	>=	52.06	deg C			
							no transmission gear change	=	TRUE	-			
							for time	>=	2	sec			
							)						
							(						
							integrated exhaust gas mass flow after the following operation points are in the monitoring window bank 1	>	60	g			
							(						
							Change of exhaust gas mass flow bank 1: (a) - (b)	<=	6.944444444	g/sec			
							Change of exhaust gas mass flow bank 1: (a) - (b)	>=	-6.944444444	g/sec			
							(a) exhaust gas mass flow bank 1						
							(b) filtered exhaust gas mass flow bank 1						
							PT1 time constant		1.20029304	sec			
							Low window exhaust gas mass flow bank 1 (see Look-Up-Table #P0420-2)	<=	22.2222222222222 to 27.7777777777778	g/sec			
							Low window exhaust gas mass flow bank 1	>=	3.888888889	g/sec			
							Low window exhaust gas mass flow bank 1	>=	(a) - (b)				
							(a) minimum exhaust gas mass flow bank 1		3.888888889	g/sec			
							(b) offset exhaust gas mass flow bank 1 at tip-out		0.833333333	g/sec			
							for time	>=	3	sec			
							High window exhaust gas mass flow bank 1 (see Look-Up-Table #P0420-1)	<=	22.2222222222222 to 27.7777777777778	g/sec			
							High window exhaust gas mass flow bank 1	>=	3.888888889	g/sec			
							)						
							(						
							Modeled catalyst temperature gradient bank 1: (a) - (b)	<=	40.0078	deg C			
							Modeled catalyst temperature gradient bank 1: (a) - (b)	>=	-40.0078	deg C			
							(a) Modeled catalyst temperature bank 1						
							(b) filtered modeled catalyst temperature bank 1	=	4.9989321	sec			
							PT1 time constant						
							Low window modeled catalyst temperature	<=	650.006	deg C			
							Low window Modeled catalyst temperature bank 1	>=	520.022	deg C			
							High window modeled catalyst temperature bank 1	<=	780.014	deg C			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					High window Modeled catalyst temperature bank 1	>=	600.014	deg C		
					Modeled catalyst temperature bank 1 after the first engine start and driving	>	420.06	deg C		
					for time	>=	12	sec		
					))					
					((					
					Integrated purge mass flow after a longer purge stop	>=	1.51	g		
					HC concentration factor in chacoal canister	<=	40	factor		
					relative fuel portion of canister purge to injected fuel mass : (a) / (b) (a) fuel mass supplied by canister purge control (b) fuel mass supplied by injection		0.200012	-		
					OR					
					open loop canister purge control	=	TRUE	-		
					OR					
					canister purge control mass flow into the manifold	<=	5.555555556	g/sec		
					((					
					integrated exhaust gas mass flow bank 1 since engine start (see Look-Up-Table #P0420-3)	>	1600 to 2850	g		
					integrated exhaust gas mass flow bank 1 after the following sensors's readiness	>	40	g		
					(					
					Secondary O2 sensor readiness bank 1					
					Primary A/F sensor readiness bank 1					
					)					
						>=	350.0	deg C		
					temperature deviation of Primary A/F sensor heater control bank 1: (a) - (b)	<	64.9922	deg C		
					(a) primary A/F sensor temperature set point for heater control		800.006	deg C		
					(b) measured primary A/F sensor temperature for heater control					
					)					
					statemachine = sm					
					statemachine (sm =0) : inactive	=				
					a commanded lambda active	=	FALSE	-		
					primary A/F commanded lambda	=	1	-		
					if the following conditions are met, sm moves to sm = 2					
					Secondary O2 sensor voltage bank1	>=	0.749512	V		
					if the following conditions are met, sm moves to sm = 1					
					Secondary O2 sensor voltage bank1	<	0.749512	V		
					Secondary O2 sensor voltage bank1	>=	0.450439	V		
					statemachine (sm=1) - rich mixture in catalyst	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda bank1	=	0.91992	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 2					
					((					
					Secondary O2 sensor voltage gradient over 0.05s	>=	0.069	V/s		
					Secondary O2 sensor voltage bank1	>=	0.749512	V		
					)					
					OR					
					Secondary O2 sensor voltage bank1	>=	0.749512	V		
					)					
					Integrated exhaust mass flow bank 1	>=	0.12	g		
					if the following conditions are met, sm moves to sm = 3					
					(					
					Secondary O2 sensor voltage bank 1	>=	0.85083	V		
					OR					
					(					
					Secondary O2 sensor voltage bank 1	>=	0.749512	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 1	>	0.15	g		
					))					
					(					
					Primary A/F sensor lambda bank 1	<=	(a) + (b)			
					(a) Primary lambda control set point bank 1	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda bank 1	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated rich exhaust gas mass flow bank 1	>=	15	g		
					)					
					(					
					Secondary O2 sensor voltage bank 1	>	(a) + (b)			
					(a) minimum secondary O2 voltage					
					(b) Offset voltage of Secondary O2 sensor	=	0.030518	V		
					)					
					statemachine (sm=2) - Lean mixture in catalyst					
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 4					
					((					
					Secondary O2 sensor voltage	<=	0.150146	V		
					for time	>=	0.1	sec		
					)					
					OR					
					(					
					Secondary O2 sensor voltage	<=	0.150146	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 1	>	0.1	g		
					))					
					(					
					Primary A/F sensor lambda	<=	(a) + (b)			
					(a) Primary lambda control set point	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated lean exhaust gas mass flow bank 1	>=	15	g		
					)					
					statemachine (sm=3) - Lean mixture in catalyst	**=**	**TRUE**	-		
					a commanded lambda active bank 1	=	TRUE	-		
					primary A/F commanded lambda bank 1	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 4					
					(					
					Secondary O2 sensor voltage bank 1	<=	0.150146	V		
					for time	>=	0.1	sec		
					OR					
					(					
					Secondary O2 sensor voltage bank 1	<=	0.150146	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 1	>	0.1	g		
					))					
					(					
					Primary A/F sensor lambda bank 1	<=	(a) + (b)			
					(a) Primary lambda control set point	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda bank 1	>=	(a) - (b)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated lean exhaust gas mass flow bank 1	>=	15	g		
					)					
					Measurement Oxygen Storage Capacity bank 1 with Secondary O2 sensor voltage bank 1 done	<=	0.200195	V		
					statemachine (sm=4) - Rich mixture in catalyst	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	0.91992	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 3					
					Measurement Oxygen Storage Capacity bank 1 starts					
					(					
					Secondary O2 sensor voltage bank 1	>=	0.85083	V		
					OR					
					(					
					Secondary O2 sensor voltage bank 1	>=	0.749512	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 1	>	0.15	g		
					))					
					(					
					Primary A/F sensor lambda bank 1	<=	(a) + (b)			
					(a) Primary lambda control set point bank 1	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda bank 1	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated rich exhaust gas mass flow bank 1	>=	15	g		
					)					
					EWMA filter strategy					
					Fast initialization mode (FIR)	**=**	**TRUE**	-		
					EWMA filter initial value for FIR mode	=	1.5	-		
					EWMA filter constant	=	0.28	-		
					Maximum number of samples per trip	=	2	counts		
					Total number of samples for FIR mode	=	4	counts		
					Response to Step Change mode (RSC)	**=**	**TRUE**	-		
					Response to Step Change mode inactive	=	TRUE	-		
					absolute difference : ABS((a) - (b))	>	(b) * (c)	-		
					(a) measured Oxygen Storage Capacity					
					(b) EWMA filtered normalized monitoring result					
					(c) Step change detection factor		0.40625	-		
					EWMA filter constant	=	0.28	-		
					Maximum number of samples per trip	=	2	number		
					Total number of samples for RSC mode	=	4	counts		
					EWMA filter constant	=	0.28	-		
					Total number of samples for stabilized mode	=	1	counts		
					No pending or confirmed DTCs	=	see sheet inhibit table	-		
					Basic enable conditions met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
	P0430	Catalyst System Efficiency Below Threshold Bank 2	Ewma filtered normalized corrected Oxygen Storage Capacity (OSC) of catalyst, bank 2	<	1	-	primary A/F commanded lambda	<=	1.09009	-	Fast Init. Response / Response to Step Change modes: 3 samples over 2 trips Stabilized mode: 1 sample per trip; Once per driving cycle	1 Trip EWMA
					EWMA normalized Oxygen Storage Capacity threshold: (a) / (b) (a) measured OSC bank 2		primary A/F commanded lambda	>=	0.8501	-		
							engine runs	=	TRUE	-		
							(					
			(see Look-Up-Table #P0430-1)	=	0.1 to 0.205	g	Deceleration Fuel Cut-Off (DFCO)	=	FALSE	-		
							for time	>=	10	sec		
			Corrected OSC: ((a) - (b)) * (c) / (d)				Vehicle speed	>=	4.350528278	mph		
			(a) Measured OSC bank 2				engine speed	<=	3520	rpm		
			(b) O2 mass for OSC correction using Sec. O2 performance diag. results				engine speed	>=	1000	rpm		
			(c) Correction map for transition and delayed response time				engine load @ full engine mode (see Look-Up-Table #P0420-4)	>=	12 to 19.992	%		
			(d) compensation time for OSC correction using Sec. O2 performance diag. results				(engine load of full engine mode / 2) @ half engine mode (see Look-Up-Table #P0420-4)	>=	12 to 19.992	%		
							for time	>=	3	sec		
							Ratio total charge to charge in cylinder	<	1.00024	-		
							for time	>=	2	sec		
							Integrated air mass flow	>	60	g		
							measured ambient temperatuer	>=	-39.8	deg C		
							measured ambient pressure	>=	50	kPa		
							measured engine coolant temperature	>=	52.06	deg C		
							no transmission gear change	=	TRUE	-		
							for time	>=	2	sec		
							)					
							(					
							integrated exhaust gas mass flow after the following operation points are in the monitoring window bank 2	>	60	g		
							(					
							Change of exhaust gas mass flow bank 2: (a) - (b)	<=	6.944444444	g/sec		
							Change of exhaust gas mass flow bank 2: (a) - (b)	>=	-6.944444444	g/sec		
							(a) exhaust gas mass flow bank 2					
							(b) filtered exhaust gas mass flow bank 2					
							PT1 time constant		1.20029304	sec		
							Low window exhaust gas mass flow bank 2 (see Look-Up-Table #P0420-2)	<=	22.2222222222222 to 27.7777777777778	g/sec		
							Low window exhaust gas mass flow bank 2	>=	3.888888889	g/sec		
							Low window exhaust gas mass flow bank 2	>=	(a) - (b)			
							(a) minimum exhaust gas mass flow bank 2		3.888888889	g/sec		
							(b) offset exhaust gas mass flow bank 2 at tip-out		0.833333333	g/sec		
							for time	>=	3	sec		
							High window exhaust gas mass flow bank 2 (see Look-Up-Table #P0420-1)	<=	22.2222222222222 to 27.7777777777778	g/sec		
							High window exhaust gas mass flow bank 2	>=	3.888888889	g/sec		
							)					
							(					
							Modeled catalyst temperature gradient bank 2: (a) - (b)	<=	40.0078	deg C		
							Modeled catalyst temperature gradient bank 2: (a) - (b)	>=	-40.0078	deg C		
							(a) Modeled catalyst temperature bank 2					
							(b) filtered modeled catalyst temperature bank 2	=	4.9989321	sec		
							PT1 time constant					
							Low window modeled catalyst temperature bank 2	<=	650.006	deg C		
							Low window Modeled catalyst temperature bank 2	>=	520.022	deg C		
							High window modeled catalyst temperature bank 2	<=	780.014	deg C		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					High window Modeled catalyst temperature bank 2	>=	600.014	deg C		
					Modeled catalyst temperature bank 2 after the first engine start and driving	>	420.06	deg C		
					for time	>=	12	sec		
					))					
					((					
					Integrated purge mass flow after a longer purge stop	>=	1.51	g		
					HC concentration factor in chacoal canister	<=	40	-		
					relative fuel portion of canister purge to injected fuel mass : (a) / (b) (a) fuel mass supplied by canister purge control (b) fuel mass supplied by injection		0.200012	-		
					OR					
					open loop canister purge control	=	TRUE	-		
					OR					
					canister purge control mass flow into the manifold	<=	5.555555556	g/sec		
					((					
					integrated exhaust gas mass flow bank 2 since engine start (see Look-Up-Table #P0420-3)	>	1600 to 2850	g		
					integrated exhaust gas mass flow bank 2 after the following sensors's readiness	>	40	g		
					(					
					Secondary O2 sensor readiness bank 2					
					Primary A/F sensor readiness bank 2					
					)					
						>=	350.0	deg C		
					temperature deviation of Primary A/F sensor heater control bank 2: (a) - (b)	<	64.9922	deg C		
					(a) primary A/F sensor temperature set point for heater control		800.006	deg C		
					(b) measured primary A/F sensor temperature for heater control					
					)					
					statemachine = sm					
					statemachine (sm =0) : inactive	=				
					a commanded lambda active	=	FALSE	-		
					primary A/F commanded lambda	=	1	-		
					if the following conditions are met, sm moves to sm = 2					
					Secondary O2 sensor voltage bank 2	>=	0.749512	V		
					if the following conditions are met, sm moves to sm = 1					
					Secondary O2 sensor voltage bank 2	<	0.749512	V		
					Secondary O2 sensor voltage bank 2	>=	0.450439	V		
					statemachine (sm=1) - rich mixture in catalyst	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda bank 2	=	0.91992	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 2					
					((					
					Secondary O2 sensor voltage gradient over 0.05s	>=	0.069	V/s		
					Secondary O2 sensor voltage bank 2	>=	0.749512	V		
					)					
					OR					
					Secondary O2 sensor voltage bank 2	>=	0.749512	V		
					)					
					Integrated exhaust mass flow bank 2	>=	0.12	g		
					if the following conditions are met, sm moves to sm = 3					
					(					
					Secondary O2 sensor voltage bank 2	>=	0.85083	V		
					OR					
					(					
					Secondary O2 sensor voltage bank 2	>=	0.749512	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 2	>	0.15	g		
					))					
					(					
					Primary A/F sensor lambda bank 2	<=	(a) + (b)			
					(a) Primary lambda control set point bank 2	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda bank 2	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated rich exhaust gas mass flow bank 2	>=	15	g		
					)					
					(					
					Secondary O2 sensor voltage bank 2	>	(a) + (b)			
					(a) minimum secondary O2 voltage					
					(b) Offset voltage of Secondary O2 sensor	=	0.030518	V		
					)					
					statemachine (sm=2) - Lean mixture in catalyst					
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 4					
					((					
					Secondary O2 sensor voltage	<=	0.150146	V		
					for time	>=	0.1	sec		
					)					
					OR					
					(					
					Secondary O2 sensor voltage bank 2	<=	0.150146	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 2	>	0.1	g		
					))					
					(					
					Primary A/F sensor lambda	<=	(a) + (b)			
					(a) Primary lambda control set point	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated lean exhaust gas mass flow bank 2	>=	15	g		
					)					
					statemachine (sm=3) - Lean mixture in catalyst	**=**	**TRUE**	-		
					a commanded lambda active bank 2	=	TRUE	-		
					primary A/F commanded lambda bank 2	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 4					
					(					
					Secondary O2 sensor voltage bank 2	<=	0.150146	V		
					for time	>=	0.1	sec		
					OR					
					(					
					Secondary O2 sensor voltage bank 2	<=	0.150146	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 2	>	0.1	g		
					))					
					(					
					Primary A/F sensor lambda bank 2	<=	(a) + (b)			
					(a) Primary lambda control set point	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda bank 2	>=	(a) - (b)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated lean exhaust gas mass flow bank 2	>=	15	g		
					)					
					Measurement Oxygen Storage Capacity bank 2 with Secondary O2 sensor voltage bank 2 done	<=	0.200195	V		
					statemachine (sm=4) -	=	TRUE	-		
					Rich mixture in catalyst					
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	0.91992	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 3					
					Measurement Oxygen Storage Capacity bank 2 starts					
					(					
					Secondary O2 sensor voltage bank 2	>=	0.85083	V		
					OR					
					(					
					Secondary O2 sensor voltage bank 2	>=	0.749512	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 2	>	0.15	g		
					))					
					(					
					Primary A/F sensor lambda bank 2	<=	(a) + (b)			
					(a) Primary lambda control set point bank 2	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda bank 2	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated rich exhaust gas mass flow bank 2	>=	15	g		
					)					
					EWMA filter strategy					
					Fast initialization mode (FIR)	**=**	**TRUE**	-		
					EWMA filter initial value for FIR mode	=	1.5	-		
					EWMA filter constant	=	0.28	-		
					Maximum number of samples per trip	=	2	counts		
					Total number of samples for FIR mode	=	4	counts		
					Response to Step Change mode (RSC)	**=**	TRUE	-		
					Response to Step Change mode inactive	=	TRUE	-		
					absolute difference : ABS((a) - (b))	>	(b) * (c)			
					(a) measured Oxygen Storage Capacity					
					(b) EWMA filtered normalized monitoring result					
					(c) Step change detection factor		0.40625	-		
					EWMA filter constant	=	0.28	-		
					Maximum number of samples per trip	=	2	counts		
					Total number of samples for RSC mode	=	4	counts		
					EWMA filter constant	=	0.28	-		
					Total number of samples for stabilized mode	=	1	counts		
					No pending or confirmed DTCs	=	see sheet inhibit table	-		
					Basic enable conditions met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Misfire	P0300	Indicates that the engine has experienced multiple cylinders misfiring, detected by a crankshaft angle delay that is too great, caused by a drop in the engine speed;	Method 1: Angular acceleration of crankshaft in transmission grip state (clutch is engaged), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-4)	>	90 to 1050	rad/s^2	Engine speed	>=	350	rpm	see Fault Paths 1-3 below	see Fault Paths 1-3 below
			OR				Engine speed	<=	6000	rpm		
			Method 1: Angular acceleration of crankshaft in transmission slip state (clutch is slipping), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-10)	>	100 to 1050	rad/s^2						
			OR				Engine coolant temperature at engine start	>	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in transmission open state (clutch is disengaged), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-7)	>	100 to 1050	rad/s^2	OR					
			OR				[Engine coolant temperature at engine start	<	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in idle state, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-1)	>	95 to 180	rad/s^2	then monitoring enabled					
			OR				Engine coolant temperature]	>	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in half-engine mode state, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-14)	>	66 to 2047.938	rad/s^2	Zero torque detection is not active	=	TRUE	-		
			OR				means					
			Method 1: Angular acceleration of crankshaft in catalyst heating, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-15)	>	161 to 275	rad/s^2	[Normalized inner engine torque	>	[A] + [B] + [C]	%		
			OR				OR					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission grip state (clutch is engaged), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	Normalized inner engine torque	>	[D] + [B] + [C]	%		
			OR				OR					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission slip state (clutch is slipping), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	Normalized inner engine torque	>	[E] + [B] + [C]	%		
			OR				OR					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission open state (clutch is disengaged), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	Normalized inner engine torque	>	[F] + [B] + [C]	%		
			OR				where					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in idle state, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[A] Threshold zero torque, driving state (see Look-Up Table #P0300-20)	=	5.32074 to 16.0797	%		
			OR				[B] Map for zero torque correction, engine speed and altitude dependant (see Look-Up Table #P0300-26)	=	-1.66016 to 0	%		
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in half-engine mode state, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[C] Map for zero torque correction, engine speed and engine temperature dependant	=	0	%		
							[D] Threshold zero torque, idle state (see Look-Up Table #P0300-23)]	=	4.25720 to 6.52008	%		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in catalyst heating, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[E] Threshold zero torque, half-engine mode state, driving (see Look-Up Table #P0300-24	=	2.00043 to 5.90057	%		
			OR				[F] Threshold zero torque, half-engine mode state, idle (see Look-Up Table #P0300-25	=	2.00043 to 5.90057	%		
			Method 3: Filtered angular acceleration of crankshaft in transmission grip state (clutch is engaged), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-5)	>	[A]+[B]	rad/s^2	Overrun/fuel cut-off is not active	=	TRUE	-		
			where				(Combustion delay after engine start has completed means	=	TRUE	-		
			[A] Base continuous misfire threshold in the transmission grip state	=	60 to 913	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2	[Engine speed	>	500	rpm		
			OR				for					
			Method 3: Filtered angular acceleration of crankshaft in transmission slip state (clutch is slipping), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-11)	>	[A]+[B]	rad/s^2	Number of combustions]	=	0	-		
			where				OR					
			[A] Base continuous misfire threshold in the transmission slip state	=	60 to 913	rad/s^2	[Engine has re-started (start-stop)	=	TRUE	-		
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2	means					
			OR				Number of combustions after re-start])	=	8	-		
			Method 3: Filtered angular acceleration of crankshaft in transmission open state (clutch is disengaged), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-8)	>	[A]+[B]	rad/s^2	Calculated EPM segment time is valid	=	TRUE	-		
			where				No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			[A] Base continuous misfire threshold in the transmission open state	=	90 to 913	rad/s^2	Basic enable conditions met	=	see sheet enable tables	-		
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in idle state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-2)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in the transmission idle state	=	105 to 135	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in half-engine mode state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-18)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in the half-engine mode state	=	60 to 2047.938	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in catalyst heating state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-19)	>	[A]+[B]	rad/s^2						
			where									

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions	Time Required			MIL Illum.
			[A] Base continuous misfire threshold in catalyst heating state	=	200 to 335	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
		Fault Path 1: Emission relevant misfire rate within first 1000 crankshaft revolutions after engine start	Total misfire counts across all cylinders within first test frame outside of catalyst heating	>	69	-			1000	revs	once per drive cycle	2 Trip (with similar conditions healing)
			OR Total misfire counts across all cylinders within first test frame during catalyst heating	>	71	-						
			and/or Total misfire counts for cylinder 1 within test frame	>	[A] x [B]	-						
			where [A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for multiple cylinder fault code	=	10.00061	%						
			and/or Total misfire counts for cylinder 2 within test frame	>	[A] x [B]	-						
			where [A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for multiple cylinder fault code	=	10.00061	%						
			and/or Total misfire counts for cylinder 3 within test frame	>	[A] x [B]	-						
			where [A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for multiple cylinder fault code	=	10.00061	%						
			and/or Total misfire counts for cylinder 4 within test frame	>	[A] x [B]	-						
			where [A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for multiple cylinder fault code	=	10.00061	%						
			and/or Total misfire counts for cylinder 5 within test frame	>	[A] x [B]	-						
			where [A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for multiple cylinder fault code	=	10.00061	%						
			and/or Total misfire counts for cylinder 6 within test frame	>	[A] x [B]	-						
			where [A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for multiple cylinder fault code	=	10.00061	%						
			and/or Total misfire counts for cylinder 7 within test frame	>	[A] x [B]	-						
			where [A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for multiple cylinder fault code	=	10.00061	%						
			and/or Total misfire counts for cylinder 8 within test frame	>	[A] x [B]	-						
			where [A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for multiple cylinder fault code	=	10.00061	%						
			with [One test frame defined by: Total number of crankshaft revolutions in first test frame specific to emission relevant misfire rate at engine start	=	1000	revolutions						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions	Time Required			MIL Illum.
		Fault Path 2: Emission relevant misfire rate after the first 1000 crankshaft revolutions	Total misfire counts across all cylinders within test frame	>	71	-			4 intervals of 1000	revs	continuous	2 Trip (with similar conditions healing)
			and/or Total misfire counts for cylinder 1 within test frame where	>	[A] x [B]	-						
			[A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for multiple cylinder fault code	=	10.00061	%						
			and/or Total misfire counts for cylinder 2 within test frame where	>	[A] x [B]	-						
			[A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for multiple cylinder fault code	=	10.00061	%						
			and/or Total misfire counts for cylinder 3 within test frame where	>	[A] x [B]	-						
			[A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for multiple cylinder fault code	=	10.00061	%						
			and/or Total misfire counts for cylinder 4 within test frame where	>	[A] x [B]	-						
			[A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for multiple cylinder fault code	=	10.00061	%						
			and/or Total misfire counts for cylinder 5 within test frame where	>	[A] x [B]	-						
			[A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for multiple cylinder fault code	=	10.00061	%						
			and/or Total misfire counts for cylinder 6 within test frame where	>	[A] x [B]	-						
			[A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for multiple cylinder fault code	=	10.00061	%						
			and/or Total misfire counts for cylinder 7 within test frame where	>	[A] x [B]	-						
			[A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for multiple cylinder fault code	=	10.00061	%						
			and/or Total misfire counts for cylinder 8 within test frame where	>	[A] x [B]	-						
			[A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for multiple cylinder fault code	=	10.00061	%						
			with [One test frame defined by: Total number of crankshaft revolutions in test frame for emission relevant misfire rate	=	1000	revolutions						
			Misfire test frame counter]	=	4	-						
		Fault Path 3: Catalyst damaging misfire rate	Weighted misfire counter for exhaust bank	>	2688	counts			immediately after catalyst damaging misfire rate is exceeded	-	continuous	1 Trip Blinking MIL (with similar conditions healing)
			OR Weighted misfire counter for exhaust bank during first interval after engine start	>	2688	counts						
			and/or									

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Total weighted misfire counts for cylinder 1 within test frame	>=	[A] x [B]	-				
			where							
			[A] Total weighted misfire counts per exhaust bank within test frame	=	measured parameter	-				
			[B] Minimum ratio of weighted misfire sum for multiple cylinder fault code	=	10.00061	%				
			and/or							
			Total weighted misfire counts for cylinder 2 within test frame	>=	[A] x [B]	-				
			where							
			[A] Total weighted misfire counts per exhaust bank within test frame	=	measured parameter	-				
			[B] Minimum ratio of weighted misfire sum for multiple cylinder fault code	=	10.00061	%				
			and/or							
			Total weighted misfire counts for cylinder 3 within test frame	>=	[A] x [B]	-				
			where							
			[A] Total weighted misfire counts per exhaust bank within test frame	=	measured parameter	-				
			[B] Minimum ratio of weighted misfire sum for multiple cylinder fault code	=	10.00061	%				
			and/or							
			Total weighted misfire counts for cylinder 4 within test frame	>=	[A] x [B]	-				
			where							
			[A] Total weighted misfire counts per exhaust bank within test frame	=	measured parameter	-				
			[B] Minimum ratio of weighted misfire sum for multiple cylinder fault code	=	10.00061	%				
			and/or							
			Total weighted misfire counts for cylinder 5 within test frame	>=	[A] x [B]	-				
			where							
			[A] Total weighted misfire counts per exhaust bank within test frame	=	measured parameter	-				
			[B] Minimum ratio of weighted misfire sum for multiple cylinder fault code	=	10.00061	%				
			and/or							
			Total weighted misfire counts for cylinder 6 within test frame	>=	[A] x [B]	-				
			where							
			[A] Total weighted misfire counts per exhaust bank within test frame	=	measured parameter	-				
			[B] Minimum ratio of weighted misfire sum for multiple cylinder fault code	=	10.00061	%				
			and/or							
			Total weighted misfire counts for cylinder 7 within test frame	>=	[A] x [B]	-				
			where							
			[A] Total weighted misfire counts per exhaust bank within test frame	=	measured parameter	-				
			[B] Minimum ratio of weighted misfire sum for multiple cylinder fault code	=	10.00061	%				
			and/or							
			Total weighted misfire counts for cylinder 8 within test frame	>=	[A] x [B]	-				
			where							
			[A] Total weighted misfire counts per exhaust bank within test frame	=	measured parameter	-				
			[B] Minimum ratio of weighted misfire sum for multiple cylinder fault code	=	10.00061	%				
			with							
			[One test frame defined by:							
			Total number of crankshaft revolutions in test frame for catalyst damaging misfire	=	200	revolutions				
			OR							
			Total number of crankshaft revolutions in first test frame after engine start for catalyst damaging misfire	=	[A] x [B]	revolutions				
			[A] Total number of crankshaft revolutions in test frame for catalyst damaging misfire	=	200	revolutions				
			[B] Test frame extension factor for first interval after engine start]	=	1	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Misfire	P0301	Indicates that the engine has experienced cylinder 1 misfiring, detected by a crankshaft angle delay that is too great, caused by a drop in the engine speed	Method 1: Angular acceleration of crankshaft in transmission grip state (clutch is engaged), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-4) OR	>	90 to 1050	rad/s^2	Engine speed	>=	350	rpm	see Fault Paths 1-3 below	
			Method 1: Angular acceleration of crankshaft in transmission slip state (clutch is slipping), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-10) OR	>	100 to 1050	rad/s^2	Engine speed	<=	6000	rpm		
							Engine coolant temperature at engine start	>	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in transmission open state (clutch is disengaged), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-7) OR	>	100 to 1050	rad/s^2	OR					
							[Engine coolant temperature at engine start	<	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in idle state, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-1) OR	>	95 to 180	rad/s^2	then monitoring enabled					
							Engine coolant temperature]	>	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in half-engine mode state, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-14) OR	>	66 to 2047.938	rad/s^2	Zero torque detection is not active	=	TRUE	-		
							means					
			Method 1: Angular acceleration of crankshaft in catalyst heating, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-15) OR	>	161 to 275	rad/s^2	[Normalized inner engine torque	>	[A] + [B] + [C]	%		
							OR					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission grip state (clutch is engaged), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system OR	>	2047.938	rad/s^2	Normalized inner engine torque	>	[D] + [B] + [C]	%		
							OR					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission slip state (clutch is slipping), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system OR	>	2047.938	rad/s^2	Normalized inner engine torque	>	[E] + [B] + [C]	%		
							OR					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission open state (clutch is disengaged), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system OR	>	2047.938	rad/s^2	Normalized inner engine torque	>	[F] + [B] + [C]	%		
							where					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in idle state, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system OR	>	2047.938	rad/s^2	[A] Threshold zero torque, driving state (see Look-Up Table #P0300-20)	=	5.32074 to 16.0797	%		
							[B] Map for zero torque correction, engine speed and altitude dependant (see Look-Up Table #P0300-26)	=	-1.66016 to 0	%		
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in half-engine mode state, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[C] Map for zero torque correction, engine speed and engine temperature dependant	=	0	%		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							[D] Threshold zero torque, idle state (see Look-Up Table #P0300-23)]	=	4.25720 to 6.52008	%		
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in catalyst heating, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[E] Threshold zero torque, half-engine mode state, driving (see Look-Up Table #P0300-24	=	2.00043 to 5.90057	%		
			OR				[F] Threshold zero torque, half-engine mode state, idle (see Look-Up Table #P0300-25	=	2.00043 to 5.90057	%		
			Method 3: Filtered angular acceleration of	>	[A]+[B]	rad/s^2	Overrun/fuel cut-off is not active	=	TRUE	-		
			where				(Combustion delay after engine start has completed	=	TRUE	-		
			[A] Base continuous misfire threshold in the transmission grip state	=	60 to 913	rad/s^2	means					
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2	[Engine speed	>	500	rpm		
			OR				for					
			Method 3: Filtered angular acceleration of crankshaft in transmission slip state (clutch is slipping), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-11)	>	[A]+[B]	rad/s^2	Number of combustions]	=	0	-		
			where				OR					
			[A] Base continuous misfire threshold in the transmission slip state	=	60 to 913	rad/s^2	[Engine has re-started (start-stop)	=	TRUE	-		
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2	means					
			OR				Number of combustions after re-start])	=	8	-		
			Method 3: Filtered angular acceleration of crankshaft in transmission open state (clutch is disengaged), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-8)	>	[A]+[B]	rad/s^2	Calculated EPM segment time is valid	=	TRUE	-		
			where				No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			[A] Base continuous misfire threshold in the transmission open state	=	90 to 913	rad/s^2	Basic enable conditions met	=	see sheet enable tables	-		
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in idle state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-2)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in the transmission idle state	=	105 to 135	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in half-engine mode state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-18)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in the half-engine mode state	=	60 to 2047.938	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in catalyst heating state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-19)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in catalyst heating state	=	200 to 335	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions	Time Required			MIL Illum.
		Fault Path 1: Emission relevant misfire rate within first 1000 crankshaft revolutions after engine start	Total misfire counts across all cylinders within first test frame outside of catalyst heating	>	69	-			1000	revs	once per drive cycle	2 Trip (with similar conditions healing)
			OR Total misfire counts across all cylinders within first test frame during catalyst heating	>	71	-						
			and/or Total misfire counts for cylinder 1 within test frame	>	[A] x [B]	-						
			where [A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for cylinder-individual fault code	=	12.5	%						
			with [One test frame defined by: Total number of crankshaft revolutions in first test frame specific to emission relevant misfire rate at engine start	=	1000	revolutions						
		Fault Path 2: Emission relevant misfire rate after the first 1000 crankshaft revolutions	Total misfire counts across all cylinders within test frame	>	71	-			4 intervals of 1000	revs	continuous	2 Trip (with similar conditions healing)
			and/or Total misfire counts for cylinder 1 within test frame	>	[A] x [B]	-						
			where [A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for cylinder-individual fault code	=	12.5	%						
			with [One test frame defined by: Total number of crankshaft revolutions in test frame for emission relevant misfire rate	=	1000	revolutions						
			Misfire test frame counter]	=	4	-						
		Fault Path 3: Catalyst damaging misfire rate	Weighted misfire counter for exhaust bank	>	2688	counts			immediately after catalyst damaging misfire rate is exceeded	-	continuous	1 Trip Blinking MIL (with similar conditions healing)
			OR Weighted misfire counter for exhaust bank during first interval after engine start	>	2688	counts						
			and/or Total weighted misfire counts for cylinder 1 within test frame	>=	[A] x [B]	-						
			where [A] Total weighted misfire counts per exhaust bank within test frame	=	measured parameter	-						
			[B] Minimum ratio of weighted misfire sum for cylinder-individual fault code	=	12.5	%						
			with [One test frame defined by: Total number of crankshaft revolutions in test frame for catalyst damaging misfire	=	200	revolutions						
			OR Total number of crankshaft revolutions in first test frame after engine start for catalyst damaging misfire	=	[A] x [B]	revolutions						
			[A] Total number of crankshaft revolutions in test frame for catalyst damaging misfire	=	200	revolutions						
			[B] Test frame extension factor for first interval after engine start]	=	1	-						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Misfire	P0302	Indicates that the engine has experienced cylinder 2 misfiring, detected by a crankshaft angle delay that is too great, caused by a drop in the engine speed	Method 1: Angular acceleration of crankshaft in transmission grip state (clutch is engaged), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-4)	>	90 to 1050	rad/s^2	Engine speed	>=	350	rpm	see Fault Paths 1-3 below	
			OR				Engine speed	<=	6000	rpm		
			Method 1: Angular acceleration of crankshaft in transmission slip state (clutch is slipping), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-10)	>	100 to 1050	rad/s^2						
			OR				Engine coolant temperature at engine start	>	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in transmission open state (clutch is disengaged), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-7)	>	100 to 1050	rad/s^2	OR					
			OR				[Engine coolant temperature at engine start	<	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in idle state, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-1)	>	95 to 180	rad/s^2	then monitoring enabled					
			OR				Engine coolant temperature]	>	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in half-engine mode state, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-14)	>	66 to 2047.938	rad/s^2	Zero torque detection is not active	=	TRUE	-		
			OR				means					
			Method 1: Angular acceleration of crankshaft in catalyst heating, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-15)	>	161 to 275	rad/s^2	[Normalized inner engine torque	>	[A] + [B] + [C]	%		
			OR				OR					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission grip state (clutch is engaged), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	Normalized inner engine torque	>	[D] + [B] + [C]	%		
			OR				OR					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission slip state (clutch is slipping), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	Normalized inner engine torque	>	[E] + [B] + [C]	%		
			OR				OR					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission open state (clutch is disengaged), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	Normalized inner engine torque	>	[F] + [B] + [C]	%		
			OR				where					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in idle state, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[A] Threshold zero torque, driving state (see Look-Up Table #P0300-20)	=	5.32074 to 16.0797	%		
			OR				[B] Map for zero torque correction, engine speed and altitude dependant (see Look-Up Table #P0300-26)	=	-1.66016 to 0	%		
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in half-engine mode state, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[C] Map for zero torque correction, engine speed and engine temperature dependant	=	0	%		
							[D] Threshold zero torque, idle state (see Look-Up Table #P0300-23)]	=	4.25720 to 6.52008	%		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in catalyst heating, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[E] Threshold zero torque, half-engine mode state, driving (see Look-Up Table #P0300-24	=	2.00043 to 5.90057	%		
			OR				[F] Threshold zero torque, half-engine mode state, idle (see Look-Up Table #P0300-25	=	2.00043 to 5.90057	%		
			Method 3: Filtered angular acceleration of crankshaft in transmission grip state (clutch is engaged), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-5)	>	[A]+[B]	rad/s^2	Overrun/fuel cut-off is not active	=	TRUE	-		
			where				(Combustion delay after engine start has completed	=	TRUE	-		
			[A] Base continuous misfire threshold in the transmission grip state	=	60 to 913	rad/s^2	means					
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2	[Engine speed	>	500	rpm		
			OR				for					
			Method 3: Filtered angular acceleration of crankshaft in transmission slip state (clutch is slipping), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-11)	>	[A]+[B]	rad/s^2	Number of combustions]	=	0	-		
			where				OR					
			[A] Base continuous misfire threshold in the transmission slip state	=	60 to 913	rad/s^2	[Engine has re-started (start-stop)	=	TRUE	-		
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2	means					
			OR				Number of combustions after re-start])	=	8	-		
			Method 3: Filtered angular acceleration of crankshaft in transmission open state (clutch is disengaged), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-8)	>	[A]+[B]	rad/s^2	Calculated EPM segment time is valid	=	TRUE	-		
			where				No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			[A] Base continuous misfire threshold in the transmission open state	=	90 to 913	rad/s^2	Basic enable conditions met	=	see sheet enable tables	-		
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in idle state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-2)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in the transmission idle state	=	105 to 135	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in half-engine mode state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-18)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in the half-engine mode state	=	60 to 2047.938	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in catalyst heating state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-19)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in catalyst heating state	=	200 to 335	rad/s^2						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions	Time Required			MIL Illum.
			[B] Smallest (negative) angular acceleration value	=	measured parameter	rad/s^2						
		Fault Path 1: Emission relevant misfire rate within first 1000 crankshaft revolutions after engine start	Total misfire counts across all cylinders within first test frame outside of catalyst heating	>	69	-			1000	revs	once per drive cycle	2 Trip (with similar
			OR									
			Total misfire counts across all cylinders within first test frame during catalyst heating	>	71	-						
			and/or									
			Total misfire counts for cylinder 1 within test frame	>	[A] x [B]	-						
			where									
			[A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for cylinder-individual fault code	=	12.5	%						
			with									
			[One test frame defined by:									
			Total number of crankshaft revolutions in first test frame specific to emission relevant misfire rate at engine start	=	1000	revolutions						
		Fault Path 2: Emission relevant misfire rate after the first 1000 crankshaft revolutions	Total misfire counts across all cylinders within test frame	>	71	-			4 intervals of 1000	revs	continuous	2 Trip (with similar conditions healing)
			and/or									
			Total misfire counts for cylinder 1 within test frame	>	[A] x [B]	-						
			where									
			[A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for cylinder-individual fault code	=	12.5	%						
			with									
			[One test frame defined by:									
			Total number of crankshaft revolutions in test frame for emission relevant misfire rate	=	1000	revolutions						
			Misfire test frame counter]	=	4	-						
		Fault Path 3: Catalyst damaging misfire rate	Weighted misfire counter for exhaust bank	>	2688	counts			immediately after catalyst damaging misfire rate is exceeded	-	continuous	1 Trip Blinking MIL (with similar conditions healing)
			OR									
			Weighted misfire counter for exhaust bank during first interval after engine start	>	2688	counts						
			and/or									
			Total weighted misfire counts for cylinder 1 within test frame	>=	[A] x [B]	-						
			where									
			[A] Total weighted misfire counts per exhaust bank within test frame	=	measured parameter	-						
			[B] Minimum ratio of weighted misfire sum for cylinder-individual fault code	=	12.5	%						
			with									
			[One test frame defined by:									
			Total number of crankshaft revolutions in test frame for catalyst damaging misfire	=	200	revolutions						
			OR									
			Total number of crankshaft revolutions in first test frame after engine start for catalyst damaging misfire	=	[A] x [B]	revolutions						
			[A] Total number of crankshaft revolutions in test frame for catalyst damaging misfire	=	200	revolutions						
			[B] Test frame extension factor for first interval after engine start]	=	1	-						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Misfire	P0303	Indicates that the engine has experienced cylinder 3 misfiring, detected by a crankshaft angle delay that is too great, caused by a drop in the engine speed	Method 1: Angular acceleration of crankshaft in transmission grip state (clutch is engaged), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-4) OR	>	90 to 1050	rad/s^2	Engine speed	>=	350	rpm	see Fault Paths 1-3 below	
							Engine speed	<=	6000	rpm		
			Method 1: Angular acceleration of crankshaft in transmission slip state (clutch is slipping), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-10) OR	>	100 to 1050	rad/s^2	Engine coolant temperature at engine start	>	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in transmission open state (clutch is disengaged), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-7) OR	>	100 to 1050	rad/s^2	OR					
							[Engine coolant temperature at engine start	<	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in idle state, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-1) OR	>	95 to 180	rad/s^2	then monitoring enabled					
							Engine coolant temperature]	>	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in half-engine mode state, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-14) OR	>	66 to 2047.938	rad/s^2	Zero torque detection is not active	=	TRUE	-		
							means					
			Method 1: Angular acceleration of crankshaft in catalyst heating, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-15) OR	>	161 to 275	rad/s^2	[Normalized inner engine torque	>	[A] + [B] + [C]	%		
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission grip state (clutch is engaged), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system OR	>	2047.938	rad/s^2	OR Normalized inner engine torque	>	[D] + [B] + [C]	%		
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission slip state (clutch is slipping), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system OR	>	2047.938	rad/s^2	OR Normalized inner engine torque	>	[E] + [B] + [C]	%		
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission open state (clutch is disengaged), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system OR	>	2047.938	rad/s^2	OR Normalized inner engine torque	>	[F] + [B] + [C]	%		
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in idle state, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system OR	>	2047.938	rad/s^2	where [A] Threshold zero torque, driving state (see Look-Up Table #P0300-20)	=	5.32074 to 16.0797	%		
							[B] Map for zero torque correction, engine speed and altitude dependant (see Look-Up Table #P0300-26)	=	-1.66016 to 0	%		
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in half-engine mode state, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[C] Map for zero torque correction, engine speed and engine temperature dependant	=	0	%		
							[D] Threshold zero torque, idle state (see Look-Up Table #P0300-23)]	=	4.25720 to 6.52008	%		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in catalyst heating, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[E] Threshold zero torque, half-engine mode state, driving (see Look-Up Table #P0300-24	=	2.00043 to 5.90057	%		
			OR				[F] Threshold zero torque, half-engine mode state, idle (see Look-Up Table #P0300-25	=	2.00043 to 5.90057	%		
			Method 3: Filtered angular acceleration of crankshaft in transmission grip state (clutch is engaged), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-5)	>	[A]+[B]	rad/s^2	Overrun/fuel cut-off is not active	=	TRUE	-		
			where				(Combustion delay after engine start has completed means	=	TRUE	-		
			[A] Base continuous misfire threshold in the transmission grip state	=	60 to 913	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2	[Engine speed	>	500	rpm		
			OR				for					
			Method 3: Filtered angular acceleration of crankshaft in transmission slip state (clutch is slipping), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-11)	>	[A]+[B]	rad/s^2	Number of combustions]	=	0	-		
			where				OR					
			[A] Base continuous misfire threshold in the transmission slip state	=	60 to 913	rad/s^2	[Engine has re-started (start-stop)	=	TRUE	-		
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2	means					
			OR				Number of combustions after re-start])	=	8	-		
			Method 3: Filtered angular acceleration of crankshaft in transmission open state (clutch is disengaged), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-8)	>	[A]+[B]	rad/s^2	Calculated EPM segment time is valid	=	TRUE	-		
			where				No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			[A] Base continuous misfire threshold in the transmission open state	=	90 to 913	rad/s^2	Basic enable conditions met	=	see sheet enable tables	-		
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in idle state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-2)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in the transmission idle state	=	105 to 135	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in half-engine mode state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-18)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in the half-engine mode state	=	60 to 2047.938	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in catalyst heating state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-19)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in catalyst heating state	=	200 to 335	rad/s^2						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions	Time Required			MIL Illum.
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
		Fault Path 1: Emission relevant misfire rate within first 1000 crankshaft revolutions after engine start	Total misfire counts across all cylinders within first test frame outside of catalyst heating	>	69	-			1000	revs	once per drive cycle	2 Trip (with similar conditions healing)
			OR									
			Total misfire counts across all cylinders within first test frame during catalyst heating	>	71	-						
			and/or									
			Total misfire counts for cylinder 1 within test frame	>	[A] x [B]	-						
			where									
			[A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for cylinder-individual fault code	=	12.5	%						
			with									
			[One test frame defined by:									
			Total number of crankshaft revolutions in first test frame specific to emission relevant misfire rate at engine start	=	1000	revolutions						
		Fault Path 2: Emission relevant misfire rate after the first 1000 crankshaft revolutions	Total misfire counts across all cylinders within test frame	>	71	-			4 intervals of 1000	revs	continuous	2 Trip (with similar conditions healing)
			and/or									
			Total misfire counts for cylinder 1 within test frame	>	[A] x [B]	-						
			where									
			[A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for cylinder-individual fault code	=	12.5	%						
			with									
			[One test frame defined by:									
			Total number of crankshaft revolutions in test frame for emission relevant misfire rate	=	1000	revolutions						
			Misfire test frame counter]	=	4	-						
		Fault Path 3: Catalyst damaging misfire rate	Weighted misfire counter for exhaust bank	>	2688	counts			immediately after catalyst damaging misfire rate is exceeded	-	continuous	1 Trip Blinking MIL (with similar conditions healing)
			OR									
			Weighted misfire counter for exhaust bank during first interval after engine start	>	2688	counts						
			and/or									
			Total weighted misfire counts for cylinder 1 within test frame	>=	[A] x [B]	-						
			where									
			[A] Total weighted misfire counts per exhaust bank within test frame	=	measured parameter	-						
			[B] Minimum ratio of weighted misfire sum for cylinder-individual fault code	=	12.5	%						
			with									
			[One test frame defined by:									
			Total number of crankshaft revolutions in test frame for catalyst damaging misfire	=	200	revolutions						
			OR									
			Total number of crankshaft revolutions in first test frame after engine start for catalyst damaging misfire	=	[A] x [B]	revolutions						
			[A] Total number of crankshaft revolutions in test frame for catalyst damaging misfire	=	200	revolutions						
			[B] Test frame extension factor for first interval after engine start]	=	1	-						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Misfire	P0304	Indicates that the engine has experienced cylinder 4 misfiring, detected by a crankshaft angle delay that is too great, caused by a drop in the engine speed	Method 1: Angular acceleration of crankshaft in transmission grip state (clutch is engaged), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-4)	>	90 to 1050	rad/s^2	Engine speed	>=	350	rpm	see Fault Paths 1-3 below	
			OR				Engine speed	<=	6000	rpm		
			Method 1: Angular acceleration of crankshaft in transmission slip state (clutch is slipping), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-10)	>	100 to 1050	rad/s^2						
			OR				Engine coolant temperature at engine start	>	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in transmission open state (clutch is disengaged), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-7)	>	100 to 1050	rad/s^2	OR					
			OR				[Engine coolant temperature at engine start	<	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in idle state, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-1)	>	95 to 180	rad/s^2	then monitoring enabled					
			OR				Engine coolant temperature]	>	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in half-engine mode state, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-14)	>	66 to 2047.938	rad/s^2	Zero torque detection is not active	=	TRUE	-		
			OR				means					
			Method 1: Angular acceleration of crankshaft in catalyst heating, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-15)	>	161 to 275	rad/s^2	[Normalized inner engine torque	>	[A] + [B] + [C]	%		
			OR				OR					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission grip state (clutch is engaged), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	Normalized inner engine torque	>	[D] + [B] + [C]	%		
			OR				OR					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission slip state (clutch is slipping), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	Normalized inner engine torque	>	[E] + [B] + [C]	%		
			OR				OR					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission open state (clutch is disengaged), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	Normalized inner engine torque	>	[F] + [B] + [C]	%		
			OR				where					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in idle state, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[A] Threshold zero torque, driving state (see Look-Up Table #P0300-20)	=	5.32074 to 16.0797	%		
			OR				[B] Map for zero torque correction, engine speed and altitude dependant (see Look-Up Table #P0300-26)	=	-1.66016 to 0	%		
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in half-engine mode state, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[C] Map for zero torque correction, engine speed and engine temperature dependant	=	0	%		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							[D] Threshold zero torque, idle state (see Look-Up Table #P0300-23)]	=	4.25720 to 6.52008	%		
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in catalyst heating, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[E] Threshold zero torque, half-engine mode state, driving (see Look-Up Table #P0300-24	=	2.00043 to 5.90057	%		
			OR				[F] Threshold zero torque, half-engine mode state, idle (see Look-Up Table #P0300-25	=	2.00043 to 5.90057	%		
			Method 3: Filtered angular acceleration of crankshaft in transmission grip state (clutch is engaged), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-5)	>	[A]+[B]	rad/s^2	Overrun/fuel cut-off is not active	=	TRUE	-		
			where				(Combustion delay after engine start has completed	=	TRUE	-		
			[A] Base continuous misfire threshold in the transmission grip state	=	60 to 913	rad/s^2	means					
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2	[Engine speed	>	500	rpm		
			OR				for					
			Method 3: Filtered angular acceleration of crankshaft in transmission slip state (clutch is slipping), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-11)	>	[A]+[B]	rad/s^2	Number of combustions]	=	0	-		
			where				OR					
			[A] Base continuous misfire threshold in the transmission slip state	=	60 to 913	rad/s^2	[Engine has re-started (start-stop)	=	TRUE	-		
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2	means					
			OR				Number of combustions after re-start])	=	8	-		
			Method 3: Filtered angular acceleration of crankshaft in transmission open state (clutch is disengaged), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-8)	>	[A]+[B]	rad/s^2	Calculated EPM segment time is valid	=	TRUE	-		
			where				No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			[A] Base continuous misfire threshold in the transmission open state	=	90 to 913	rad/s^2	Basic enable conditions met	=	see sheet enable tables	-		
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in idle state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-2)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in the transmission idle state	=	105 to 135	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in half-engine mode state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-18)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in the half-engine mode state	=	60 to 2047.938	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in catalyst heating state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-19)	>	[A]+[B]	rad/s^2						
			where									

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions	Time Required			MIL Illum.
			[A] Base continuous misfire threshold in catalyst heating state	=	200 to 335	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
		Fault Path 1: Emission relevant misfire rate within first 1000 crankshaft revolutions after engine start	Total misfire counts across all cylinders within first test frame outside of catalyst heating	>	69	-			1000	revs	once per drive cycle	2 Trip (with similar conditions healing)
			OR Total misfire counts across all cylinders within first test frame during catalyst heating	>	71	-						
			and/or Total misfire counts for cylinder 1 within test frame	>	[A] x [B]	-						
			where [A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for cylinder-individual fault code	=	12.5	%						
			with [One test frame defined by: Total number of crankshaft revolutions in first test frame specific to emission relevant misfire rate at engine start	=	1000	revolutions						
		Fault Path 2: Emission relevant misfire rate after the first 1000 crankshaft revolutions	Total misfire counts across all cylinders within test frame	>	71	-			4 intervals of 1000	revs	continuous	2 Trip (with similar conditions healing)
			and/or Total misfire counts for cylinder 1 within test frame	>	[A] x [B]	-						
			where [A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for cylinder-individual fault code	=	12.5	%						
			with [One test frame defined by: Total number of crankshaft revolutions in test frame for emission relevant misfire rate	=	1000	revolutions						
			Misfire test frame counter]	=	4	-						
		Fault Path 3: Catalyst damaging misfire rate	Weighted misfire counter for exhaust bank	>	2688	counts			immediately after catalyst damaging misfire rate is exceeded	-	continuous	1 Trip Blinking MIL (with similar conditions healing)
			OR Weighted misfire counter for exhaust bank during first interval after engine start	>	2688	counts						
			and/or Total weighted misfire counts for cylinder 1 within test frame	>=	[A] x [B]	-						
			where [A] Total weighted misfire counts per exhaust bank within test frame	=	measured parameter	-						
			[B] Minimum ratio of weighted misfire sum for cylinder-individual fault code	=	12.5	%						
			with [One test frame defined by: Total number of crankshaft revolutions in test frame for catalyst damaging misfire	=	200	revolutions						
			OR Total number of crankshaft revolutions in first test frame after engine start for catalyst damaging misfire	=	[A] x [B]	revolutions						
			[A] Total number of crankshaft revolutions in test frame for catalyst damaging misfire	=	200	revolutions						
			[B] Test frame extension factor for first interval after engine start]	=	1	-						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Misfire	P0305	Indicates that the engine has experienced cylinder 5 misfiring, detected by a crankshaft angle delay that is too great, caused by a drop in the engine speed	Method 1: Angular acceleration of crankshaft in transmission grip state (clutch is engaged), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-4)	>	90 to 1050	rad/s^2	Engine speed	>=	350	rpm	see Fault Paths 1-3 below	
			OR				Engine speed	<=	6000	rpm		
			Method 1: Angular acceleration of crankshaft in transmission slip state (clutch is slipping), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-10)	>	100 to 1050	rad/s^2						
			OR				Engine coolant temperature at engine start	>	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in transmission open state (clutch is disengaged), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-7)	>	100 to 1050	rad/s^2	OR					
			OR				[Engine coolant temperature at engine start	<	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in idle state, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-1)	>	95 to 180	rad/s^2	then monitoring enabled					
			OR				Engine coolant temperature]	>	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in half-engine mode state, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-14)	>	66 to 2047.938	rad/s^2	Zero torque detection is not active	=	TRUE	-		
			OR				means					
			Method 1: Angular acceleration of crankshaft in catalyst heating, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-15)	>	161 to 275	rad/s^2	[Normalized inner engine torque	>	[A] + [B] + [C]	%		
			OR				OR					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission grip state (clutch is engaged), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	Normalized inner engine torque	>	[D] + [B] + [C]	%		
			OR				OR					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission slip state (clutch is slipping), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	Normalized inner engine torque	>	[E] + [B] + [C]	%		
			OR				OR					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission open state (clutch is disengaged), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	Normalized inner engine torque	>	[F] + [B] + [C]	%		
			OR				where					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in idle state, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[A] Threshold zero torque, driving state (see Look-Up Table #P0300-20)	=	5.32074 to 16.0797	%		
			OR				[B] Map for zero torque correction, engine speed and altitude dependant (see Look-Up Table #P0300-26)	=	-1.66016 to 0	%		
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in half-engine mode state, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[C] Map for zero torque correction, engine speed and engine temperature dependant	=	0	%		
							[D] Threshold zero torque, idle state (see Look-Up Table #P0300-23)	=	4.25720 to 6.52008	%		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in catalyst heating, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[E] Threshold zero torque, half-engine mode state, driving (see Look-Up Table #P0300-24	=	2.00043 to 5.90057	%		
			OR				[F] Threshold zero torque, half-engine mode state, idle (see Look-Up Table #P0300-25	=	2.00043 to 5.90057	%		
			Method 3: Filtered angular acceleration of crankshaft in transmission grip state (clutch is engaged), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-5)	>	[A]+[B]	rad/s^2	Overrun/fuel cut-off is not active	=	TRUE	-		
			where				(Combustion delay after engine start has completed	=	TRUE	-		
			[A] Base continuous misfire threshold in the transmission grip state	=	60 to 913	rad/s^2	means					
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2	[Engine speed	>	500	rpm		
			OR				for					
			Method 3: Filtered angular acceleration of crankshaft in transmission slip state (clutch is slipping), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-11)	>	[A]+[B]	rad/s^2	Number of combustions]	=	0	-		
			where				OR					
			[A] Base continuous misfire threshold in the transmission slip state	=	60 to 913	rad/s^2	[Engine has re-started (start-stop)	=	TRUE	-		
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2	means					
			OR				Number of combustions after re-start])	=	8	-		
			Method 3: Filtered angular acceleration of crankshaft in transmission open state (clutch is disengaged), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-8)	>	[A]+[B]	rad/s^2	Calculated EPM segment time is valid	=	TRUE	-		
			where				No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			[A] Base continuous misfire threshold in the transmission open state	=	90 to 913	rad/s^2	Basic enable conditions met	=	see sheet enable tables	-		
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in idle state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-2)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in the transmission idle state	=	105 to 135	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in half-engine mode state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-18)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in the half-engine mode state	=	60 to 2047.938	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in catalyst heating state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-19)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in catalyst heating state	=	200 to 335	rad/s^2						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	= measured parameter rad/s^2				
		Fault Path 1: Emission relevant misfire rate within first 1000 crankshaft revolutions after engine start	Total misfire counts across all cylinders within first test frame outside of catalyst heating	> 69 -			1000 revs once per drive cycle	2 Trip (with similar conditions healing)
			OR Total misfire counts across all cylinders within first test frame during catalyst heating	> 71 -				
			and/or Total misfire counts for cylinder 1 within test frame	> [A] x [B] -				
			where [A] Total misfire counts across all cylinders within test frame	= measured parameter -				
			[B] Minimum ratio of misfire sum for cylinder-individual fault code	= 12.5 %				
			with [One test frame defined by: Total number of crankshaft revolutions in first test frame specific to emission relevant misfire rate at engine start	= 1000 revolutions				
		Fault Path 2: Emission relevant misfire rate after the first 1000 crankshaft revolutions	Total misfire counts across all cylinders within test frame	> 71 -			4 intervals of 1000 revs continuous	2 Trip (with similar conditions healing)
			and/or Total misfire counts for cylinder 1 within test frame	> [A] x [B] -				
			where [A] Total misfire counts across all cylinders within test frame	= measured parameter -				
			[B] Minimum ratio of misfire sum for cylinder-individual fault code	= 12.5 %				
			with [One test frame defined by: Total number of crankshaft revolutions in test frame for emission relevant misfire rate	= 1000 revolutions				
			Misfire test frame counter]	= 4 -				
		Fault Path 3: Catalyst damaging misfire rate	Weighted misfire counter for exhaust bank	> 2688 counts			immediately after catalyst damaging misfire rate is exceeded - continuous	1 Trip Blinking MIL (with similar conditions healing)
			OR Weighted misfire counter for exhaust bank during first interval after engine start	> 2688 counts				
			and/or Total weighted misfire counts for cylinder 1 within test frame	>= [A] x [B] -				
			where [A] Total weighted misfire counts per exhaust bank within test frame	= measured parameter -				
			[B] Minimum ratio of weighted misfire sum for cylinder-individual fault code	= 12.5 %				
			with [One test frame defined by: Total number of crankshaft revolutions in test frame for catalyst damaging misfire	= 200 revolutions				
			OR Total number of crankshaft revolutions in first test frame after engine start for catalyst damaging misfire	= [A] x [B] revolutions				
			[A] Total number of crankshaft revolutions in test frame for catalyst damaging misfire	= 200 revolutions				
			[B] Test frame extension factor for first interval after engine start]	= 1 -				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Misfire	P0306	Indicates that the engine has experienced cylinder 6 misfiring, detected by a crankshaft angle delay that is too great, caused by a drop in the engine speed	Method 1: Angular acceleration of crankshaft in transmission grip state (clutch is engaged), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-4)	>	90 to 1050	rad/s^2	Engine speed	>=	350	rpm	see Fault Paths 1-3 below	
			OR				Engine speed	<=	6000	rpm		
			Method 1: Angular acceleration of crankshaft in transmission slip state (clutch is slipping), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-10)	>	100 to 1050	rad/s^2						
			OR				Engine coolant temperature at engine start	>	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in transmission open state (clutch is disengaged), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-7)	>	100 to 1050	rad/s^2	OR					
			OR				[Engine coolant temperature at engine start	<	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in idle state, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-1)	>	95 to 180	rad/s^2	then monitoring enabled					
			OR				Engine coolant temperature]	>	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in half-engine mode state, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-14)	>	66 to 2047.938	rad/s^2	Zero torque detection is not active	=	TRUE	-		
			OR				means					
			Method 1: Angular acceleration of crankshaft in catalyst heating, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-15)	>	161 to 275	rad/s^2	[Normalized inner engine torque	>	[A] + [B] + [C]	%		
			OR				OR					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission grip state (clutch is engaged), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	Normalized inner engine torque	>	[D] + [B] + [C]	%		
			OR				OR					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission slip state (clutch is slipping), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	Normalized inner engine torque	>	[E] + [B] + [C]	%		
			OR				OR					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission open state (clutch is disengaged), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	Normalized inner engine torque	>	[F] + [B] + [C]	%		
			OR				where					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in idle state, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[A] Threshold zero torque, driving state (see Look-Up Table #P0300-20)	=	5.32074 to 16.0797	%		
			OR				[B] Map for zero torque correction, engine speed and altitude dependant (see Look-Up Table #P0300-26)	=	-1.66016 to 0	%		
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in half-engine mode state, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[C] Map for zero torque correction, engine speed and engine temperature dependant	=	0	%		
							[D] Threshold zero torque, idle state (see Look-Up Table #P0300-23)	=	4.25720 to 6.52008	%		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in catalyst heating, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[E] Threshold zero torque, half-engine mode state, driving (see Look-Up Table #P0300-24	=	2.00043 to 5.90057	%		
			OR				[F] Threshold zero torque, half-engine mode state, idle (see Look-Up Table #P0300-25	=	2.00043 to 5.90057	%		
			Method 3: Filtered angular acceleration of crankshaft in transmission grip state (clutch is engaged), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-5)	>	[A]+[B]	rad/s^2	Overrun/fuel cut-off is not active	=	TRUE	-		
			where				(Combustion delay after engine start has completed means	=	TRUE	-		
			[A] Base continuous misfire threshold in the transmission grip state	=	60 to 913	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2	[Engine speed	>	500	rpm		
			OR				for					
			Method 3: Filtered angular acceleration of crankshaft in transmission slip state (clutch is slipping), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-11)	>	[A]+[B]	rad/s^2	Number of combustions]	=	0	-		
			where				OR					
			[A] Base continuous misfire threshold in the transmission slip state	=	60 to 913	rad/s^2	[Engine has re-started (start-stop)	=	TRUE	-		
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2	means					
			OR				Number of combustions after re-start])	=	8	-		
			Method 3: Filtered angular acceleration of crankshaft in transmission open state (clutch is disengaged), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-8)	>	[A]+[B]	rad/s^2	Calculated EPM segment time is valid	=	TRUE	-		
			where				No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			[A] Base continuous misfire threshold in the transmission open state	=	90 to 913	rad/s^2	Basic enable conditions met	=	see sheet enable tables	-		
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in idle state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-2)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in the transmission idle state	=	105 to 135	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in half-engine mode state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-18)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in the half-engine mode state	=	60 to 2047.938	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in catalyst heating state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-19)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in catalyst heating state	=	200 to 335	rad/s^2						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions	Time Required			MIL Illum.
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
		Fault Path 1: Emission relevant misfire rate within first 1000 crankshaft revolutions after engine start	Total misfire counts across all cylinders within first test frame outside of catalyst heating	>	69	-			1000	revs	once per drive cycle	2 Trip (with similar conditions healing)
			OR									
			Total misfire counts across all cylinders within first test frame during catalyst heating	>	71	-						
			and/or									
			Total misfire counts for cylinder 1 within test frame	>	[A] x [B]	-						
			where									
			[A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for cylinder-individual fault code	=	12.5	%						
			with									
			[One test frame defined by:									
			Total number of crankshaft revolutions in first test frame specific to emission relevant misfire rate at engine start]	=	1000	revolutions						
		Fault Path 2: Emission relevant misfire rate after the first 1000 crankshaft revolutions	Total misfire counts across all cylinders within test frame	>	71	-			4 intervals of 1000	revs	continuous	2 Trip (with similar conditions healing)
			and/or									
			Total misfire counts for cylinder 1 within test frame	>	[A] x [B]	-						
			where									
			[A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for cylinder-individual fault code	=	12.5	%						
			with									
			[One test frame defined by:									
			Total number of crankshaft revolutions in test frame for emission relevant misfire rate	=	1000	revolutions						
			Misfire test frame counter]	=	4	-						
		Fault Path 3: Catalyst damaging misfire rate	Weighted misfire counter for exhaust bank	>	2688	counts			immediately after catalyst damaging misfire rate is exceeded	-	continuous	1 Trip Blinking MIL (with similar conditions healing)
			OR									
			Weighted misfire counter for exhaust bank during first interval after engine start	>	2688	counts						
			and/or									
			Total weighted misfire counts for cylinder 1 within test frame	>=	[A] x [B]	-						
			where									
			[A] Total weighted misfire counts per exhaust bank within test frame	=	measured parameter	-						
			[B] Minimum ratio of weighted misfire sum for cylinder-individual fault code	=	12.5	%						
			with									
			[One test frame defined by:									
			Total number of crankshaft revolutions in test frame for catalyst damaging misfire	=	200	revolutions						
			OR									
			Total number of crankshaft revolutions in first test frame after engine start for catalyst damaging misfire	=	[A] x [B]	revolutions						
			[A] Total number of crankshaft revolutions in test frame for catalyst damaging misfire	=	200	revolutions						
			[B] Test frame extension factor for first interval after engine start]	=	1	-						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Misfire	P0307	Indicates that the engine has experienced cylinder 7 misfiring, detected by a crankshaft angle delay that is too great, caused by a drop in the engine speed	Method 1: Angular acceleration of crankshaft in transmission grip state (clutch is engaged), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-4)	>	90 to 1050	rad/s^2	Engine speed	>=	350	rpm	see Fault Paths 1-3 below	
			OR				Engine speed	<=	6000	rpm		
			Method 1: Angular acceleration of crankshaft in transmission slip state (clutch is slipping), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-10)	>	100 to 1050	rad/s^2						
			OR				Engine coolant temperature at engine start	>	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in transmission open state (clutch is disengaged), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-7)	>	100 to 1050	rad/s^2	OR					
			OR				[Engine coolant temperature at engine start	<	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in idle state, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-1)	>	95 to 180	rad/s^2	then monitoring enabled					
			OR				Engine coolant temperature]	>	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in half-engine mode state, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-14)	>	66 to 2047.938	rad/s^2	Zero torque detection is not active	=	TRUE	-		
			OR				means					
			Method 1: Angular acceleration of crankshaft in catalyst heating, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-15)	>	161 to 275	rad/s^2	[Normalized inner engine torque	>	[A] + [B] + [C]	%		
			OR				OR					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission grip state (clutch is engaged), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	Normalized inner engine torque	>	[D] + [B] + [C]	%		
			OR				OR					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission slip state (clutch is slipping), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	Normalized inner engine torque	>	[E] + [B] + [C]	%		
			OR				OR					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission open state (clutch is disengaged), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	Normalized inner engine torque	>	[F] + [B] + [C]	%		
			OR				where					
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in idle state, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[A] Threshold zero torque, driving state (see Look-Up Table #P0300-20)	=	5.32074 to 16.0797	%		
			OR				[B] Map for zero torque correction, engine speed and altitude dependant (see Look-Up Table #P0300-26)	=	-1.66016 to 0	%		
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in half-engine mode state, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[C] Map for zero torque correction, engine speed and engine temperature dependant	=	0	%		
							[D] Threshold zero torque, idle state (see Look-Up Table #P0300-23)]	=	4.25720 to 6.52008	%		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in catalyst heating, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[E] Threshold zero torque, half-engine mode state, driving (see Look-Up Table #P0300-24	=	2.00043 to 5.90057	%		
			OR				[F] Threshold zero torque, half-engine mode state, idle (see Look-Up Table #P0300-25	=	2.00043 to 5.90057	%		
			Method 3: Filtered angular acceleration of crankshaft in transmission grip state (clutch is engaged), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-5)	>	[A]+[B]	rad/s^2	Overrun/fuel cut-off is not active	=	TRUE	-		
			where				(Combustion delay after engine start has completed means	=	TRUE	-		
			[A] Base continuous misfire threshold in the transmission grip state	=	60 to 913	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2	[Engine speed	>	500	rpm		
			OR				for					
			Method 3: Filtered angular acceleration of crankshaft in transmission slip state (clutch is slipping), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-11)	>	[A]+[B]	rad/s^2	Number of combustions]	=	0	-		
			where				OR					
			[A] Base continuous misfire threshold in the transmission slip state	=	60 to 913	rad/s^2	[Engine has re-started (start-stop)	=	TRUE	-		
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2	means					
			OR				Number of combustions after re-start])	=	8	-		
			Method 3: Filtered angular acceleration of crankshaft in transmission open state (clutch is disengaged), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-8)	>	[A]+[B]	rad/s^2	Calculated EPM segment time is valid	=	TRUE	-		
			where				No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			[A] Base continuous misfire threshold in the transmission open state	=	90 to 913	rad/s^2	Basic enable conditions met	=	see sheet enable tables	-		
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in idle state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-2)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in the transmission idle state	=	105 to 135	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in half-engine mode state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-18)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in the half-engine mode state	=	60 to 2047.938	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in catalyst heating state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-19)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in catalyst heating state	=	200 to 335	rad/s^2						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	= measured parameter rad/s^2				
		Fault Path 1: Emission relevant misfire rate within first 1000 crankshaft revolutions after engine start	Total misfire counts across all cylinders within first test frame outside of catalyst heating	> 69 -			1000 revs once per drive cycle	2 Trip (with similar conditions healing)
			OR					
			Total misfire counts across all cylinders within first test frame during catalyst heating	> 71 -				
			and/or					
			Total misfire counts for cylinder 1 within test frame	> [A] x [B] -				
			where					
			[A] Total misfire counts across all cylinders within test frame	= measured parameter -				
			[B] Minimum ratio of misfire sum for cylinder-individual fault code	= 12.5 %				
			with					
			[One test frame defined by:					
			Total number of crankshaft revolutions in first test frame specific to emission relevant misfire rate at engine start]	= 1000 revolutions				
		Fault Path 2: Emission relevant misfire rate after the first 1000 crankshaft revolutions	Total misfire counts across all cylinders within test frame	> 71 -			4 intervals of 1000 revs continuous	2 Trip (with similar conditions healing)
			and/or					
			Total misfire counts for cylinder 1 within test frame	> [A] x [B] -				
			where					
			[A] Total misfire counts across all cylinders within test frame	= measured parameter -				
			[B] Minimum ratio of misfire sum for cylinder-individual fault code	= 12.5 %				
			with					
			[One test frame defined by:					
			Total number of crankshaft revolutions in test frame for emission relevant misfire rate	= 1000 revolutions				
			Misfire test frame counter]	= 4 -				
		Fault Path 3: Catalyst damaging misfire rate	Weighted misfire counter for exhaust bank	> 2688 counts			immediately after catalyst damaging misfire rate is exceeded - continuous	1 Trip Blinking MIL (with similar conditions healing)
			OR					
			Weighted misfire counter for exhaust bank during first interval after engine start	> 2688 counts				
			and/or					
			Total weighted misfire counts for cylinder 1 within test frame	>= [A] x [B] -				
			where					
			[A] Total weighted misfire counts per exhaust bank within test frame	= measured parameter -				
			[B] Minimum ratio of weighted misfire sum for cylinder-individual fault code	= 12.5 %				
			with					
			[One test frame defined by:					
			Total number of crankshaft revolutions in test frame for catalyst damaging misfire	= 200 revolutions				
			OR					
			Total number of crankshaft revolutions in first test frame after engine start for catalyst damaging misfire	= [A] x [B] revolutions				
			[A] Total number of crankshaft revolutions in test frame for catalyst damaging misfire	= 200 revolutions				
			[B] Test frame extension factor for first interval after engine start]	= 1 -				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Misfire	P0308	Indicates that the engine has experienced cylinder 8 misfiring, detected by a crankshaft angle delay that is too great, caused by a drop in the engine speed	Method 1: Angular acceleration of crankshaft in transmission grip state (clutch is engaged), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-4)	>	90 to 1050	rad/s^2	Engine speed	>=	350	rpm	see Fault Paths 1-3 below	
			OR Method 1: Angular acceleration of crankshaft in transmission slip state (clutch is slipping), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-10)	>	100 to 1050	rad/s^2	Engine speed	<=	6000	rpm		
			OR Method 1: Angular acceleration of crankshaft in transmission open state (clutch is disengaged), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-7)	>	100 to 1050	rad/s^2	Engine coolant temperature at engine start OR	>	-7.24	deg C		
			OR				[Engine coolant temperature at engine start	<	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in idle state, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-1)	>	95 to 180	rad/s^2	then monitoring enabled					
			OR				Engine coolant temperature]	>	-7.24	deg C		
			Method 1: Angular acceleration of crankshaft in half-engine mode state, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-14)	>	66 to 2047.938	rad/s^2	Zero torque detection is not active	=	TRUE	-		
			OR Method 1: Angular acceleration of crankshaft in catalyst heating, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire (see Look-Up Table #P0300-15)	>	161 to 275	rad/s^2	means [Normalized inner engine torque	>	[A] + [B] + [C]	%		
			OR Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission grip state (clutch is engaged), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	OR Normalized inner engine torque	>	[D] + [B] + [C]	%		
			OR Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission slip state (clutch is slipping), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	OR Normalized inner engine torque	>	[E] + [B] + [C]	%		
			OR Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in transmission open state (clutch is disengaged), compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	OR Normalized inner engine torque	>	[F] + [B] + [C]	%		
			OR Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in idle state, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	where [A] Threshold zero torque, driving state (see Look-Up Table #P0300-20)	=	5.32074 to 16.0797	%		
			OR				[B] Map for zero torque correction, engine speed and altitude dependant (see Look-Up Table #P0300-26)	=	-1.66016 to 0	%		
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in half-engine mode state, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[C] Map for zero torque correction, engine speed and engine temperature dependant	=	0	%		
							[D] Threshold zero torque, idle state (see Look-Up Table #P0300-23)]	=	4.25720 to 6.52008	%		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Method 2: Angular acceleration of crankshaft corrected for cylinders sharing same sensor wheel segments in catalyst heating, compared to threshold primarily used to detect single cylinder continuous and select paired cylinder continuous misfires in a non-adapted system	>	2047.938	rad/s^2	[E] Threshold zero torque, half-engine mode state, driving (see Look-Up Table #P0300-24	=	2.00043 to 5.90057	%		
			OR				[F] Threshold zero torque, half-engine mode state, idle (see Look-Up Table #P0300-25	=	2.00043 to 5.90057	%		
			Method 3: Filtered angular acceleration of crankshaft in transmission grip state (clutch is engaged), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-5)	>	[A]+[B]	rad/s^2	Overrun/fuel cut-off is not active	=	TRUE	-		
			where				(Combustion delay after engine start has completed	=	TRUE	-		
			[A] Base continuous misfire threshold in the transmission grip state	=	60 to 913	rad/s^2	means					
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2	[Engine speed	>	500	rpm		
			OR				for					
			Method 3: Filtered angular acceleration of crankshaft in transmission slip state (clutch is slipping), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-11)	>	[A]+[B]	rad/s^2	Number of combustions]	=	0	-		
			where				OR					
			[A] Base continuous misfire threshold in the transmission slip state	=	60 to 913	rad/s^2	[Engine has re-started (start-stop)	=	TRUE	-		
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2	means					
			OR				Number of combustions after re-start])	=	8	-		
			Method 3: Filtered angular acceleration of crankshaft in transmission open state (clutch is disengaged), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-8)	>	[A]+[B]	rad/s^2	Calculated EPM segment time is valid	=	TRUE	-		
			where				No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			[A] Base continuous misfire threshold in the transmission open state	=	90 to 913	rad/s^2	Basic enable conditions met	=	see sheet enable tables	-		
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in idle state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-2)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in the transmission idle state	=	105 to 135	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in half-engine mode state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-18)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in the half-engine mode state	=	60 to 2047.938	rad/s^2						
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
			OR									
			Method 3: Filtered angular acceleration of crankshaft in catalyst heating state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires (see Look-Up Table #P0300-19)	>	[A]+[B]	rad/s^2						
			where									
			[A] Base continuous misfire threshold in catalyst heating state	=	200 to 335	rad/s^2						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions	Time Required			MIL Illum.
			[B] Smallest (negative) angular acceleration value from a non-misfiring cylinder; limited depending on operating point	=	measured parameter	rad/s^2						
		Fault Path 1: Emission relevant misfire rate within first 1000 crankshaft revolutions after engine start	Total misfire counts across all cylinders within first test frame outside of catalyst heating	>	69	-			1000	revs	once per drive cycle	2 Trip (with similar conditions healing)
			OR									
			Total misfire counts across all cylinders within first test frame during catalyst heating	>	71	-						
			and/or									
			Total misfire counts for cylinder 1 within test frame	>	[A] x [B]	-						
			where									
			[A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for cylinder-individual fault code	=	12.5	%						
			with									
			[One test frame defined by:									
			Total number of crankshaft revolutions in first test frame specific to emission relevant misfire rate at engine start]	=	1000	revolutions						
		Fault Path 2: Emission relevant misfire rate after the first 1000 crankshaft revolutions	Total misfire counts across all cylinders within test frame	>	71	-			4 intervals of 1000	revs	continuous	2 Trip (with similar conditions healing)
			and/or									
			Total misfire counts for cylinder 1 within test frame	>	[A] x [B]	-						
			where									
			[A] Total misfire counts across all cylinders within test frame	=	measured parameter	-						
			[B] Minimum ratio of misfire sum for cylinder-individual fault code	=	12.5	%						
			with									
			[One test frame defined by:									
			Total number of crankshaft revolutions in test frame for emission relevant misfire rate	=	1000	revolutions						
			Misfire test frame counter]	=	4	-						
		Fault Path 3: Catalyst damaging misfire rate	Weighted misfire counter for exhaust bank	>	2688	counts			immediately after catalyst damaging misfire rate is exceeded	-	continuous	1 Trip Blinking MIL (with similar conditions healing)
			OR									
			Weighted misfire counter for exhaust bank during first interval after engine start	>	2688	counts						
			and/or									
			Total weighted misfire counts for cylinder 1 within test frame	>=	[A] x [B]	-						
			where									
			[A] Total weighted misfire counts per exhaust bank within test frame	=	measured parameter	-						
			[B] Minimum ratio of weighted misfire sum for cylinder-individual fault code	=	12.5	%						
			with									
			[One test frame defined by:									
			Total number of crankshaft revolutions in test frame for catalyst damaging misfire	=	200	revolutions						
			OR									
			Total number of crankshaft revolutions in first test frame after engine start for catalyst damaging misfire	=	[A] x [B]	revolutions						
			[A] Total number of crankshaft revolutions in test frame for catalyst damaging misfire	=	200	revolutions						
			[B] Test frame extension factor for first interval after engine start]	=	1	-						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative System	P0497	Monitoring of fuel tank pressure while CVV is closed and CPV open (CPV stuck closed)	Difference between low pass filtered tank and start pressure for Tank leakage diagnosis	<= -0.007446 kPa	Basic Enable conditions are fulfilled as following conditions:	= TRUE -	1 sec once per driving cycle	2 Trips
			OR		Diagnosis of canister purge system is active	= TRUE -	once per driving cycle	
			Integrated CPV mass flow during vacuum build-up	> 0.08993 g	means			
					(			
					Battery Voltage	>= 10.9 V		
					Battery Voltage	<= 16 V		
					Fuel Tank Pressure	>= -3500 Pa		
					Fuel Tank Pressure	<= 1300.049 Pa		
					Pressure ratio of manifold pressure and ambient pressure	< 0.796875 -		
					)			
					Engine Coolant Temperature	> 69.8 deg C		
					ambient air temperature	> -7.5 deg C		
					vehicle speed	<= 0.12622747 mph		
					engine speed	> 0 rpm		
					(			
					Purge mass flow	<= 0.008355556 g/sec		
					Canister close valve check	= TRUE -		
					(			
					Lowpass filtered tank pressure	>= -900.024 Pa		
					OR			
					Time for measurement (maximum)	>= 5 sec		
					)			
					Pressure Stabilization Check	= TRUE -		
					(			
					Absolute reference value of differential tank pressure	<= 0.039917 kPa		
					for time	>= 2 sec		
					)			
					Compensation Gradient Determination	= TRUE -		
					(			
					Time for gradient measurements	>= 3 sec		
					)			
					)			
					Monitor has not completed this drive cycle (i.e. monitor runs once per trip)	= TRUE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
	P0496	Monitoring of fuel tank pressure while CPV and CVV are closed (CPV stuck open)	Difference between low pass filtered tank and start pressure for Tank leakage diagnosis	< -0.060059 kPa	Basic Enable conditions are fulfilled as following conditions:	= TRUE -	1 sec once per driving cycle	2 Trips
					Diagnosis of canister purge system is active	= TRUE -	once per driving cycle	
					means			
					(			
					Battery Voltage	>= 10.9 V		
					Battery Voltage	<= 16 V		
					Fuel Tank Pressure	>= -3500 Pa		
					Fuel Tank Pressure	<= 1300.049 Pa		
					Pressure ratio of manifold pressure and ambient pressure	< 0.796875 -		
					)			
					Engine Coolant Temperature	> 69.8 deg C		
					ambient air temperature	> -7.5 deg C		
					vehicle speed	<= 0.12622747 mph		
					engine speed	> 0 rpm		
					(			
					Purge mass flow	<= 0.008355556 g/sec		
					Canister close valve check	= TRUE -		
					(			
					Lowpass filtered tank pressure	>= -900.024 Pa		
					OR			
					Time for measurement (maximum)	>= 5 sec		
					)			
					Pressure Stabilization Check	= TRUE -		
					(			
					Absolute reference value of differential tank pressure	<= 0.039917 kPa		
					for time	>= 2 sec		
					)			
					Compensation Gradient Determination	= TRUE -		
					(			
					Time for gradient measurements	>= 3 sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					)			
					)			
					Monitor has not completed this drive cycle (i.e. monitor runs once per trip)	= TRUE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
	P04DF	Canister purge valve Bank1 is monitored for further pinpointing of a stuck open pruge valve. The diagnostic evaluates the impact on the MAP pressure bank 1 signal during an intrusively commanded purge valve opening	failing counter results during canister purge valve bank 1 diagnosis	<= 3 -	integrated purge mass flow bank 2	>= 0 g	1 sec continuous	2 Trips
			Counter is incremented if the following occurs (during intrusive purge valve command):		filtered difference of environmental pressure and intake manifold pressure	< 30 kPa	once per driving cycle	
			difference in intake manifold pressure bank1 (difference is between intake manifold pressure bank 1 at the beginning of intrusive canister purge valve activation and the end)	<= 2.1992 kPa	**Canister purge valve release conditions met:**	= TRUE -		
					(			
					engine coolant temperature	> 69.8 deg C		
					ambient air pressure correction factor	> 0.690002 -		
					ambient air temperature	> -7.5 deg C		
					)			
					time in between diagnostic events has elapsed. Waiting time betwee events	= 1 sec		
					Difference in filtered mixture correction	> 0.099976 -		
					Difference in filtered mixture correction	< -0.099976 -		
					Monitor has not completed this drive cycle (i.e. monitor runs once per trip)	= TRUE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
	P04AE	Canister purge valve Bank2 is monitored for further pinpointing of a stuck open pruge valve. The diagnostic evaluates the impact on the MAP pressure bank 2 signal during an intrusively commanded purge valve opening	failing counter results during canister purge valve diagnosis	<= 3 -	integrated purge mass flow bank 2	>= 0 g	1 sec continuous	2 Trips
			Counter is incremented if the following occurs (during intrusive purge valve command):		filtered difference of environmental pressure and intake manifold pressure	< 30 kPa	once per driving cycle	
			difference in intake manifold pressure bank2 (difference is between intake manifold pressure bank 2 at the beginning of intrusive canister purge valve activation and the end)	<= 2 kPa	**Canister purge valve release conditions met:**	= TRUE -		
					(			
					engine coolant temperature	> 69.8 deg C		
					ambient air pressure correction factor	> 0.690002 -		
					ambient air temperature	> -7.5 deg C		
					)			
					time in between diagnostic events has elapsed. Waiting time betwee events	= 1 sec		
					Difference in filtered mixture correction	> 0.099976 -		
					Difference in filtered mixture correction	< -0.099976 -		
					Monitor has not completed this drive cycle (i.e. monitor runs once per trip)	= TRUE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
	P0442	**Phase 1:** Monitoring of vacuum decay gradient while CPV and CVV are closed (engine on)	Engine Off Natural Vacuum Test:				**Conditions specific to Phase 1(engine running):**					1 Trip
		Phase 2: Monitoring of tank pressure while CPV and CVV are closed (engine off).	EWMA filtered fault index	>	0.5	factor	Tank pressure vacuum decay gradient while CPV and CVV are closed (see Look-Up-Table #P0422-2)	>	0.0042 to 0.0180	hPa/s		EWMA
			based on:				Engine coolant temperature at start	>=	-7.5	deg C		
			(				Engine coolant temperature at start	<=	100.5	deg C		
			Difference between max. tank differential pressure & min. tank differential pressure (A-B) (see Look-Up-Table #P0422-1)	<	300.049 to 550.049	Pa	Ambient temperature	<=	35.3	deg C		
			Max. & min differential pressures are observable				Ambient temperature	>=	-7.5	deg C		
							Fuel tank level	>	7.7	l		
			Phase 1 (CPV and CVV are closed):				Fuel tank level	<	64	l		
			(				(					
			A (Maximum pressure)	>	0	Pa	Absolute change in barometric pressure	<	1.6016	kPa		
			Stabilization phase (CPV closed and CVV open):				for time	=	600	sec		
			Wait for pressure to reach barometric pressure.	=	300	sec	)					
			)				Canister purge active	=	TRUE	-		
							Minimum purging time of the charcoal	>	20	sec		
			Phase 2 (CPV and CVV are closed):				Time since last charcoal canister purging	<	35	sec		
			(				Load factor of charcoal canister	<	40	factor		
			Wait for pressure to reach barometric pressure.				for time	>=	30	sec		
			B: Minimum pressure	=	0	Pa						
			)									
			)				**Conditions specific to Phase 2 (engine**					
							Canister purge valve (CPV) commanded	=	TRUE	-		
							Canister vent valve (CVV) commanded	=	TRUE	-		
							P0446, P0496, P0455 diagnostics have	=	TRUE	-		
							Ambient temperature	<=	-7.5	deg C		
							Ambient temperature	>=	35.3	deg C		
							Engine coolant temperature at start	<=	100.5	deg C		
							Engine coolant temperature at start -	<=	99.8	deg C		
							Engine had been running for time	>	0	sec		
							Driving distance covered in current dcy	>=	11000	m		
							(					
							Load factor of charcoal canister	<	63.99805	factor		
							for time	>	30	sec		
							)					
							Barometric pressure	>	70	kPa		
							Engine coolant temperature at engine off	>	60	deg C		
							Battery voltage	>	10.9	V		
							Condition - refueling detected	=	FALSE	-		
							Condition filler cap has been opened	=	FALSE	-		
							Condition - Sloshing of fuel detected	=	FALSE	-		
										-		
							EWMA Filter Normal Mode:					
							Filter coefficient for stabilized mode	=	0.179688	factor		
							Number of measurements for stabilized	=	6			
							EWMA Filter Fast Initial Response (FIR)					
							Filter coefficient for Fast Initial Response	=	0.200012	factor		
							EWMA Filter Rapid Response (RR)					
							Filter coefficient for Rapid Responde mode	=	0.203125	factor		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
							Basic enable conditions met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel System	P0171	Monitoring of maximum lambda controller deviation when the lambda controller mean value is greater than the calibrated threshold	Deviation of fast lambda controller mean value from 1.0	> 0.230011 -	(		10 sec	2 Trips
					(			
					(			
					Unrestricted operation of Upstream closed loop lambda controller is active	= TRUE -		
					(			
					Enleanment protection of lambda controller	= FALSE -		
					(			
					Large deceleration enleanment protection of lambda controller	= FALSE -		
					(			
					Relative fuel mass transient component threshold for deceleration enleanment	>= -10.0078 %/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>= -10.0078 %/seg		
					)			
					for time (See-Look Up-table #P2177-5)	<= 0.3 to 1 sec		
					)			
					OR			
					(			
					Large acceleration enrichment protection of lambda controller	= FALSE -		
					(			
					Relative fuel mass transient componet threshold for acceleration enrichment	<= 19.0078 %/seg		
					and			
					Relative fuel mass transient componet threshold for acceleration enrichment	<= 19.0078 %/seg		
					)			
					for time (See-Look Up-table #P2177-6)	<= 0.5 to 1 sec		
					)			
					)			
					and			
					Upstream Lambda closed loop control for bank 1	= TRUE -		
					(			
					Lambda control after injection cut off or fuel cut off is disabled	= FALSE -		
					and			
					Lambda swtiched ON after fuel cutoff	= TRUE -		
					(			
					Fuel cut off is active	= FALSE -		
					and			
					(			
					time counter for after fuel cut off for enabling lambda control	> 8 sec		
					OR			
					(			
					Absolute value of diffence in lambda of bank 1	<= 0.1001 -		
					and			
					Difference of counter time and plant time constant a-(b+c)	> 0 sec		
					where a is time counter for after fuel cut off for enabling lambda control			
					b is plant time constant for continuous air/fuel control			
					c is plant parameter for dead time for lambda control			
					)			
					)			
					)			
					and			
					LSU sensor upstream to catalyst ready for operation	= TRUE -		
					(			
					Level of lambda sensor 1 signal quality	<= 12 -		
					)			
					and			
					OBDII error flag, lambda control disabled	= FALSE -		
					(			
					Injector power stage fault is active	= FALSE -		
					and			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Camshaft fault in critical operating range present and MAF is main air charge senor	=	FALSE	-		
					)					
					and					
					(					
					lambda control is active since warmup is finished	=	TRUE	-		
					and					
					Relative air charge	>	0	%		
					(					
					for time	>=	2	sec		
					)					
					)					
					and					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					and					
					lambda value referred to sensor fitting location	>=	0.6499	-		
					and					
					Minimum injection time limitation for GDI mode is active	=	FALSE	-		
					)					
					and					
					Width of dead zone for lambda control deviation in case of scavenging	<	0.999969	-		
					)					
					(					
					Canister purge valve is active and open	=	FALSE	-		
					OR					
					Integral of canister purge mass flow after a longer purge stop	>=	11.32	g		
					OR					
					Condition for limit control	=	TRUE	-		
					(					
					(					
					Canister purge rate reduction because of fuel rate controller deviations	>=	0	-		
					and					
					Canister purge mass flow (see Look-Up-Table #P0171-1)	<=	0 to 0.833333333333333	g/sec		
					)					
					for time	>=	10	sec		
					)					
					and					
					Engine Coolant temperature	>=	0	deg C		
					and					
					Number of injections for enabling fuel mixture adaptation diagnosis	>=	700	-		
					and					
					high amount fuel in the oil	=	FALSE	-		
					(					
					Maximum proportion of evaporating fuel from the engine oil to the fuel demand	<	0.148437	-		
					)					
					)					
					for time	>=	100	sec		
					)					
					No pending or confirmed DTCs	=	see sheet inhibit tables	-		
					Basic enable conditions met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	P0172	Monitoring of minimum lambda controller deviation when the lambda controller mean value is lesser than the calibrated threshold	Deviation of fast lambda controller mean value from 1.0	< -0.230011 -	(		10 sec	2 Trips
					((Unrestricted operation of Upstream closed loop lambda controller is active	= TRUE -		
					(Enleanment protection of lambda controller	= FALSE -		
					(Large deceleration enleanment protection of lambda controller	= FALSE -		
					(Relative fuel mass transient component threshold for deceleration enleanment	>= -10.0078 %/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>= -10.0078 %/seg		
					) for time (See-Look Up-table #P2177-5)	<= 0.3 to 1 sec		
					) OR (Large acceleration enrichment protection of lambda controller	= FALSE -		
					(Relative fuel mass transient componet threshold for acceleration enrichment	<= 19.0078 %/seg		
					and Relative fuel mass transient componet threshold for acceleration enrichment	<= 19.0078 %/seg		
					) for time (See-Look Up-table #P2177-6)	<= 0.5 to 1 sec		
					)) and Upstream Lambda closed loop control for bank 1	= TRUE -		
					(Lambda control after injection cut off or fuel cut off is disabled	= FALSE -		
					and Lambda swtiched ON after fuel cutoff	= TRUE -		
					(Fuel cut off is active	= FALSE -		
					and (time counter for after fuel cut off for enabling lambda control	> 8 sec		
					OR (Absolute value of diffence in lambda of bank 1	<= 0.1001 -		
					and Difference of counter time and plant time constant a-(b+c) where a is time counter for after fuel cut off for enabling lambda control b is plant time constant for continuous air/fuel control c is plant parameter for dead time for lambda control)))	> 0 sec		
					and LSU sensor upstream to catalyst ready for operation	= TRUE -		
					(Level of lambda sensor 1 signal quality	<= 12 -		
					) and OBDII error flag, lambda control disabled	= FALSE -		
					(Injector power stage fault is active	= FALSE -		
					and			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Camshaft fault in critical operating range present and MAF is main air charge senor	= FALSE -		
					)			
					and			
					(			
					lambda control is active since warmup is finished	= TRUE -		
					and			
					Relative air charge	> 0 %		
					(			
					for time	>= 2 sec		
					)			
					)			
					and			
					Lamda control active due to GDI mode change	= TRUE -		
					(			
					GDI mode homogeneous	= TRUE -		
					for time	>= 0.8 sec		
					)			
					)			
					and			
					lambda value referred to sensor fitting location	>= 0.6499 -		
					and			
					Minimum injection time limitation for GDI mode is active	= FALSE -		
					)			
					and			
					Width of dead zone for lambda control deviation in case of scavenging	< 0.999969 -		
					)			
					(			
					Canister purge valve is active and open	= FALSE -		
					OR			
					Integral of canister purge mass flow after a longer purge stop	>= 11.32 g		
					OR			
					Condition for limit control	= TRUE -		
					(			
					(			
					Canister purge rate reduction because of fuel rate controller deviations	>= 0 -		
					and			
					Canister purge mass flow (see Look-Up-Table #P0171-1)	<= 0 to 0.833333333333333 g/sec		
					)			
					for time	>= 10 sec		
					)			
					and			
					Engine Coolant temperature	>= 0 deg C		
					and			
					Number of injections for enabling fuel mixture adaptation diagnosis	>= 700 -		
					and			
					high amount fuel in the oil	= FALSE -		
					(			
					Maximum proportion of evaporating fuel from the engine oil to the fuel demand	< 0.148437 -		
					)			
					)			
					for time	>= 100 sec		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required		MIL Illum.
	P0174	Monitoring of maximum lambda controller deviation when the lambda controller mean value is greater than the calibrated threshold	Deviation of fast lambda controller mean value from 1.0 of bank 2	>	0.230011	-	(				10	sec	2 Trips
							(						
							(Unrestricted operation of Upstream closed loop lambda controller of bank 2 is active	=	TRUE	-			
							(Enleanment protection of lambda controller of bank 2	=	FALSE	-			
							(Large deceleration enleanment protection of lambda controller	=	FALSE	-			
							(Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg			
							Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg			
							) for time (See-Look Up-table #P2177-5)	<=	0.3 to 1	sec			
							) OR						
							(Large acceleration enrichment protection of lambda controller	=	FALSE	-			
							(Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg			
							and Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg			
							) for time (See-Look Up-table #P2177-6)	<=	0.5 to 1	sec			
							)) and						
							Upstream Lambda closed loop control for bank 2	=	TRUE	-			
							(Lambda control after injection cut off or fuel cut off of bank 2 is disabled	=	FALSE	-			
							and Lambda swtiched ON after fuel cutoff of bank 2	=	TRUE	-			
							(Fuel cut off is active	=	FALSE	-			
							and (time counter for after fuel cut off for enabling lambda control	>	8	sec			
							OR (Absolute value of diffence in lambda of bank 2	<=	0.1001	-			
							and Difference of counter time and plant time constant a-(b+c)	>	0	sec			
							where a is time counter for after fuel cut off for enabling lambda control						
							b is plant time constant for continuous air/fuel control						
							c is plant parameter for dead time for lambda control						
							))) and						
							LSU sensor upstream to catalyst ready for operation in bank 2	=	TRUE	-			
							(Level of lambda sensor 1 signal quality of bank 2	<=	12	-			
							) and						
							OBDII error flag, lambda control of bank 2 disabled	=	FALSE	-			
							(						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Injector power stage fault is active	= FALSE -		
					and			
					Camshaft fault in critical operating range present and MAF is main air charge senor	= FALSE -		
					)			
					and			
					(			
					lambda control is active since warmup is finished	= TRUE -		
					and			
					Relative air charge	> 0 %		
					(			
					for time	>= 2 sec		
					)			
					)			
					and			
					Lamda control active due to GDI mode change	= TRUE -		
					(			
					GDI mode homogeneous	= TRUE -		
					for time	>= 0.8 sec		
					)			
					)			
					and			
					lambda value referred to sensor fitting location of bank 2	>= 0.6499 -		
					and			
					Minimum injection time limitation for GDI mode of bank 2 is active	= FALSE -		
					)			
					and			
					Width of dead zone for lambda control deviation in case of scavenging	< 0.999969 -		
					)			
					(			
					Canister purge valve is active and open	= FALSE -		
					OR			
					Integral of canister purge mass flow after a longer purge stop	>= 11.32 g		
					OR			
					Condition for limit control	= TRUE -		
					(			
					(			
					Canister purge rate reduction because of fuel rate controller deviations	>= 0 -		
					and			
					Canister purge mass flow (see Look-Up-Table #P0171-1)	<= 0 to 0.833333333333333 g/sec		
					)			
					for time	>= 10 sec		
					)			
					and			
					Engine Coolant temperature	>= 0 deg C		
					and			
					Number of injections for enabling fuel mixture adaptation diagnosis	>= 700 -		
					and			
					high amount fuel in the oil	= FALSE -		
					(			
					Maximum proportion of evaporating fuel from the engine oil to the fuel demand	< 0.148437 -		
					)			
					)			
					for time	>= 100 sec		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	P0175	Monitoring of fast lambda controller mean value against Minimum rationality threshold	Deviation of fast lambda controller mean value from 1.0 corrected with P-part controller, bank 2	< -0.230011 -	(		10 sec	2 Trips
					(			
					(			
					Unrestricted operation of Upstream closed loop lambda controller of bank 2 is active	= TRUE -		
					(			
					Enleanment protection of lambda controller of bank 2	= FALSE -		
					(			
					Large deceleration enleanment protection of lambda controller	= FALSE -		
					(			
					Relative fuel mass transient component threshold for deceleration enleanment	>= -10.0078 %/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>= -10.0078 %/seg		
					)			
					for time (See-Look Up-table #P2177-5)	<= 0.3 to 1 sec		
					)			
					OR			
					(			
					Large acceleration enrichment protection of lambda controller	= FALSE -		
					(			
					Relative fuel mass transient componet threshold for acceleration enrichment	<= 19.0078 %/seg		
					and			
					Relative fuel mass transient componet threshold for acceleration enrichment	<= 19.0078 %/seg		
					)			
					for time (See-Look Up-table #P2177-6)	<= 0.5 to 1 sec		
					)			
					)			
					and			
					Upstream Lambda closed loop control for bank 2	= TRUE -		
					(			
					Lambda control after injection cut off or fuel cut off of bank 2 is disabled	= FALSE -		
					and			
					Lambda swtiched ON after fuel cutoff of bank 2	= TRUE -		
					(			
					Fuel cut off is active	= FALSE -		
					and			
					(			
					time counter for after fuel cut off for enabling lambda control	> 8 sec		
					OR			
					(			
					Absolute value of diffence in lambda of bank 2	<= 0.1001 -		
					and			
					Difference of counter time and plant time constant a-(b+c)	> 0 sec		
					where a is time counter for after fuel cut off for enabling lambda control			
					b is plant time constant for continuous air/fuel control			
					c is plant parameter for dead time for lambda control			
					)			
					)			
					)			
					and			
					LSU sensor upstream to catalyst ready for operation in bank 2	= TRUE -		
					(			
					Level of lambda sensor 1 signal quality of bank 2	<= 12 -		
					)			
					and			
					OBDII error flag, lambda control of bank 2 disabled	= FALSE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					Injector power stage fault is active	=	FALSE	-		
					and					
					Camshaft fault in critical operating range present and MAF is main air charge senor	=	FALSE	-		
					)					
					and					
					(					
					lambda control is active since warmup is finished	=	TRUE	-		
					and					
					Relative air charge	>	0	%		
					(					
					for time	>=	2	sec		
					)					
					)					
					and					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					and					
					lambda value referred to sensor fitting location of bank 2	>=	0.6499	-		
					and					
					Minimum injection time limitation for GDI mode of bank 2 is active	=	FALSE	-		
					)					
					and					
					Width of dead zone for lambda control deviation in case of scavenging	<	0.999969	-		
					)					
					(					
					Canister purge valve is active and open	=	FALSE	-		
					OR					
					Integral of canister purge mass flow after a longer purge stop	>=	11.32	g		
					OR					
					Condition for limit control	=	TRUE	-		
					(					
					(					
					Canister purge rate reduction because of fuel rate controller deviations	>=	0	-		
					and					
					Canister purge mass flow (see Look-Up-Table #P0171-1)	<=	0 to 0.833333333333333	g/sec		
					)					
					for time	>=	10	sec		
					)					
					and					
					Engine Coolant temperature	>=	0	deg C		
					and					
					Number of injections for enabling fuel mixture adaptation diagnosis	>=	700	-		
					and					
					high amount fuel in the oil	=	FALSE	-		
					(					
					Maximum proportion of evaporating fuel from the engine oil to the fuel demand	<	0.148437	-		
					)					
					)					
					for time	>=	100	sec		
					)					
					No pending or confirmed DTCs	=	see sheet inhibit tables	-		
					Basic enable conditions met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
	P2177	Multiplicative part of the Long Term Fuel Trim for Bank 1 in gasoline mode is greater than a calibrated threshold.	Multiplicative part of LTFT, Bank 1	>	1.230011	-	LTFT Multiplicative mixture adaptation bank 1 is active	=	TRUE	-	multiple	2 Trips
							(					
							LTFT multiplicative part Bank 1 Integrator is stable which is of the following conditions	=	TRUE	-		
							(					
							(					
							Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 1 is stable	=	TRUE	-		
							(					
							Multiplicative part of LTFT for bank 1	>	1.230011	-		
							OR					
							Multiplicative part of LTFT for bank 1	<	0.769989	-		
							)					
							OR					
							Similar conditions for multiplicative fuel adaptation fulfilled	=	TRUE	-		
							(					
							Difference between Measured and reference Engine speed	<=	375	rpm		
							Difference between reference and measured Engine speed	<=	375	rpm		
							Difference between measured load value to reference load	<=	20	-		
							Difference between reference load value to measured load	<=	20	-		
							)					
							)					
							LTFT multiplicative part Bank 1 is stable, which is the following conditions for time	>=	10	sec		
							(					
							(					
							Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 1 is stable	=	TRUE	-		
							(					
							Absolute change of LTFT multiplicative part, Bank 1	<=	1.999969	-		
							)					
							OR					
							Absolute change of LTFT multiplicative part, Bank 1	<=	0.029999	-		
							)					
							(					
							Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 1 is stable	=	TRUE	-		
							OR					
							Change in short term fuel trim, Bank 1	<=	0.049988	-		
							)					
							Absolute difference between LTFT additive part, Bank 1 and its fixed value at beginning of multiplicative steady state phase	<=	0.75	%		
							Multiplicative mixture adaptation is active	=	TRUE	-		
							(					
							(					
							Multiplicative mixture adaptation is active, which is the following conditions:	=	TRUE	-		
							(					
							Fra operational readiness independent of the operating mode is active, which is the following conditions for time	>=	2	sec		
							(					
							Fundamental operating mode independent operation readiness of mixture adaption	=	TRUE	-		
							(					
							(					
							Condition error suspicion in mixture adaptation	=	TRUE	-		
							(					
							Coolant Engine Temperature	>=	Min(C, D)	deg C		
							where C - cut-in temperature adaptive precontrol for lambda closed-loop control	=	54.8	deg C		
							where D - cut-in temperature fuel mixture adaptation in case of error suspicion	=	54.8	deg C		
							)					
							OR					
							Coolant Engine Temperature	>=	54.8	deg C		
							)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Basic willingness of fuel mixture adaptation, except engine temperature	=	TRUE	-		
					(					
					Intake air temperature	<	90	deg C		
					Conditiion of Wide Open Throttle	=	FALSE	-		
					(					
					Propulsion torque after driving assistance coordination	<	3276.7	Nm		
					)					
					Increased tolerances of air charge determination expected	=	FALSE	-		
					Maximum proportion of evaporating fuel from the engine oil to the fuel demand (model based)	<=	0	-		
					Ratio total charge to charge in cylinder	<	15	-		
					)					
					(					
					Number of injections since start	>=	1200	-		
					OR					
					Number of injections since start	>=	1000	-		
					)					
					)					
					FRA adaption physically enabled	=	TRUE	-		
					(					
					Torque commanded to charge control (see Look-Up-Table #P2177-2)	>=	8.00018 to 99.98932	%		
					Torque commanded to charge control (see Look-Up-Table #P2177-1)	<=	0 to 44.99969	%		
					)					
					)					
					Operating mode dependent Readiness LRA	=	TRUE	-		
					(					
					(					
					Lambda closed loop control upstream catalyst, bank 1	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-6)	>=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	>=	0.3 to 1	sec		
					)					
					)					
					Upstream Lambda closed loop control for bank 1	=	TRUE	-		
					(					
					Lambda control disabled during after					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					b is plant time constant for continuous air/fuel control					
					c is plant parameter for dead time for lambda control					
					)					
					)					
					)					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1 signal quality	<=	12	-		
					)					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					and					
					Injector power stage fault is active	=	FALSE	-		
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					lambda control is active since warmup is finished	=	TRUE	-		
					Relative air charge	>	0	%		
					(					
					for time	>=	2	sec		
					)					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					Lambda set point	>=	0.6499	-		
					Minimum injection time limitation for GDI mode is active	=	FALSE	-		
					Width of dead zone for lambda control deviation	<	0.999969	-		
					(					
					Width of dead zone for lambda control deviation	<	0	-		
					OR					
					Lambda control continuos error	>	0	-		
					)					
					)					
					OR					
					(					
					Unrestricted operation of Upstream closed loop lambda controller of bank 2 is active	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-6)	<=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	<=	0.3 to 1	sec		
					)					
					)					
					Upstream Lambda closed loop control for bank 2	=	TRUE	-		
					(					
					Lambda control disabled during after	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					(					
						>	8	sec		
					enabling lambda control					
					OR					
					(					
					Absolute value of diffence in lambda of bank 2	<=	0.1001	-		
					Difference of counter time and plant time constant a-(b+c) where a is Time running down after fuel b is plant time constant of bank 2 for continuous air/fuel control c is plant parameter of bank 2 for dead time for lambda control	>	0	sec		
					)					
					)					
					)					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1, bank 2 signal quality	<=	12	-		
					)					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					Injector power stage fault is active	=	FALSE	-		
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					lambda control is active since warmup is finished	=	TRUE	-		
					Relative air charge	>	0	%		
					(					
					for time	>=	2	sec		
					)					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					Lambda set point	>=	0.6499	-		
					Minimum injection time limitation for GDI mode of bank 2 is active	=	FALSE	-		
					Width of dead zone for Width of dead zone for lambda control deviation	<	0.999969	-		
					(					
					Width of dead zone for lambda control deviation	=	0	-		
					OR					
					Lambda control continuos error	>	0	-		
					)					
					)					
					for time	>=	3	sec		
					)					
					(					
					Difference between lambda value referenced to sensor fitting of bank 1 and bank 2	>=	0	-		
					Lambda set point	<	1.04004	-		
					(					
					Detection of fuel mixture adaption	=	TRUE	-		
					(					
					Lambda set point of bank 2	>	0.8999	-		
					)					
					OR					
					Lambda set point of bank 2	>	0.95996	-		
					)					
					for time	>=	Max(A,B)	sec		
					where A - delay time for lambda fuel adaption (rich condition)		0	sec		
					where B - delay time for lambda fuel adaption (lean condition)		0	sec		
					)					
					Limitation due to fuel in oil is deactivated	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Limitation due to fuel in oil is deactivated for bank 2	=	TRUE	-		
					)					
					(					
					Half Engine mode is deactivated	=	TRUE	-		
					for time	>=	10	sec		
					)					
					)					
					Lambda closed loop control upstream catalyst, bank 1	=	TRUE	-		
					)					
					Multiplicative adaptation correction factor	>	0	-		
					)					
					)					
					)					
					No pending or confirmed DTCs	=	see sheet inhibit tables	-		
					Basic enable conditions met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
	P2178	Multiplicative part of the Long Term Fuel Trim for Bank 1 in gasoline mode is less than a calibrated threshold.	Multiplicative part of LTFT for bank 1	< 0.769989 -	LTFT Multiplicative mixture adaptation bank 1 is active	=	TRUE	-	multiple	2 Trips
					(					
					LTFT multiplicative part Bank 1 Integrator is stable which is of the following conditions	=	TRUE	-		
					(					
					(					
					Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 1 is stable	=	TRUE	-		
					(					
					Multiplicative part of LTFT for bank 1	>	1.230011	-		
					OR					
					Multiplicative part of LTFT for bank 1	<	0.769989	-		
					)					
					OR					
					Similar conditions for multiplicative fuel adaptation fulfilled	=	TRUE	-		
					(					
					Difference between Measured and reference Engine speed	<=	375	rpm		
					Difference between reference and measured Engine speed	<=	375	rpm		
					Difference between measured load value to reference load	<=	20	-		
					Difference between reference load value to measured load	<=	20	-		
					)					
					)					
					LTFT multiplicative part Bank 1 is stable, which is the following conditions for time	>=	10	sec		
					(					
					(					
					Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 1 is stable	=	TRUE	-		
					(					
					Absolute change of LTFT multiplicative part, Bank 1	<=	1.999969	-		
					)					
					OR					
					Absolute change of LTFT multiplicative part, Bank 1	<=	0.029999	-		
					)					
					(					
					Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 1 is stable	=	TRUE	-		
					OR					
					Change in short term fuel trim, Bank 1	<=	0.049988	-		
					)					
					Absolute difference between LTFT additive part, Bank 1 and its fixed value at beginning of multiplicative steady state phase	<=	0.75	%		
					Multiplicative mixture adaptation is active	=	TRUE	-		
					(					
					(					
					Multiplicative mixture adaptation is active, which is the following conditions:	=	TRUE	-		
					(					
					Fra operational readiness independent of the operating mode is active, which is the following conditions for time	>=	2	sec		
					(					
					Fundamental operating mode independent operation readiness of mixture adaption	=	TRUE	-		
					(					
					(					
					Condition error suspicion in mixture adaptation	=	TRUE	-		
					(					
					Coolant Engine Temperature	>=	Min(C, D)	deg C		
					where C - cut-in temperature adaptive precontrol for lambda closed-loop control	=	54.8	deg C		
					where D - cut-in temperature fuel mixture adaptation in case of error suspicion	=	54.8	deg C		
					)					
					OR					
					Coolant Engine Temperature	>=	54.8	deg C		
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Basic willingness of fuel mixture adaptation, except engine temperature	=	TRUE	-		
					(					
					Intake air temperature	<	90	deg C		
					Conditiion of Wide Open Throttle	=	FALSE	-		
					(					
					Propulsion torque after driving assistance coordination	<	3276.7	Nm		
					)					
					Increased tolerances of air charge determination expected	=	FALSE	-		
					Maximum proportion of evaporating fuel from the engine oil to the fuel demand (model based)	<=	0	-		
					Ratio total charge to charge in cylinder	<	15	-		
					)					
					(					
					Number of injections since start	>=	1200	-		
					OR					
					Number of injections since start	>=	1000	-		
					)					
					)					
					FRA adaption physically enabled	=	TRUE	-		
					(					
					Torque commanded to charge control (see Look-Up-Table #P2177-2)	>=	8.00018 to 99.98932	%		
					Torque commanded to charge control (see Look-Up-Table #P2177-1)	<=	0 to 44.99969	%		
					)					
					)					
					Operating mode dependent Readiness LRA	=	TRUE	-		
					(					
					(					
					Lambda closed loop control upstream catalyst, bank 1	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-6)	>=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	>=	0.3 to 1	sec		
					)					
					)					
					Upstream Lambda closed loop control for bank 1	=	TRUE	-		
					(					
					Lambda control disabled during after	=	FALSE	-		
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					(					
					enabling lambda control	>	8	sec		
					OR					
					(					
					Absolute value of diffence in lambda of bank 1	<=	0.1001	-		
					Difference of counter time and plant time constant a-(b+c) where a is Time running down after fuel	>	0	sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					b is plant time constant for continuous air/fuel control					
					c is plant parameter for dead time for lambda control					
					)					
					)					
					)					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1 signal quality	<=	12	-		
					)					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					and					
					Injector power stage fault is active	=	FALSE	-		
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					lambda control is active since warmup is finished	=	TRUE	-		
					Relative air charge	>	0	%		
					(					
					for time	>=	2	sec		
					)					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					Lambda set point	>=	0.6499	-		
					Minimum injection time limitation for GDI mode is active	=	FALSE	-		
					Width of dead zone for lambda control deviation	<	0.999969	-		
					(					
					Width of dead zone for lambda control deviation	<	0	-		
					OR					
					Lambda control continuos error	>	0	-		
					)					
					)					
					OR					
					(					
					Unrestricted operation of Upstream closed loop lambda controller of bank 2 is active	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-6)	<=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	<=	0.3 to 1	sec		
					)					
					)					
					Upstream Lambda closed loop control for bank 2	=	TRUE	-		
					(					
					Lambda control disabled during after	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					(					
						>	8	sec		
					enabling lambda control					
					OR					
					(					
					Absolute value of diffence in lambda of bank 2	<=	0.1001	-		
					Difference of counter time and plant time constant	>	0	sec		
					a-(b+c)					
					where a is Time running down after fuel					
					b is plant time constant of bank 2 for continuous air/fuel control					
					c is plant parameter of bank 2 for dead time for lambda control					
					)					
					)					
					)					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1, bank 2 signal quality	<=	12	-		
					)					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					and					
					Injector power stage fault is active	=	FALSE	-		
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					lambda control is active since warmup is finished	=	TRUE	-		
					Relative air charge	>	0	%		
					(					
					for time	>=	2	sec		
					)					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					Lambda set point	>=	0.6499	-		
					Minimum injection time limitation for GDI mode of bank 2 is active	=	FALSE	-		
					Width of dead zone for Width of dead zone for lambda control deviation	<	0.999969	-		
					(					
					Width of dead zone for lambda control deviation	=	0	-		
					OR					
					Lambda control continuos error	>	0	-		
					)					
					)					
					for time	>=	3	sec		
					)					
					(					
					Difference between lambda value referenced to sensor fitting of bank 1 and bank 2	>=	0	-		
					Lambda set point	<	1.04004	-		
					(					
					Detection of fuel mixture adaption	=	TRUE	-		
					(					
					Lambda set point of bank 2	>	0.8999	-		
					)					
					OR					
					Lambda set point of bank 2	>	0.95996	-		
					)					
					for time	>=	Max(A,B)	sec		
					where A - delay time for lambda fuel adaption (rich condition)		0	sec		
					where B - delay time for lambda fuel adaption (lean condition)		0	sec		
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Limitation due to fuel in oil is deactivated Limitation due to fuel in oil is deactivated for bank 2) (Half Engine mode is deactivated for time)) Lambda closed loop control upstream catalyst, bank 1) Multiplicative adaptation correction factor))) No pending or confirmed DTCs Basic enable conditions met	= TRUE - = TRUE - = TRUE - >= 10 sec = TRUE - > 0 - = see sheet inhibit tables - = see sheet enable tables -		
	P2179	Multiplicative part of the Long Term Fuel Trim for Bank 2 in gasoline mode is greater than a calibrated threshold.	Multiplicative part of LTFT, Bank 2	> 1.230011 -	LTFT Multiplicative mixture adaptation bank 2 is active (LTFT multiplicative part Bank 2 Integrator is stable which is of the following conditions ((Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 2 is stable (Multiplicative part of LTFT for bank 2 OR Multiplicative part of LTFT for bank 2) OR Similar conditions for multiplicative fuel adaptation fulfilled for bank 2 (Difference between Measured and reference Engine speed, bank 2 Difference between reference and measured Engine speed, bank 2 Difference between measured load value to reference load, bank 2 Difference between reference load value to measured load, bank 2)) LTFT multiplicative part Bank 2 is stable, which is the following conditions for time ((Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 2 is stable (Absolute change of LTFT multiplicative part, Bank 2) OR Absolute change of LTFT multiplicative part, Bank 2) (Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 2 is stable OR Change in short term fuel trim, Bank 2) Absolute difference between LTFT additive part, Bank 1 and its fixed value at beginning of multiplicative steady state phase Multiplicative mixture adaptation is active, bank 2 ((	= TRUE - = TRUE - = TRUE - > 1.230011 - < 0.769989 - = TRUE - <= 375 rpm <= 375 rpm <= 20 - <= 20 - >= 10 sec = TRUE - <= 1.999969 - <= 0.029999 - = TRUE - <= 0.049988 - <= 0.75 % = TRUE -	multiple	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Multiplicative mixture adaptation is active, which is the following conditions:	=	TRUE	-		
					(					
					Fra operational readiness independent of the operating mode is active, which is the following conditions for time	>=	2	sec		
					(					
					Fundamental operating mode independent operation readiness of mixture adaption	=	TRUE	-		
					(					
					(					
					Condition error suspicion in mixture adaptation	=	TRUE	-		
					(					
					Coolant Engine Temperature	>=	Min(C, D)	deg C		
					where C - cut-in temperature adaptive precontrol for lambda closed-loop control	=	54.8	deg C		
					where D - cut-in temperature fuel mixture adaptation in case of error suspicion	=	54.8	deg C		
					)					
					OR					
					Coolant Engine Temperature	>=	54.8	deg C		
					)					
					Basic willingness of fuel mixture adaptation, except engine temperature	=	TRUE	-		
					(					
					Intake air temperature	<	90	deg C		
					Conditiion of Wide Open Throttle	=	FALSE	-		
					(					
					Propulsion torque after driving assistance coordination	<	3276.7	Nm		
					)					
					Increased tolerances of air charge determination expected	=	FALSE	-		
					Maximum proportion of evaporating fuel from the engine oil to the fuel demand (model based)	<=	0	-		
					Ratio total charge to charge in cylinder	<	15	-		
					)					
					(					
					Number of injections since start	>=	1200	-		
					OR					
					Number of injections since start	>=	1000	-		
					)					
					)					
					FRA adaption physically enabled	=	TRUE	-		
					(					
					Torque commanded to charge control (see Look-Up-Table #P2177-2)	>=	8.00018 to 99.98932	%		
					Torque commanded to charge control (see Look-Up-Table #P2177-1)	<=	0 to 44.99969	%		
					)					
					)					
					Operating mode dependent Readiness LRA	=	TRUE	-		
					(					
					(					
					Lambda closed loop control upstream catalyst, bank 1	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-6)	>=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichmen	<=	19.0078	%/seg		
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					for time (see Look-Up-Table #P2177-5)	>=	0.3 to 1	sec		
					)					
					)					
					Upstream Lambda closed loop control for bank 1	=	TRUE	-		
					(					
					Lambda control disabled during after	=	FALSE	-		
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					(					
						>	8	sec		
					enabling lambda control					
					OR					
					(					
					Absolute value of diffence in lambda of bank 1	<=	0.1001	-		
					Difference of counter time and plant time constant	>	0	sec		
					a-(b+c)					
					where a is Time running down after fuel					
					b is plant time constant for continuous air/fuel control					
					c is plant parameter for dead time for lambda control					
					)					
					)					
					)					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1 signal quality	<=	12	-		
					)					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					and					
					Injector power stage fault is active	=	FALSE	-		
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					lambda control is active since warmup is finished	=	TRUE	-		
					Relative air charge	>	0	%		
					(					
					for time	>=	2	sec		
					)					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					Lambda set point	>=	0.6499	-		
					Minimum injection time limitation for GDI mode is active	=	FALSE	-		
					Width of dead zone for lambda control deviation	<	0.999969	-		
					(					
					Width of dead zone for lambda control deviation	<	0	-		
					OR					
					Lambda control continuos error	>	0	-		
					)					
					)					
					OR					
					(					
					Unrestricted operation of Upstream closed loop lambda controller of bank 2 is active	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-6)	<=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichmen	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	<=	0.3 to 1	sec		
					)					
					)					
					Upstream Lambda closed loop control for bank 2	=	TRUE	-		
					(					
					Lambda control disabled during after	=	FALSE	-		
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					(					
						>	8	sec		
					enabling lambda control					
					OR					
					(					
					Absolute value of diffence in lambda of bank 2	<=	0.1001	-		
					Difference of counter time and plant time constant	>	0	sec		
					a-(b+c)					
					where a is Time running down after fuel					
					b is plant time constant of bank 2 for continuous air/fuel control					
					c is plant parameter of bank 2 for dead time for lambda control					
					)					
					)					
					)					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1, bank 2 signal quality	<=	12	-		
					)					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					and					
					Injector power stage fault is active	=	FALSE	-		
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					lambda control is active since warmup is finished	=	TRUE	-		
					Relative air charge	>	0	%		
					(					
					for time	>=	2	sec		
					)					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					Lambda set point	>=	0.6499	-		
					Minimum injection time limitation for GDI mode of bank 2 is active	=	FALSE	-		
					Width of dead zone for Width of dead zone for lambda control deviation	<	0.999969	-		
					(					
					Width of dead zone for lambda control deviation	=	0	-		
					OR					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Lambda control continuos error	>	0	-		
							)					
							)					
							for time	>=	3	sec		
							)					
							(					
							Difference between lambda value referenced to sensor fitting of bank 1 and bank 2	>=	0	-		
							Lambda set point	<	1.04004	-		
							(					
							Detection of fuel mixture adaption	=	TRUE	-		
							(					
							Lambda set point of bank 2	>	0.8999	-		
							)					
							OR					
							Lambda set point of bank 2	>	0.95996	-		
							)					
							for time	>=	Max(A,B)	sec		
							where A - delay time for lambda fuel adaption (rich condition)		0	sec		
							where B - delay time for lambda fuel adaption (lean condition)		0	sec		
							)					
							Limitation due to fuel in oil is deactivated	=	TRUE	-		
							Limitation due to fuel in oil is deactivated for bank 2	=	TRUE	-		
							)					
							(					
							Half Engine mode is deactivated	=	TRUE	-		
							for time	>=	10	sec		
							)					
							)					
							Lambda closed loop control upstream catalyst, bank 2	=	TRUE	-		
							)					
							Multiplicative adaptation correction factor of bank 2	>	0	-		
							)					
							)					
							)					
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
							Basic enable conditions met	=	see sheet enable tables	-		
	P2180	Multiplicative part of the Long Term Fuel Trim for Bank 2 in gasoline mode is less than a calibrated threshold.	Multiplicative part of LTFT for bank 2	<	0.769989	-	LTFT Multiplicative mixture adaptation bank 2 is active	=	TRUE	-	multiple	2 Trips
							(					
							LTFT multiplicative part Bank 2 Integrator is stable which is of the following conditions	=	TRUE	-		
							(					
							(					
							Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 2 is stable	=	TRUE	-		
							(					
							Multiplicative part of LTFT for bank 2	>	1.230011	-		
							OR					
							Multiplicative part of LTFT for bank 2	<	0.769989	-		
							)					
							OR					
							Similar conditions for multiplicative fuel adaptation fulfilled for bank 2	=	TRUE	-		
							(					
							Difference between Measured and reference Engine speed, bank 2	<=	375	rpm		
							Difference between reference and measured Engine speed, bank 2	<=	375	rpm		
							Difference between measured load value to reference load, bank 2	<=	20	-		
							Difference between reference load value to measured load, bank 2	<=	20	-		
							)					
							)					
							LTFT multiplicative part Bank 2 is stable, which is the following conditions for time	>=	10	sec		
							(					
							(					
							Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 2 is stable	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					Absolute change of LTFT multiplicative part, Bank 2	<=	1.999969	-		
					)					
					OR					
					Absolute change of LTFT multiplicative part, Bank 2	<=	0.029999	-		
					)					
					(					
					Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 2 is stable	=	TRUE	-		
					OR					
					Change in short term fuel trim, Bank 2	<=	0.049988	-		
					)					
					Absolute difference between LTFT additive part, Bank 1 and its fixed value at beginning of multiplicative steady state phase	<=	0.75	%		
					Multiplicative mixture adaptation is active, bank 2	=	TRUE	-		
					(					
					(					
					Multiplicative mixture adaptation is active, which is the following conditions:	=	TRUE	-		
					(					
					Fra operational readiness independent of the operating mode is active, which is the following conditions for time	>=	2	sec		
					(					
					Fundamental operating mode independent operation readiness of mixture adaption	=	TRUE	-		
					(					
					(					
					Condition error suspicion in mixture adaptation	=	TRUE	-		
					(					
					Coolant Engine Temperature	>=	Min(C, D)	deg C		
					where C - cut-in temperature adaptive precontrol for lambda closed-loop control	=	54.8	deg C		
					where D - cut-in temperature fuel mixture adaptation in case of error suspicion	=	54.8	deg C		
					)					
					OR					
					Coolant Engine Temperature	>=	54.8	deg C		
					)					
					Basic willingness of fuel mixture adaptation, except engine temperature	=	TRUE	-		
					(					
					Intake air temperature	<	90	deg C		
					Conditiion of Wide Open Throttle	=	FALSE	-		
					(					
					Propulsion torque after driving assistance coordination	<	3276.7	Nm		
					)					
					Increased tolerances of air charge determination expected	=	FALSE	-		
					Maximum proportion of evaporating fuel from the engine oil to the fuel demand (model based)	<=	0	-		
					Ratio total charge to charge in cylinder	<	15	-		
					)					
					(					
					Number of injections since start	>=	1200	-		
					OR					
					Number of injections since start	>=	1000	-		
					)					
					)					
					FRA adaption physically enabled	=	TRUE	-		
					(					
					Torque commanded to charge control (see Look-Up-Table #P2177-2)	>=	8.00018 to 99.98932	%		
					Torque commanded to charge control (see Look-Up-Table #P2177-1)	<=	0 to 44.99969	%		
					)					
					)					
					Operating mode dependent Readiness LRA	=	TRUE	-		
					(					
					(					
					Lambda closed loop control upstream catalyst, bank 1	=	TRUE	-		
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-6)	>=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichmen	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	>=	0.3 to 1	sec		
					)					
					)					
					Upstream Lambda closed loop control for bank 1	=	TRUE	-		
					(					
					Lambda control disabled during after	=	FALSE	-		
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					(					
						>	8	sec		
					enabling lambda control					
					OR					
					(					
					Absolute value of diffence in lambda of bank 1	<=	0.1001	-		
					Difference of counter time and plant time constant	>	0	sec		
					a-(b+c)					
					where a is Time running down after fuel					
					b is plant time constant for continuous air/fuel control					
					c is plant parameter for dead time for lambda control					
					)					
					)					
					)					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1 signal quality	<=	12	-		
					)					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					and					
					Injector power stage fault is active	=	FALSE	-		
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					lambda control is active since warmup is finished	=	TRUE	-		
					Relative air charge	>	0	%		
					(					
					for time	>=	2	sec		
					)					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					Lambda set point	>=	0.6499	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Minimum injection time limitation for GDI mode is active	=	FALSE	-		
					Width of dead zone for lambda control deviation	<	0.999969	-		
					(					
					Width of dead zone for lambda control deviation	<	0	-		
					OR					
					Lambda control continuos error	>	0	-		
					)					
					)					
					OR					
					(					
					Unrestricted operation of Upstream closed loop lambda controller of bank 2 is active	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-6)	<=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichmen	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	<=	0.3 to 1	sec		
					)					
					)					
					Upstream Lambda closed loop control for bank 2	=	TRUE	-		
					(					
					Lambda control disabled during after	=	FALSE	-		
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					(					
						>	8	sec		
					enabling lambda control					
					OR					
					(					
					Absolute value of diffence in lambda of bank 2	<=	0.1001	-		
					Difference of counter time and plant time constant	>	0	sec		
					a-(b+c)					
					where a is Time running down after fuel					
					b is plant time constant of bank 2 for continuous air/fuel control					
					c is plant parameter of bank 2 for dead time for lambda control					
					)					
					)					
					)					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1, bank 2 signal quality	<=	12	-		
					)					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					Injector power stage fault is active	=	FALSE	-		
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					)					
					lambda control is active since warmup is finished	=	TRUE	-		
					Relative air charge	>	0	%		
					for time	>=	2	sec		
					)					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					Lambda set point	>=	0.6499	-		
					Minimum injection time limitation for GDI mode of bank 2 is active	=	FALSE	-		
					Width of dead zone for Width of dead zone for lambda control deviation	<	0.999969	-		
					(					
					Width of dead zone for lambda control deviation	=	0	-		
					OR					
					Lambda control continuos error	>	0	-		
					)					
					)					
					for time	>=	3	sec		
					)					
					(					
					Difference between lambda value referenced to sensor fitting of bank 1 and bank 2	>=	0	-		
					Lambda set point	<	1.04004	-		
					(					
					Detection of fuel mixture adaption	=	TRUE	-		
					(					
					Lambda set point of bank 2	>	0.8999	-		
					)					
					OR					
					Lambda set point of bank 2	>	0.95996	-		
					)					
					for time	>=	Max(A,B)	sec		
					where A - delay time for lambda fuel adaption (rich condition)		0	sec		
					where B - delay time for lambda fuel adaption (lean condition)		0	sec		
					)					
					Limitation due to fuel in oil is deactivated	=	TRUE	-		
					Limitation due to fuel in oil is deactivated for bank 2	=	TRUE	-		
					)					
					(					
					Half Engine mode is deactivated	=	TRUE	-		
					for time	>=	10	sec		
					)					
					)					
					Lambda closed loop control upstream catalyst, bank 2	=	TRUE	-		
					)					
					Multiplicative adaptation correction factor of bank 2	>	0	-		
					)					
					)					
					)					
					No pending or confirmed DTCs	=	see sheet inhibit tables	-		
					Basic enable conditions met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	P2E68	Multiplicative part of the Long Term Fuel Trim for Bank 1 in ZAS mode is greater than a calibrated threshold.	Multiplicative part of LTFT for bank 1 in ZAS mode	> 1.230011 -	LTFT Multiplicative mixture adaptation bank 1 in ZAS operation mode is active	= TRUE -	multiple	2 Trips
					(			
					LTFT multiplicative part Bank 1 Integrator is stable which is of the following conditions	= TRUE -		
					(			
					(			
					Condition diagnostic thresholds of multiplicative correction in ZAS mode currently exceeded of bank 1 is stable	= TRUE -		
					(			
					Multiplicative part of LTFT for bank 1 in ZAS mode	> 1.230011 -		
					OR			
					Multiplicative part of LTFT for bank 1 in ZAS mode	< 0.769989 -		
					)			
					OR			
					Similar conditions for multiplicative fuel adaptation fulfilled	= TRUE -		
					(			
					Difference between Measured and reference Engine speed	<= 375 rpm		
					Difference between reference and measured Engine speed	<= 375 rpm		
					Difference between measured load value to reference load	<= 20 -		
					Difference between reference load value to measured load	<= 20 -		
					)			
					)			
					LTFT multiplicative part Bank 1 is stable, which is the following conditions for time	>= 10 sec		
					(			
					(			
					Condition diagnostic thresholds of multiplicative correction in ZAS mode currently exceeded	= TRUE -		
					(			
					Absolute change of LTFT multiplicative part, Bank 1	<= 1.999969 -		
					)			
					OR			
					Absolute change of LTFT multiplicative part, Bank 1	<= 0.029999 -		
					)			
					(			
					Condition diagnostic thresholds of multiplicative correction in ZAS mode currently exceeded	= TRUE -		
					OR			
					Change in short term fuel trim, Bank 1	<= 0.049988 -		
					)			
					Absolute difference between LTFT additive part, Bank 1 and its fixed value at beginning of multiplicative steady state phase	<= 0.75 %		
					Multiplicative mixture adaptation in ZAS mode is active	= TRUE -		
					(			
					Multiplicative mixture adaptation is active, which is the following conditions:	= TRUE -		
					(			
					Fraz operational readiness independent of the operating mode is active, which is the following conditions for time	>= 2 sec		
					(			
					Fundamental operating mode independent operation readiness of mixture adaption	= TRUE -		
					(			
					(			
					Condition error suspicion in mixture adaptation	= TRUE -		
					(			
					Coolant Engine Temperature	>= Min(C, D) deg C		
					where C - cut-in temperature adaptive precontrol for lambda closed-loop control	= 54.8 deg C		
					where D - cut-in temperature fuel mixture adaptation in case of error suspicion	= 54.8 deg C		
					)			
					OR			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Coolant Engine Temperature	>=	54.8	deg C		
					)					
					Basic willingness of fuel mixture adaptation, except engine temperature	=	TRUE	-		
					(					
					Intake air temperature	<	90	deg C		
					Conditiion of Wide Open Throttle	=	FALSE	-		
					(					
					Propulsion torque after driving assistance coordination	<	3276.7	Nm		
					)					
					Increased tolerances of air charge determination expected	=	FALSE	-		
					Maximum proportion of evaporating fuel from the engine oil to the fuel demand (model based)	<=	0	-		
					Ratio total charge to charge in cylinder	<	15	-		
					)					
					(					
					Number of injections since start	>=	1200	-		
					OR					
					Number of injections since start	>=	1000	-		
					)					
					)					
					FRAZ adaption physically enabled	=	TRUE	-		
					(					
					Torque commanded to charge control (see Look-Up-Table #P2E68-2)	>=	3.99933 to 99.98932	%		
					Torque commanded to charge control (see Look-Up-Table #P2E68-1)	<=	0 to 30.00031	%		
					)					
					)					
					Operating mode dependent Readiness LRA	=	TRUE	-		
					(					
					(					
					Lambda closed loop control upstream catalyst, bank 1	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-6)	>=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichmen	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	>=	0.3 to 1	sec		
					)					
					)					
					Upstream Lambda closed loop control for bank 1	=	TRUE	-		
					(					
					Lambda control disabled during after	=	FALSE	-		
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					(					
						>	8	sec		
					enabling lambda control					
					OR					
					(					
					Absolute value of diffence in lambda of bank 1	<=	0.1001	-		
					Difference of counter time and plant time constant a-(b+c)	>	0	sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					where a is Time running down after fuel					
					b is plant time constant for continuous air/fuel control					
					c is plant parameter for dead time for lambda control					
					)					
					)					
					)					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1 signal quality	<=	12	-		
					)					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					Injector power stage fault is active	=	FALSE	-		
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					lambda control is active since warmup is finished	=	TRUE	-		
					Relative air charge	>	0	%		
					for time	>=	2	sec		
					)					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					Lambda set point	>=	0.6499	-		
					Minimum injection time limitation for GDI mode is active	=	FALSE	-		
					Width of dead zone for lambda control deviation	<	0.999969	-		
					(					
					Width of dead zone for lambda control deviation	<	0	-		
					OR					
					Lambda control continuos error	>	0	-		
					)					
					)					
					OR					
					(					
					Unrestricted operation of Upstream closed loop lambda controller of bank 2 is active	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-6)	<=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichmen	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	<=	0.3 to 1	sec		
					)					
					)					
					Upstream Lambda closed loop control for bank 2	=	TRUE	-		
					(					
					Lambda control disabled during after	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					(					
						>	8	sec		
					enabling lambda control					
					OR					
					(					
					Absolute value of diffence in lambda of bank 2	<=	0.1001	-		
					Difference of counter time and plant time constant	>	0	sec		
					a-(b+c)					
					where a is Time running down after fuel					
					b is plant time constant of bank 2 for continuous air/fuel control					
					c is plant parameter of bank 2 for dead time for lambda control					
					)					
					)					
					)					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1, bank 2 signal quality	<=	12	-		
					)					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					Injector power stage fault is active	=	FALSE	-		
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					lambda control is active since warmup is finished	=	TRUE	-		
					Relative air charge	>	0	%		
					(					
					for time	>=	2	sec		
					)					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					Lambda set point	>=	0.6499	-		
					Minimum injection time limitation for GDI mode of bank 2 is active	=	FALSE	-		
					Width of dead zone for Width of dead zone for lambda control deviation	<	0.999969	-		
					(					
					Width of dead zone for lambda control deviation	=	0	-		
					OR					
					Lambda control continuos error	>	0	-		
					)					
					)					
					for time	>=	3	sec		
					)					
					(					
					Difference between lambda value referenced to sensor fitting of bank 1 and bank 2	>=	0	-		
					Lambda set point	<	1.04004	-		
					(					
					Detection of fuel mixture adaption	=	TRUE	-		
					(					
					Lambda set point of bank 2	>	0.8999	-		
					)					
					OR					
					Lambda set point of bank 2	>	0.95996	-		
					)					
					for time	>=	Max(A,B)	sec		
					where A - delay time for lambda fuel adaption (rich condition)		0	sec		
					where B - delay time for lambda fuel adaption (lean condition)		0	sec		
					)					
					Limitation due to fuel in oil is deactivated	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Limitation due to fuel in oil is deactivated for bank 2	=	TRUE	-		
							)					
							Lambda closed loop control upstream catalyst, bank 1	=	TRUE	-		
							)					
							Multiplicative adaptation correction factor	>	0	-		
							)					
							)					
							)					
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
							Basic enable conditions met	=	see sheet enable tables	-		
	P2E69	Multiplicative part of the Long Term Fuel Trim for Bank 1 in ZAS mode is less than a calibrated threshold.	Multiplicative part of LTFT for bank 1 in ZAS mode	<	0.769989	-	LTFT Multiplicative mixture adaptation bank 1 in ZAS operation mode is active	=	TRUE	-	multiple	2 Trips
							(					
							LTFT multiplicative part Bank 1 Integrator is stable which is of the following conditions	=	TRUE	-		
							(					
							(					
							Condition diagnostic thresholds of multiplicative correction in ZAS mode currently exceeded of bank 1 is stable	=	TRUE	-		
							(					
							Multiplicative part of LTFT for bank 1 in ZAS mode	>	1.230011	-		
							OR					
							Multiplicative part of LTFT for bank 1 in ZAS mode	<	0.769989	-		
							)					
							OR					
							Similar conditions for multiplicative fuel adaptation fulfilled	=	TRUE	-		
							(					
							Difference between Measured and reference Engine speed	<=	375	rpm		
							Difference between reference and measured Engine speed	<=	375	rpm		
							Difference between measured load value to reference load	<=	20	-		
							Difference between reference load value to measured load	<=	20	-		
							)					
							)					
							LTFT multiplicative part Bank 1 is stable, which is the following conditions for time	>=	10	sec		
							(					
							(					
							Condition diagnostic thresholds of multiplicative correction in ZAS mode currently exceeded	=	TRUE	-		
							(					
							Absolute change of LTFT multiplicative part, Bank 1	<=	1.999969	-		
							)					
							OR					
							Absolute change of LTFT multiplicative part, Bank 1	<=	0.029999	-		
							)					
							(					
							Condition diagnostic thresholds of multiplicative correction in ZAS mode currently exceeded	=	TRUE	-		
							OR					
							Change in short term fuel trim, Bank 1	<=	0.049988	-		
							)					
							Absolute difference between LTFT additive part, Bank 1 and its fixed value at beginning of multiplicative steady state phase	<=	0.75	%		
							Multiplicative mixture adaptation in ZAS mode is active	=	TRUE	-		
							(					
							Multiplicative mixture adaptation is active, which is the following conditions:	=	TRUE	-		
							(					
							Fraz operational readiness independent of the operating mode is active, which is the following conditions for time	>=	2	sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					Fundamental operating mode independent operation readiness of mixture adaption	=	TRUE	-		
					(					
					(					
					Condition error suspicion in mixture adaptation	=	TRUE	-		
					(					
					Coolant Engine Temperature	>=	Min(C, D)	deg C		
					where C - cut-in temperature adaptive precontrol for lambda closed-loop control	=	54.8	deg C		
					where D - cut-in temperature fuel mixture adaptation in case of error suspicion	=	54.8	deg C		
					)					
					OR					
					Coolant Engine Temperature	>=	54.8	deg C		
					)					
					Basic willingness of fuel mixture adaptation, except engine temperature	=	TRUE	-		
					(					
					Intake air temperature	<	90	deg C		
					Conditiion of Wide Open Throttle	=	FALSE	-		
					(					
					Propulsion torque after driving assistance coordination	<	3276.7	Nm		
					)					
					Increased tolerances of air charge determination expected	=	FALSE	-		
					Maximum proportion of evaporating fuel from the engine oil to the fuel demand (model based)	<=	0	-		
					Ratio total charge to charge in cylinder	<	15	-		
					)					
					(					
					Number of injections since start	>=	1200	-		
					OR					
					Number of injections since start	>=	1000	-		
					)					
					)					
					FRAZ adaption physically enabled	=	TRUE	-		
					(					
					Torque commanded to charge control (see Look-Up-Table #P2E68-2)	>=	3.99933 to 99.98932	%		
					Torque commanded to charge control (see Look-Up-Table #P2E68-1)	<=	0 to 30.00031	%		
					)					
					)					
					Operating mode dependent Readiness LRA	=	TRUE	-		
					(					
					(					
					Lambda closed loop control upstream catalyst, bank 1	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-6)	>=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichmen	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	>=	0.3 to 1	sec		
					)					
					)					
					Upstream Lambda closed loop control for bank 1	=	TRUE	-		
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Lambda control disabled during after	=	FALSE	-		
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					(					
					enabling lambda control	>	8	sec		
					OR					
					(					
					Absolute value of diffence in lambda of bank 1	<=	0.1001	-		
					Difference of counter time and plant time constant	>	0	sec		
					a-(b+c)					
					where a is Time running down after fuel					
					b is plant time constant for continuous air/fuel control					
					c is plant parameter for dead time for lambda control					
					)					
					)					
					)					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1 signal quality	<=	12	-		
					)					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					Injector power stage fault is active	=	FALSE	-		
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					lambda control is active since warmup is finished	=	TRUE	-		
					Relative air charge	>	0	%		
					for time	>=	2	sec		
					)					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					Lambda set point	>=	0.6499	-		
					Minimum injection time limitation for GDI mode is active	=	FALSE	-		
					Width of dead zone for lambda control deviation	<	0.999969	-		
					(					
					Width of dead zone for lambda control deviation	<	0	-		
					OR					
					Lambda control continuos error	>	0	-		
					)					
					)					
					OR					
					(					
					Unrestricted operation of Upstream closed loop lambda controller of bank 2 is active	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-6)	<=	0.5 to 1	sec		
					)					
					OR					
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichmen	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	<=	0.3 to 1	sec		
					)					
					)					
					Upstream Lambda closed loop control for bank 2	=	TRUE	-		
					(					
					Lambda control disabled during after	=	FALSE	-		
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					(					
					enabling lambda control	>	8	sec		
					OR					
					(					
					Absolute value of diffence in lambda of bank 2	<=	0.1001	-		
					Difference of counter time and plant time constant	>	0	sec		
					a-(b+c)					
					where a is Time running down after fuel					
					b is plant time constant of bank 2 for continuous air/fuel control					
					c is plant parameter of bank 2 for dead time for lambda control					
					)					
					)					
					)					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1, bank 2 signal quality	<=	12	-		
					)					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					Injector power stage fault is active	=	FALSE	-		
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					lambda control is active since warmup is finished	=	TRUE	-		
					Relative air charge	>	0	%		
					(					
					for time	>=	2	sec		
					)					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					Lambda set point	>=	0.6499	-		
					Minimum injection time limitation for GDI mode of bank 2 is active	=	FALSE	-		
					Width of dead zone for Width of dead zone for lambda control deviation	<	0.999969	-		
					(					
					Width of dead zone for lambda control deviation	=	0	-		
					OR					
					Lambda control continuos error	>	0	-		
					)					
					)					
					for time	>=	3	sec		
					)					
					(					
					Difference between lambda value referenced to sensor fitting of bank 1 and bank 2	>=	0	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Lambda set point	< 1.04004 -		
					(			
					Detection of fuel mixture adaption	= TRUE -		
					(			
					Lambda set point of bank 2	> 0.8999 -		
					)			
					OR			
					Lambda set point of bank 2	> 0.95996 -		
					)			
					for time	>= Max(A,B) sec		
					where A - delay time for lambda fuel adaption (rich condition)	0 sec		
					where B - delay time for lambda fuel adaption (lean condition)	0 sec		
					)			
					Limitation due to fuel in oil is deactivated	= TRUE -		
					Limitation due to fuel in oil is deactivated for bank 2	= TRUE -		
					)			
					Lambda closed loop control upstream catalyst, bank 1	= TRUE -		
					)			
					Multiplicative adaptation correction factor	> 0 -		
					)			
					)			
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P2E6A	Multiplicative part of the Long Term Fuel Trim for Bank 2 in ZAS mode is greater than a calibrated threshold.	Multiplicative part of LTFT for bank 2 in ZAS mode	> 1.230011 -	LTFT Multiplicative mixture adaptation bank 2 in ZAS operation mode is active	= TRUE -	multiple	2 Trips
					(			
					LTFT multiplicative part Bank 2 Integrator is stable which is of the following conditions	= TRUE -		
					(			
					(			
					Condition diagnostic thresholds of multiplicative correction in ZAS mode currently exceeded of bank 2 is stable	= TRUE -		
					(			
					Multiplicative part of LTFT for bank 2 in ZAS mode	> 1.230011 -		
					OR			
					Multiplicative part of LTFT for bank 2 in ZAS mode	< 0.769989 -		
					)			
					OR			
					Similar conditions for multiplicative fuel adaptation fulfilled for bank 2	= TRUE -		
					(			
					Difference between Measured and reference Engine speed, bank 2	<= 375 rpm		
					and			
					Difference between reference and measured Engine speed, bank 2	<= 375 rpm		
					and			
					Difference between measured load value to reference load, bank 2	<= 20 -		
					and			
					Difference between reference load value to measured load, bank 2	<= 20 -		
					)			
					)			
					and			
					LTFT multiplicative part Bank 2 is stable, which is the following conditions for time	>= 10 sec		
					(			
					(			
					Condition diagnostic thresholds of multiplicative correction in ZAS mode currently exceeded of bank 2 is stable	= TRUE -		
					(			
					Absolute change of LTFT multiplicative part, Bank 2	<= 1.999969 -		
					)			
					OR			
					Absolute change of LTFT multiplicative part, Bank 2	<= 0.029999 -		
					)			
					and			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					Condition diagnostic thresholds of multiplicative correction in ZAS mode currently exceeded of bank 2 is stable	=	TRUE	-		
					OR					
					Change in short term fuel trim, Bank 2	<=	0.049988	-		
					)					
					and					
					Absolute difference between LTFT additive part, Bank 2 and its fixed value at beginning of multiplicative steady state phase	<=	0.75	%		
					and					
					Multiplicative mixture adaptation in ZAS mode is active, bank 2	=	TRUE	-		
					(					
					Multiplicative mixture adaptation is active, which is the following conditions:	=	TRUE	-		
					(					
					Fraz operational readiness independent of the operating mode is active, which is the following conditions for time	>=	2	sec		
					(					
					Fundamental operating mode independent operation readiness of mixture adaption	=	TRUE	-		
					(					
					(					
					Condition error suspicion in mixture adaptation	=	TRUE	-		
					(					
					Coolant Engine Temperature	>=	Min(C, D)	deg C		
					where C - cut-in temperature adaptive precontrol for lambda closed-loop control	=	54.8	deg C		
					where D - cut-in temperature fuel mixture adaptation in case of error suspicion	=	54.8	deg C		
					)					
					OR					
					Coolant Engine Temperature	>=	54.8	deg C		
					)					
					and					
					Basic willingness of fuel mixture adaptation, except engine temperature	=	TRUE	-		
					(					
					Intake air temperature	<	90	deg C		
					and					
					Conditiion of Wide Open Throttle	=	FALSE	-		
					(					
					Propulsion torque after driving assistance coordination	<	3276.7	Nm		
					)					
					and					
					Increased tolerances of air charge determination expected	=	FALSE	-		
					and					
					Maximum proportion of evaporating fuel from the engine oil to the fuel demand (model based)	<=	0	-		
					and					
					Ratio total charge to charge in cylinder	<	15	-		
					)					
					and					
					(					
					Number of injections since start	>=	1200	-		
					OR					
					Number of injections since start	>=	1000	-		
					)					
					)					
					and					
					FRAZ adaption physically enabled	=	TRUE	-		
					(					
					Torque commanded to charge control (see Look-Up-Table #P2E68-2)	>=	3.99933 to 99.98932	%		
					and					
					Torque commanded to charge control (see Look-Up-Table #P2E68-1)	<=	0 to 30.00031	%		
					)					
					)					
					and					
					Operating mode dependent Readiness LRA	=	TRUE	-		
					(					
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Lambda closed loop control upstream catalyst, bank 1	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time(see Look-Up-Table #P2177-6)	>=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichmen	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	>=	0.3 to 1	sec		
					)					
					)					
					and					
					Upstream Lambda closed loop control for bank 1	=	TRUE	-		
					(					
					Lambda control disabled during after	=	FALSE	-		
					and					
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					and					
					(					
						>	8	sec		
					enabling lambda control					
					OR					
					(					
					Absolute value of diffence in lambda of bank 1	<=	0.1001	-		
					and					
					Difference of counter time and plant time constant	>	0	sec		
					a-(b+c)					
					where a is Time running down after fuel					
					b is plant time constant for continuous air/fuel control					
					c is plant parameter for dead time for lambda control					
					)					
					)					
					)					
					and					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1 signal quality	<=	12	-		
					)					
					and					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					and					
					Injector power stage fault is active	=	FALSE	-		
					and					
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					and					
					lambda control is active since warmup is finished	=	TRUE	-		
					and					
					Relative air charge	>	0	%		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					for time	>=	2	sec		
					)					
					and					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					and					
					Lambda set point	>=	0.6499	-		
					and					
					Minimum injection time limitation for GDI mode is active	=	FALSE	-		
					and					
					Width of dead zone for lambda control deviation	<	0.999969	-		
					and					
					(					
					Width of dead zone for lambda control deviation	<	0	-		
					OR					
					Lambda control continuos error	>	0	-		
					)					
					)					
					OR					
					(					
					Unrestricted operation of Upstream closed loop lambda controller of bank 2 is active	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time(see Look-Up-Table #P2177-6)	<=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichmen	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	<=	0.3 to 1	sec		
					)					
					)					
					and					
					Upstream Lambda closed loop control for bank 2	=	TRUE	-		
					(					
					Lambda control disabled during after	=	FALSE	-		
					and					
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					and					
					(					
						>	8	sec		
					enabling lambda control					
					OR					
					(					
					Absolute value of diffence in lambda of bank 2	<=	0.1001	-		
					and					
					Difference of counter time and plant time constant	>	0	sec		
					a-(b+c)					
					where a is Time running down after fuel					
					b is plant time constant of bank 2 for continuous air/fuel control					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					c is plant parameter of bank 2 for dead time for lambda control			
					)			
					)			
					)			
					and			
					LSU sensor upstream to catalyst ready for operation	= TRUE -		
					(			
					Level of lambda sensor 1, bank 2 signal quality	<= 12 -		
					)			
					and			
					Lambda control disabled by a fault	= FALSE -		
					(			
					Catalyst damaging misfire rate exceeded	= FALSE -		
					and			
					Injector power stage fault is active	= FALSE -		
					and			
					Camshaft fault in critical operating range present and MAF is main air charge sensor	= FALSE -		
					)			
					and			
					lambda control is active since warmup is finished	= TRUE -		
					and			
					Relative air charge	> 0 %		
					for time	>= 2 sec		
					)			
					and			
					Lamda control active due to GDI mode change	= TRUE -		
					(			
					GDI mode homogeneous	= TRUE -		
					for time	>= 0.8 sec		
					)			
					)			
					and			
					Lambda set point	>= 0.6499 -		
					and			
					Minimum injection time limitation for GDI mode of bank 2 is active	= FALSE -		
					and			
					Width of dead zone for Width of dead zone for lambda control deviation	< 0.999969 -		
					and			
					(			
					Width of dead zone for lambda control deviation	= 0 -		
					OR			
					Lambda control continuos error	> 0 -		
					)			
					)			
					for time	>= 3 sec		
					)			
					and			
					(			
					Difference between lambda value referenced to sensor fitting of bank 1 and bank 2	>= 0 -		
					and			
					Lambda set point	< 1.04004 -		
					and			
					(			
					Detection of fuel mixture adaption	= TRUE -		
					(			
					Lambda set point of bank 2	> 0.8999 -		
					)			
					OR			
					Lambda set point of bank 2	> 0.95996 -		
					)			
					for time	>= Max(A,B) sec		
					where A - delay time for lambda fuel adaption (rich condition)	0 sec		
					where B - delay time for lambda fuel adaption (lean condition)	0 sec		
					)			
					and			
					Limitation due to fuel in oil is deactivated	= TRUE -		
					and			
					Limitation due to fuel in oil is deactivated for bank 2	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					) and Lambda closed loop control upstream catalyst, bank 2) Multiplicative adaptation correction factor, bank 2))) No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 0 - = see sheet inhibit tables - = see sheet enable tables -		
	P2E6B	Multiplicative part of the Long Term Fuel Trim for Bank 2 in ZAS mode is less than a calibrated threshold.	Multiplicative part of LTFT for bank 2 in ZAS mode	< 0.769989 -	LTFT Multiplicative mixture adaptation bank 2 in ZAS operation mode is active (LTFT multiplicative part Bank 2 Integrator is stable which is of the following conditions ((Condition diagnostic thresholds of multiplicative correction in ZAS mode currently exceeded of bank 2 is stable (Multiplicative part of LTFT for bank 2 in ZAS mode OR Multiplicative part of LTFT for bank 2 in ZAS mode) OR Similar conditions for multiplicative fuel adaptation fulfilled for bank 2 (Difference between Measured and reference Engine speed, bank 2 and Difference between reference and measured Engine speed, bank 2 and Difference between measured load value to reference load, bank 2 and Difference between reference load value to measured load, bank 2)) and LTFT multiplicative part Bank 2 is stable, which is the following conditions for time ((Condition diagnostic thresholds of multiplicative correction in ZAS mode currently exceeded of bank 2 is stable (Absolute change of LTFT multiplicative part, Bank 2) OR Absolute change of LTFT multiplicative part, Bank 2) and (Condition diagnostic thresholds of multiplicative correction in ZAS mode currently exceeded of bank 2 is stable OR Change in short term fuel trim, Bank 2) and Absolute difference between LTFT additive part, Bank 2 and its fixed value at beginning of multiplicative steady state phase and Multiplicative mixture adaptation in ZAS mode is active, bank 2	= TRUE - = TRUE - = TRUE - > 1.230011 - < 0.769989 - = TRUE - <= 375 rpm <= 375 rpm <= 20 - <= 20 - >= 10 sec = TRUE - <= 1.999969 - <= 0.029999 - = TRUE - <= 0.049988 - <= 0.75 % = TRUE -	multiple	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					Multiplicative mixture adaptation is active, which is the following conditions:	=	TRUE	-		
					(					
					Fraz operational readiness independent of the operating mode is active, which is the following conditions for time	>=	2	sec		
					(					
					Fundamental operating mode independent operation readiness of mixture adaption	=	TRUE	-		
					(					
					(					
					Condition error suspicion in mixture adaptation	=	TRUE	-		
					(					
					Coolant Engine Temperature	>=	Min(C, D)	deg C		
					where C - cut-in temperature adaptive precontrol for lambda closed-loop control	=	54.8	deg C		
					where D - cut-in temperature fuel mixture adaptation in case of error suspicion	=	54.8	deg C		
					)					
					OR					
					Coolant Engine Temperature	>=	54.8	deg C		
					)					
					and					
					Basic willingness of fuel mixture adaptation, except engine temperature	=	TRUE	-		
					(					
					Intake air temperature	<	90	deg C		
					and					
					Conditiion of Wide Open Throttle	=	FALSE	-		
					(					
					Propulsion torque after driving assistance coordination	<	3276.7	Nm		
					)					
					and					
					Increased tolerances of air charge determination expected	=	FALSE	-		
					and					
					Maximum proportion of evaporating fuel from the engine oil to the fuel demand (model based)	<=	0	-		
					and					
					Ratio total charge to charge in cylinder	<	15	-		
					)					
					and					
					(					
					Number of injections since start	>=	1200	-		
					OR					
					Number of injections since start	>=	1000	-		
					)					
					)					
					and					
					FRAZ adaption physically enabled	=	TRUE	-		
					(					
					Torque commanded to charge control (see Look-Up-Table #P2E68-2)	>=	3.99933 to 99.98932	%		
					and					
					Torque commanded to charge control (see Look-Up-Table #P2E68-1)	<=	0 to 30.00031	%		
					)					
					)					
					and					
					Operating mode dependent Readiness LRA	=	TRUE	-		
					(					
					(					
					Lambda closed loop control upstream catalyst, bank 1	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time(see Look-Up-Table #P2177-6)	>=	0.5 to 1	sec		
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichmen	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	>=	0.3 to 1	sec		
					)					
					)					
					and					
					Upstream Lambda closed loop control for bank 1	=	TRUE	-		
					(					
					Lambda control disabled during after	=	FALSE	-		
					and					
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					and					
					(					
						>	8	sec		
					enabling lambda control					
					OR					
					(					
					Absolute value of diffence in lambda of bank 1	<=	0.1001	-		
					and					
					Difference of counter time and plant time constant	>	0	sec		
					a-(b+c)					
					where a is Time running down after fuel					
					b is plant time constant for continuous air/fuel control					
					c is plant parameter for dead time for lambda control					
					)					
					)					
					)					
					and					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1 signal quality	<=	12	-		
					)					
					and					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					and					
					Injector power stage fault is active	=	FALSE	-		
					and					
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					and					
					lambda control is active since warmup is finished	=	TRUE	-		
					and					
					Relative air charge	>	0	%		
					for time	>=	2	sec		
					)					
					and					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					and					
					Lambda set point	>=	0.6499	-		
					and					
					Minimum injection time limitation for GDI mode is active	=	FALSE	-		
					and					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Width of dead zone for lambda control deviation	<	0.999969	-		
					and					
					(					
					Width of dead zone for lambda control deviation	<	0	-		
					OR					
					Lambda control continuos error	>	0	-		
					)					
					)					
					OR					
					(					
					Unrestricted operation of Upstream closed loop lambda controller of bank 2 is active	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time(see Look-Up-Table #P2177-6)	<=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichmen	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	<=	0.3 to 1	sec		
					)					
					)					
					and					
					Upstream Lambda closed loop control for bank 2	=	TRUE	-		
					(					
					Lambda control disabled during after	=	FALSE	-		
					and					
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					and					
					(					
					enabling lambda control	>	8	sec		
					OR					
					(					
					Absolute value of diffence in lambda of bank 2	<=	0.1001	-		
					and					
					Difference of counter time and plant time constant a-(b+c) where a is Time running down after fuel b is plant time constant of bank 2 for continuous air/fuel control c is plant parameter of bank 2 for dead time for lambda control	>	0	sec		
					)					
					)					
					)					
					and					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1, bank 2 signal quality	<=	12	-		
					)					
					and					
					Lambda control disabled by a fault	=	FALSE	-		
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					and					
					Injector power stage fault is active	=	FALSE	-		
					and					
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					and					
					lambda control is active since warmup is finished	=	TRUE	-		
					and					
					Relative air charge	>	0	%		
					for time	>=	2	sec		
					)					
					and					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					and					
					Lambda set point	>=	0.6499	-		
					and					
					Minimum injection time limitation for GDI mode of bank 2 is active	=	FALSE	-		
					and					
					Width of dead zone for Width of dead zone for lambda control deviation	<	0.999969	-		
					and					
					(					
					Width of dead zone for lambda control deviation	=	0	-		
					OR					
					Lambda control continuos error	>	0	-		
					)					
					)					
					for time	>=	3	sec		
					)					
					and					
					(					
					Difference between lambda value referenced to sensor fitting of bank 1 and bank 2	>=	0	-		
					and					
					Lambda set point	<	1.04004	-		
					and					
					(					
					Detection of fuel mixture adaption	=	TRUE	-		
					(					
					Lambda set point of bank 2	>	0.8999	-		
					)					
					OR					
					Lambda set point of bank 2	>	0.95996	-		
					)					
					for time	>=	Max(A,B)	sec		
					where A - delay time for lambda fuel adaption (rich condition)		0	sec		
					where B - delay time for lambda fuel adaption (lean condition)		0	sec		
					)					
					and					
					Limitation due to fuel in oil is deactivated	=	TRUE	-		
					and					
					Limitation due to fuel in oil is deactivated for bank 2	=	TRUE	-		
					)					
					and					
					Lambda closed loop control upstream catalyst, bank 2	=	TRUE	-		
					)					
					Multiplicative adaptation correction factor, bank 2	>	0	-		
					)					
					)					
					)					
					No pending or confirmed DTCs	=	see sheet inhibit tables	-		
					Basic enable conditions met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
	P2187	Additive part of the Long Term Fuel Trim for Bank 1 in gasoline mode is greater than a calibrated threshold	Additive part of LTFT, Bank 1	>	5.484	%	LTFT Additive mixture adaptation bank 1 is active	=	TRUE	-	multiple	2 Trips
							(					
							(					
							LTFT multiplicative part Bank 1 Integrator is stable which is of the following conditions	=	TRUE	-		
							(					
							(					
							Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 1 is stable	=	TRUE	-		
							(					
							Multiplicative part of LTFT for bank 1	>	1.230011	-		
							OR					
							Multiplicative part of LTFT for bank 1	<	0.769989	-		
							)					
							OR					
							Similar conditions for multiplicative fuel adaptation fulfilled	=	TRUE	-		
							(					
							Difference between Measured and reference Engine speed	<=	375	rpm		
							and					
							Difference between reference and measured Engine speed	<=	375	rpm		
							and					
							Difference between measured load value to reference load	<=	20	-		
							and					
							Difference between reference load value to measured load	<=	20	-		
							)					
							)					
							and					
							LTFT multiplicative part Bank 1 is stable, which is the following conditions for time	>=	10	sec		
							(					
							(					
							Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 1 is stable	=	TRUE	-		
							(					
							Absolute change of LTFT multiplicative part, Bank 1	<=	1.999969	-		
							)					
							OR					
							Absolute change of LTFT multiplicative part, Bank 1	<=	0.029999	-		
							)					
							and					
							(					
							Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 1 is stable	=	TRUE	-		
							OR					
							Change in short term fuel trim, Bank 1	<=	0.049988	-		
							)					
							and					
							Absolute difference between LTFT additive part, Bank 1 and its fixed value at beginning of multiplicative steady state phase	<=	0.75	%		
							and					
							Multiplicative mixture adaptation is active	=	TRUE	-		
							(					
							(					
							Multiplicative mixture adaptation is active, which is the following conditions:	=	TRUE	-		
							(					
							Fra operational readiness independent of the operating mode is active, which is the following conditions for time	>=	2	sec		
							(					
							Fundamental operating mode independent operation readiness of mixture adaption	=	TRUE	-		
							(					
							(					
							Condition error suspicion in mixture adaptation	=	TRUE	-		
							(					
							Coolant Engine Temperature	>=	Min(C, D)	deg C		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					where C - cut-in temperature adaptive precontrol for lambda closed-loop control	=	54.8	deg C		
					where D - cut-in temperature fuel mixture adaptation in case of error suspicion	=	54.8	deg C		
					)					
					OR					
					Coolant Engine Temperature	>=	54.8	deg C		
					)					
					and					
					Basic willingness of fuel mixture adaptation, except engine temperature	=	TRUE	-		
					(					
					Intake air temperature	<	90	deg C		
					and					
					Conditiion of Wide Open Throttle	=	FALSE	-		
					(					
					Propulsion torque after driving assistance coordination	<	3276.7	Nm		
					)					
					and					
					Increased tolerances of air charge determination expected	=	FALSE	-		
					and					
					Maximum proportion of evaporating fuel from the engine oil to the fuel demand (model based)	<=	0	-		
					and					
					Ratio total charge to charge in cylinder	<	15	-		
					)					
					and					
					(					
					Number of injections since start	>=	1200	-		
					OR					
					Number of injections since start	>=	1000	-		
					)					
					)					
					and					
					FRA adaption physically enabled	=	TRUE	-		
					(					
					Torque commanded to charge control (see Look-Up-Table #P2177-2)	>=	8.00018 to 99.98932	%		
					and					
					Torque commanded to charge control (see Look-Up-Table #P2177-1)	<=	0 to 44.99969	%		
					)					
					)					
					and					
					Operating mode dependent Readiness LRA	=	TRUE	-		
					(					
					(					
					Lambda closed loop control upstream catalyst, bank 1	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-6)	>=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichmen	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	>=	0.3 to 1	sec		
					)					
					)					
					and					
					Upstream Lambda closed loop control for bank 1	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					Lambda control disabled during after	=	FALSE	-		
					and					
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					and					
					(					
					enabling lambda control	>	8	sec		
					OR					
					(					
					Absolute value of diffence in lambda of bank 1	<=	0.1001	-		
					and					
					Difference of counter time and plant time constant	>	0	sec		
					a-(b+c)					
					where a is Time running down after fuel					
					b is plant time constant for continuous air/fuel control					
					c is plant parameter for dead time for lambda control					
					)					
					)					
					)					
					and					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1 signal quality	<=	12	-		
					)					
					and					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					and					
					Injector power stage fault is active	=	FALSE	-		
					and					
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					and					
					lambda control is active since warmup is finished	=	TRUE	-		
					and					
					Relative air charge	>	0	%		
					for time	>=	2	sec		
					)					
					and					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					and					
					Lambda set point	>=	0.6499	-		
					and					
					Minimum injection time limitation for GDI mode is active	=	FALSE	-		
					and					
					Width of dead zone for lambda control deviation	<	0.999969	-		
					and					
					(					
					Width of dead zone for lambda control deviation	<	0	-		
					OR					
					Lambda control continuos error	>	0	-		
					)					
					)					
					OR					
					(					
					Unrestricted operation of Upstream closed loop lambda controller of bank 2 is active	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-6)	<=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichmen	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	<=	0.3 to 1	sec		
					)					
					)					
					and					
					Upstream Lambda closed loop control for bank 2	=	TRUE	-		
					(					
					Lambda control disabled during after	=	FALSE	-		
					and					
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					and					
					(					
						>	8	sec		
					enabling lambda control					
					OR					
					(					
					Absolute value of diffence in lambda of bank 2	<=	0.1001	-		
					and					
					Difference of counter time and plant time constant	>	0	sec		
					a-(b+c)					
					where a is Time running down after fuel					
					b is plant time constant of bank 2 for continuous air/fuel control					
					c is plant parameter of bank 2 for dead time for lambda control					
					)					
					)					
					)					
					and					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1, bank 2 signal quality	<=	12	-		
					)					
					and					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					and					
					Injector power stage fault is active	=	FALSE	-		
					and					
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					and					
					lambda control is active since warmup is finished	=	TRUE	-		
					and					
					Relative air charge	>	0	%		
					for time	>=	2	sec		
					)					
					and					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					and					
					Lambda set point	>=	0.6499	-		
					and					
					Minimum injection time limitation for GDI mode of bank 2 is active	=	FALSE	-		
					and					
					Width of dead zone for Width of dead zone for lambda control deviation	<	0.999969	-		
					and					
					(					
					Width of dead zone for lambda control deviation	=	0	-		
					OR					
					Lambda control continuos error	>	0	-		
					)					
					)					
					for time	>=	3	sec		
					)					
					and					
					(					
					Difference between lambda value referenced to sensor fitting of bank 1 and bank 2	>=	0	-		
					and					
					Lambda set point	<	1.04004	-		
					and					
					(					
					Detection of fuel mixture adaption	=	TRUE	-		
					(					
					Lambda set point of bank 2	>	0.8999	-		
					)					
					OR					
					Lambda set point of bank 2	>	0.95996	-		
					)					
					for time	>=	Max(A,B)	sec		
					where A - delay time for lambda fuel adaption (rich condition)		0	sec		
					where B - delay time for lambda fuel adaption (lean condition)		0	sec		
					)					
					and					
					Limitation due to fuel in oil is deactivated	=	TRUE	-		
					and					
					Limitation due to fuel in oil is deactivated for bank 2	=	TRUE	-		
					)					
					and					
					(					
					Half Engine mode is deactivated	=	TRUE	-		
					for time	>=	10	sec		
					)					
					)					
					and					
					Lambda closed loop control upstream catalyst, bank 1	=	TRUE	-		
					)					
					Multiplicative adaptation correction factor, bank 1	>	0	-		
					)					
					)					
					and					
					(					
					LTFT additive part Bank 1 Integrator is stable which is of the following conditions	=	TRUE	-		
					(					
					(					
					Condition diagnostic thresholds of additive correction currently exceeded of bank 1 is stable	=	TRUE	-		
					(					
					Additive part of LTFT for bank 1	>	5.484	%		
					OR					
					Additive part of LTFT for bank 1	<	-5.484	%		
					)					
					OR					
					Similar conditions for additive fuel adaptation fulfilled	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					Difference between Measured and reference Engine speed	<=	375	rpm		
					and					
					Difference between reference and measured Engine speed	<=	375	rpm		
					and					
					Difference between measured load value to reference load	<=	20	-		
					and					
					Difference between reference load value to measured load	<=	20	-		
					)					
					)					
					and					
					LTFT additive part Bank 1 is stable, which is the following conditions for time	>=	10	sec		
					(					
					(					
					Condition diagnostic thresholds of additive correction currently exceeded of bank 1 is stable	=	TRUE	-		
					(					
					Absolute change of LTFT additive part, Bank 1	<=	0.188	%		
					)					
					OR					
					Absolute change of LTFT additive part, Bank 1	<=	0.188	%		
					)					
					and					
					(					
					Condition diagnostic thresholds of additive correction currently exceeded of bank 1 is stable	=	TRUE	-		
					OR					
					Change in short term fuel trim, Bank 1	<=	0.049988	-		
					)					
					and					
					Absolute difference between LTFT multiplicative part, Bank 1 and its fixed value at beginning of additive steady state phase	<=	0.049988	%		
					and					
					Additive mixture adaptation is active	=	TRUE	-		
					(					
					(					
					Additive mixture adaptation is active, which is the following conditions:	=	TRUE	-		
					(					
					Ora operational readiness independent of the operating mode is active, which is the following conditions for time	>=	0	sec		
					(					
					Fundamental operating mode independent operation readiness of mixture adaption	=	TRUE	-		
					and					
					ORA adaption physically enabled	=	TRUE	-		
					(					
					Torque commanded to charge control (see Look-Up-Table #P2187-2)	>=	3.99933 to 99.98932	%		
					and					
					Torque commanded to charge control (see Look-Up-Table #P2187-1)	<=	0 to 14.99939	%		
					)					
					)					
					and					
					Operating mode dependent Readiness LRA	=	TRUE	-		
					)					
					and					
					Lambda closed loop control upstream catalyst, bank 1	=	TRUE	-		
					)					
					and					
					Additive adaptation correction factor, bank 1	>	0	-		
					)					
					)					
					)					
					No pending or confirmed DTCs	=	see sheet inhibit tables	-		
					Basic enable conditions met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
	P2188	Additive part of the Long Term Fuel Trim for Bank 1 in gasoline mode is less than a calibrated threshold	Additive part of LTFT, Bank 1	<	-5.484	%	LTFT Additive mixture adaptation bank 1 is active	=	TRUE	-	multiple	2 Trips
							(					
							(					
							LTFT multiplicative part Bank 1 Integrator is stable which is of the following conditions	=	TRUE	-		
							(					
							(					
							Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 1 is stable	=	TRUE	-		
							(					
							Multiplicative part of LTFT for bank 1	>	1.230011	-		
							OR					
							Multiplicative part of LTFT for bank 1	<	0.769989	-		
							)					
							OR					
							Similar conditions for multiplicative fuel adaptation fulfilled	=	TRUE	-		
							(					
							Difference between Measured and reference Engine speed	<=	375	rpm		
							and					
							Difference between reference and measured Engine speed	<=	375	rpm		
							and					
							Difference between measured load value to reference load	<=	20	-		
							and					
							Difference between reference load value to measured load	<=	20	-		
							)					
							)					
							and					
							LTFT multiplicative part Bank 1 is stable, which is the following conditions for time	>=	10	sec		
							(					
							(					
							Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 1 is stable	=	TRUE	-		
							(					
							Absolute change of LTFT multiplicative part, Bank 1	<=	1.999969	-		
							)					
							OR					
							Absolute change of LTFT multiplicative part, Bank 1	<=	0.029999	-		
							)					
							and					
							(					
							Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 1 is stable	=	TRUE	-		
							OR					
							Change in short term fuel trim, Bank 1	<=	0.049988	-		
							)					
							and					
							Absolute difference between LTFT additive part, Bank 1 and its fixed value at beginning of multiplicative steady state phase	<=	0.75	%		
							and					
							Multiplicative mixture adaptation is active	=	TRUE	-		
							(					
							(					
							Multiplicative mixture adaptation is active, which is the following conditions:	=	TRUE	-		
							(					
							Fra operational readiness independent of the operating mode is active, which is the following conditions for time	>=	2	sec		
							(					
							Fundamental operating mode independent operation readiness of mixture adaption	=	TRUE	-		
							(					
							(					
							Condition error suspicion in mixture adaptation	=	TRUE	-		
							(					
							Coolant Engine Temperature	>=	Min(C, D)	deg C		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					where C - cut-in temperature adaptive precontrol for lambda closed-loop control	=	54.8	deg C		
					where D - cut-in temperature fuel mixture adaptation in case of error suspicion	=	54.8	deg C		
					)					
					OR					
					Coolant Engine Temperature	>=	54.8	deg C		
					)					
					and					
					Basic willingness of fuel mixture adaptation, except engine temperature	=	TRUE	-		
					(					
					Intake air temperature	<	90	deg C		
					and					
					Conditiion of Wide Open Throttle	=	FALSE	-		
					(					
					Propulsion torque after driving assistance coordination	<	3276.7	Nm		
					)					
					and					
					Increased tolerances of air charge determination expected	=	FALSE	-		
					and					
					Maximum proportion of evaporating fuel from the engine oil to the fuel demand (model based)	<=	0	-		
					and					
					Ratio total charge to charge in cylinder	<	15	-		
					)					
					and					
					(					
					Number of injections since start	>=	1200	-		
					OR					
					Number of injections since start	>=	1000	-		
					)					
					)					
					and					
					FRA adaption physically enabled	=	TRUE	-		
					(					
					Torque commanded to charge control (see Look-Up-Table #P2177-2)	>=	8.00018 to 99.98932	%		
					and					
					Torque commanded to charge control (see Look-Up-Table #P2177-1)	<=	0 to 44.99969	%		
					)					
					)					
					and					
					Operating mode dependent Readiness LRA	=	TRUE	-		
					(					
					(					
					Lambda closed loop control upstream catalyst, bank 1	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-6)	>=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichmen	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	>=	0.3 to 1	sec		
					)					
					)					
					and					
					Upstream Lambda closed loop control for bank 1	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					Lambda control disabled during after	=	FALSE	-		
					and					
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					and					
					(					
						>	8	sec		
					enabling lambda control					
					OR					
					(					
					Absolute value of diffence in lambda of bank 1	<=	0.1001	-		
					and					
					Difference of counter time and plant time constant	>	0	sec		
					a-(b+c)					
					where a is Time running down after fuel					
					b is plant time constant for continuous air/fuel control					
					c is plant parameter for dead time for lambda control					
					)					
					)					
					)					
					and					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1 signal quality	<=	12	-		
					)					
					and					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					and					
					Injector power stage fault is active	=	FALSE	-		
					and					
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					and					
					lambda control is active since warmup is finished	=	TRUE	-		
					and					
					Relative air charge	>	0	%		
					for time	>=	2	sec		
					)					
					and					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					and					
					Lambda set point	>=	0.6499	-		
					and					
					Minimum injection time limitation for GDI mode is active	=	FALSE	-		
					and					
					Width of dead zone for lambda control deviation	<	0.999969	-		
					and					
					(					
					Width of dead zone for lambda control deviation	<	0	-		
					OR					
					Lambda control continuos error	>	0	-		
					)					
					)					
					OR					
					(					
					Unrestricted operation of Upstream closed loop lambda controller of bank 2 is active	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-6)	<=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichmen	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	<=	0.3 to 1	sec		
					)					
					)					
					and					
					Upstream Lambda closed loop control for bank 2	=	TRUE	-		
					(					
					Lambda control disabled during after	=	FALSE	-		
					and					
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					and					
					(					
					enabling lambda control	>	8	sec		
					OR					
					(					
					Absolute value of diffence in lambda of bank 2	<=	0.1001	-		
					and					
					Difference of counter time and plant time constant	>	0	sec		
					a-(b+c)					
					where a is Time running down after fuel					
					b is plant time constant of bank 2 for continuous air/fuel control					
					c is plant parameter of bank 2 for dead time for lambda control					
					)					
					)					
					)					
					and					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1, bank 2 signal quality	<=	12	-		
					)					
					and					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					and					
					Injector power stage fault is active	=	FALSE	-		
					and					
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					and					
					lambda control is active since warmup is finished	=	TRUE	-		
					and					
					Relative air charge	>	0	%		
					for time	>=	2	sec		
					)					
					and					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Lamda control active due to GDI mode change	= TRUE -		
					(			
					GDI mode homogeneous	= TRUE -		
					for time	>= 0.8 sec		
					)			
					)			
					and			
					Lambda set point	>= 0.6499 -		
					and			
					Minimum injection time limitation for GDI mode of bank 2 is active	= FALSE -		
					and			
					Width of dead zone for Width of dead zone for lambda control deviation	< 0.999969 -		
					and			
					(			
					Width of dead zone for lambda control deviation	= 0 -		
					OR			
					Lambda control continuos error	> 0 -		
					)			
					)			
					for time	>= 3 sec		
					)			
					and			
					(			
					Difference between lambda value referenced to sensor fitting of bank 1 and bank 2	>= 0 -		
					and			
					Lambda set point	< 1.04004 -		
					and			
					(			
					Detection of fuel mixture adaption	= TRUE -		
					(			
					Lambda set point of bank 2	> 0.8999 -		
					)			
					OR			
					Lambda set point of bank 2	> 0.95996 -		
					)			
					for time	>= Max(A,B) sec		
					where A - delay time for lambda fuel adaption (rich condition)	0 sec		
					where B - delay time for lambda fuel adaption (lean condition)	0 sec		
					)			
					and			
					Limitation due to fuel in oil is deactivated	= TRUE -		
					and			
					Limitation due to fuel in oil is deactivated for bank 2	= TRUE -		
					)			
					and			
					(			
					Half Engine mode is deactivated	= TRUE -		
					for time	>= 10 sec		
					)			
					)			
					and			
					Lambda closed loop control upstream catalyst, bank 1	= TRUE -		
					)			
					Multiplicative adaptation correction factor, bank 1	> 0 -		
					)			
					)			
					and			
					(			
					LTFT additive part Bank 1 Integrator is stable which is of the following conditions	= TRUE -		
					(			
					(			
					Condition diagnostic thresholds of additive correction currently exceeded of bank 1 is stable	= TRUE -		
					(			
					Additive part of LTFT for bank 1	> 5.484 %		
					OR			
					Additive part of LTFT for bank 1	< -5.484 %		
					)			
					OR			
					Similar conditions for additive fuel adaptation fulfilled	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					Difference between Measured and reference Engine speed	<=	375	rpm		
					and					
					Difference between reference and measured Engine speed	<=	375	rpm		
					and					
					Difference between measured load value to reference load	<=	20	-		
					and					
					Difference between reference load value to measured load	<=	20	-		
					)					
					)					
					and					
					LTFT additive part Bank 1 is stable, which is the following conditions for time	>=	10	sec		
					(					
					(					
					Condition diagnostic thresholds of additive correction currently exceeded of bank 1 is stable	=	TRUE	-		
					(					
					Absolute change of LTFT additive part, Bank 1	<=	0.188	%		
					)					
					OR					
					Absolute change of LTFT additive part, Bank 1	<=	0.188	%		
					)					
					and					
					(					
					Condition diagnostic thresholds of additive correction currently exceeded of bank 1 is stable	=	TRUE	-		
					OR					
					Change in short term fuel trim, Bank 1	<=	0.049988	-		
					)					
					and					
					Absolute difference between LTFT multiplicative part, Bank 1 and its fixed value at beginning of additive steady state phase	<=	0.049988	%		
					and					
					Additive mixture adaptation is active	=	TRUE	-		
					(					
					(					
					Additive mixture adaptation is active, which is the following conditions:	=	TRUE	-		
					(					
					Ora operational readiness independent of the operating mode is active, which is the following conditions for time	>=	0	sec		
					(					
					Fundamental operating mode independent operation readiness of mixture adaption	=	TRUE	-		
					and					
					ORA adaption physically enabled	=	TRUE	-		
					(					
					Torque commanded to charge control (see Look-Up-Table #P2187-2)	>=	3.99933 to 99.98932	%		
					and					
					Torque commanded to charge control (see Look-Up-Table #P2187-1)	<=	0 to 14.99939	%		
					)					
					)					
					and					
					Operating mode dependent Readiness LRA	=	TRUE	-		
					)					
					and					
					Lambda closed loop control upstream catalyst, bank 1	=	TRUE	-		
					)					
					and					
					Additive adaptation correction factor, bank 1	>	0	-		
					)					
					)					
					)					
					No pending or confirmed DTCs	=	see sheet inhibit tables	-		
					Basic enable conditions met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
	P2189	Additive part of the Long Term Fuel Trim for Bank 2 in gasoline mode is greater than a calibrated threshold	Additive part of LTFT, Bank 2	>	5.484	%	LTFT Additive mixture adaptation bank 2 is active	=	TRUE	-	multiple	2 Trips
							(					
							(					
							LTFT multiplicative part Bank 2 Integrator is stable which is of the following conditions	=	TRUE	-		
							(					
							(					
							Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 2 is stable	=	TRUE	-		
							(					
							Multiplicative part of LTFT for bank 2	>	1.230011	-		
							OR					
							Multiplicative part of LTFT for bank 2	<	0.769989	-		
							)					
							OR					
							Similar conditions for multiplicative fuel adaptation fulfilled for bank 2	=	TRUE	-		
							(					
							Difference between Measured and reference Engine speed, bank 2	<=	375	rpm		
							and					
							Difference between reference and measured Engine speed, bank 2	<=	375	rpm		
							and					
							Difference between measured load value to reference load, bank 2	<=	20	-		
							and					
							Difference between reference load value to measured load, bank 2	<=	20	-		
							)					
							)					
							and					
							LTFT multiplicative part Bank 2 is stable, which is the following conditions for time	>=	10	sec		
							(					
							(					
							Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 2 is stable	=	TRUE	-		
							(					
							Absolute change of LTFT multiplicative part, Bank 2	<=	1.999969	-		
							)					
							OR					
							Absolute change of LTFT multiplicative part, Bank 2	<=	0.029999	-		
							)					
							and					
							(					
							Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 2 is stable	=	TRUE	-		
							OR					
							Change in short term fuel trim, Bank 2	<=	0.049988	-		
							)					
							and					
							Absolute difference between LTFT additive part, Bank 1 and its fixed value at beginning of multiplicative steady state phase	<=	0.75	%		
							and					
							Multiplicative mixture adaptation is active, bank 2	=	TRUE	-		
							(					
							(					
							Multiplicative mixture adaptation is active, which is the following conditions:	=	TRUE	-		
							(					
							Fra operational readiness independent of the operating mode is active, which is the following conditions for time	>=	2	sec		
							(					
							Fundamental operating mode independent operation readiness of mixture adaption	=	TRUE	-		
							(					
							(					
							Condition error suspicion in mixture adaptation	=	TRUE	-		
							(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Coolant Engine Temperature	>=	Min(C, D)	deg C		
					where C - cut-in temperature adaptive precontrol for lambda closed-loop control	=	54.8	deg C		
					where D - cut-in temperature fuel mixture adaptation in case of error suspicion	=	54.8	deg C		
					)					
					OR					
					Coolant Engine Temperature	>=	54.8	deg C		
					)					
					and					
					Basic willingness of fuel mixture adaptation, except engine temperature	=	TRUE	-		
					(					
					Intake air temperature	<	90	deg C		
					and					
					Conditiion of Wide Open Throttle	=	FALSE	-		
					(					
					Propulsion torque after driving assistance coordination	<	3276.7	Nm		
					)					
					and					
					Increased tolerances of air charge determination expected	=	FALSE	-		
					and					
					Maximum proportion of evaporating fuel from the engine oil to the fuel demand (model based)	<=	0	-		
					and					
					Ratio total charge to charge in cylinder	<	15	-		
					)					
					and					
					(					
					Number of injections since start	>=	1200	-		
					OR					
					Number of injections since start	>=	1000	-		
					)					
					)					
					and					
					FRA adaption physically enabled	=	TRUE	-		
					(					
					Torque commanded to charge control (see Look-Up-Table #P2177-2)	>=	8.00018 to 99.98932	%		
					and					
					Torque commanded to charge control (see Look-Up-Table #P2177-1)	<=	0 to 44.99969	%		
					)					
					)					
					and					
					Operating mode dependent Readiness LRA	=	TRUE	-		
					(					
					(					
					Lambda closed loop control upstream catalyst, bank 1	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-6)	>=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichmen	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	>=	0.3 to 1	sec		
					)					
					)					
					and					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Upstream Lambda closed loop control for bank 1	=	TRUE	-		
					(					
					Lambda control disabled during after	=	FALSE	-		
					and					
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					and					
					(					
						>	8	sec		
					enabling lambda control					
					OR					
					(					
					Absolute value of diffence in lambda of bank 1	<=	0.1001	-		
					and					
					Difference of counter time and plant time constant	>	0	sec		
					a-(b+c)					
					where a is Time running down after fuel					
					b is plant time constant for continuous air/fuel control					
					c is plant parameter for dead time for lambda control					
					)					
					)					
					)					
					and					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1 signal quality	<=	12	-		
					)					
					and					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					and					
					Injector power stage fault is active	=	FALSE	-		
					and					
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					and					
					lambda control is active since warmup is finished	=	TRUE	-		
					and					
					Relative air charge	>	0	%		
					for time	>=	2	sec		
					)					
					and					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					and					
					Lambda set point	>=	0.6499	-		
					and					
					Minimum injection time limitation for GDI mode is active	=	FALSE	-		
					and					
					Width of dead zone for lambda control deviation	<	0.999969	-		
					and					
					(					
					Width of dead zone for lambda control deviation	<	0	-		
					OR					
					Lambda control continuos error	>	0	-		
					)					
					)					
					OR					
					(					
					Unrestricted operation of Upstream closed loop lambda controller of bank 2 is active	=	TRUE	-		
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-6)	<=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichmen	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	<=	0.3 to 1	sec		
					)					
					)					
					and					
					Upstream Lambda closed loop control for bank 2	=	TRUE	-		
					(					
					Lambda control disabled during after	=	FALSE	-		
					and					
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					and					
					(					
					enabling lambda control	>	8	sec		
					OR					
					(					
					Absolute value of diffence in lambda of bank 2	<=	0.1001	-		
					and					
					Difference of counter time and plant time constant	>	0	sec		
					a-(b+c)					
					where a is Time running down after fuel					
					b is plant time constant of bank 2 for continuous air/fuel control					
					c is plant parameter of bank 2 for dead time for lambda control					
					)					
					)					
					)					
					and					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1, bank 2 signal quality	<=	12	-		
					)					
					and					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					and					
					Injector power stage fault is active	=	FALSE	-		
					and					
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					and					
					lambda control is active since warmup is finished	=	TRUE	-		
					and					
					Relative air charge	>	0	%		
					(					
					for time	>=	2	sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					)			
					and			
					Lamda control active due to GDI mode change	= TRUE -		
					(			
					GDI mode homogeneous	= TRUE -		
					for time	>= 0.8 sec		
					)			
					)			
					and			
					Lambda set point	>= 0.6499 -		
					and			
					Minimum injection time limitation for GDI mode of bank 2 is active	= FALSE -		
					and			
					Width of dead zone for Width of dead zone for lambda control deviation	< 0.999969 -		
					and			
					(			
					Width of dead zone for lambda control deviation	= 0 -		
					OR			
					Lambda control continuos error	> 0 -		
					)			
					)			
					for time	>= 3 sec		
					)			
					and			
					(			
					Difference between lambda value referenced to sensor fitting of bank 1 and bank 2	>= 0 -		
					and			
					Lambda set point	< 1.04004 -		
					and			
					(			
					Detection of fuel mixture adaption	= TRUE -		
					(			
					Lambda set point of bank 2	> 0.8999 -		
					)			
					OR			
					Lambda set point of bank 2	> 0.95996 -		
					)			
					for time	>= Max(A,B) sec		
					where A - delay time for lambda fuel adaption (rich condition)	0 sec		
					where B - delay time for lambda fuel adaption (lean condition)	0 sec		
					)			
					and			
					Limitation due to fuel in oil is deactivated	= TRUE -		
					and			
					Limitation due to fuel in oil is deactivated for bank 2	= TRUE -		
					)			
					and			
					(			
					Half Engine mode is deactivated	= TRUE -		
					for time	>= 10 sec		
					)			
					)			
					and			
					Lambda closed loop control upstream catalyst, bank 2	= TRUE -		
					)			
					Multiplicative adaptation correction factor, bank 2	> 0 -		
					)			
					)			
					and			
					(			
					LTFT additive part Bank 2 Integrator is stable which is of the following conditions	= TRUE -		
					(			
					(			
					Condition diagnostic thresholds of additive correction currently exceeded of bank 2 is stable	= TRUE -		
					(			
					Additive part of LTFT for bank 2	> 5.484 %		
					OR			
					Additive part of LTFT for bank 2	< -5.484 %		
					)			
					OR			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Similar conditions for additive fuel adaptation fulfilled, bank 2	=	TRUE	-		
					(					
					Difference between Measured and reference Engine speed, bank 2	<=	375	rpm		
					and					
					Difference between reference and measured Engine speed, bank 2	<=	375	rpm		
					and					
					Difference between measured load value to reference load, bank 2	<=	20	-		
					and					
					Difference between reference load value to measured load, bank 2	<=	20	-		
					)					
					)					
					and					
					LTFT additive part Bank 2 is stable, which is the following conditions for time	>=	10	sec		
					(					
					(					
					Condition diagnostic thresholds of additive correction currently exceeded of bank 2 is stable	=	TRUE	-		
					(					
					Absolute change of LTFT additive part, Bank 2	<=	0.188	%		
					)					
					OR					
					Absolute change of LTFT additive part, Bank 2	<=	0.188	%		
					)					
					and					
					(					
					Condition diagnostic thresholds of additive correction currently exceeded of bank 2 is stable	=	TRUE	-		
					OR					
					Change in short term fuel trim, Bank 2	<=	0.049988	-		
					)					
					and					
					Absolute difference between LTFT multiplicative part, Bank 2 and its fixed value at beginning of additive steady state phase	<=	0.049988	%		
					and					
					Additive mixture adaptation is active, bank2	=	TRUE	-		
					(					
					(					
					Additive mixture adaptation is active, which is the following conditions:	=	TRUE	-		
					(					
					Ora operational readiness independent of the operating mode is active, which is the following conditions for time	>=	0	sec		
					(					
					Fundamental operating mode independent operation readiness of mixture adaption	=	TRUE	-		
					and					
					ORA adaption physically enabled	=	TRUE	-		
					(					
					Torque commanded to charge control (see Look-Up-Table #P2187-2)	>=	3.99933 to 99.98932	%		
					and					
					Torque commanded to charge control (see Look-Up-Table #P2187-1)	<=	0 to 14.99939	%		
					)					
					)					
					and					
					Operating mode dependent Readiness LRA	=	TRUE	-		
					)					
					and					
					Lambda closed loop control upstream catalyst, bank 2	=	TRUE	-		
					)					
					and					
					Additive adaptation correction factor, bank 2	>	0	-		
					)					
					)					
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
							Basic enable conditions met	=	see sheet enable tables	-		
	P2190	Additive part of the Long Term Fuel Trim for Bank 2 in gasoline mode is less than a calibrated threshold	Additive part of LTFT, Bank 2	<	-5.484	%	LTFT Additive mixture adaptation bank 2 is active	=	TRUE	-	multiple	2 Trips
							(					
							(					
							LTFT multiplicative part Bank 2 Integrator is stable which is of the following conditions	=	TRUE	-		
							(					
							(					
							Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 2 is stable	=	TRUE	-		
							(					
							Multiplicative part of LTFT for bank 2	>	1.230011	-		
							OR					
							Multiplicative part of LTFT for bank 2	<	0.769989	-		
							)					
							OR					
							Similar conditions for multiplicative fuel adaptation fulfilled for bank 2	=	TRUE	-		
							(					
							Difference between Measured and reference Engine speed, bank 2	<=	375	rpm		
							and					
							Difference between reference and measured Engine speed, bank 2	<=	375	rpm		
							and					
							Difference between measured load value to reference load, bank 2	<=	20	-		
							and					
							Difference between reference load value to measured load, bank 2	<=	20	-		
							)					
							)					
							and					
							LTFT multiplicative part Bank 2 is stable, which is the following conditions for time	>=	10	sec		
							(					
							(					
							Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 2 is stable	=	TRUE	-		
							(					
							Absolute change of LTFT multiplicative part, Bank 2	<=	1.999969	-		
							)					
							OR					
							Absolute change of LTFT multiplicative part, Bank 2	<=	0.029999	-		
							)					
							and					
							(					
							Condition diagnostic thresholds of multiplicative correction currently exceeded of bank 2 is stable	=	TRUE	-		
							OR					
							Change in short term fuel trim, Bank 2	<=	0.049988	-		
							)					
							and					
							Absolute difference between LTFT additive part, Bank 1 and its fixed value at beginning of multiplicative steady state phase	<=	0.75	%		
							and					
							Multiplicative mixture adaptation is active, bank 2	=	TRUE	-		
							(					
							(					
							Multiplicative mixture adaptation is active, which is the following conditions:	=	TRUE	-		
							(					
							Fra operational readiness independent of the operating mode is active, which is the following conditions for time	>=	2	sec		
							(					
							Fundamental operating mode independent operation readiness of mixture adaption	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					(					
					Condition error suspicion in mixture adaptation	=	TRUE	-		
					(					
					Coolant Engine Temperature	>=	Min(C, D)	deg C		
					where C - cut-in temperature adaptive precontrol for lambda closed-loop control	=	54.8	deg C		
					where D - cut-in temperature fuel mixture adaptation in case of error suspicion	=	54.8	deg C		
					)					
					OR					
					Coolant Engine Temperature	>=	54.8	deg C		
					)					
					and					
					Basic willingness of fuel mixture adaptation, except engine temperature	=	TRUE	-		
					(					
					Intake air temperature	<	90	deg C		
					and					
					Conditiion of Wide Open Throttle	=	FALSE	-		
					(					
					Propulsion torque after driving assistance coordination	<	3276.7	Nm		
					)					
					and					
					Increased tolerances of air charge determination expected	=	FALSE	-		
					and					
					Maximum proportion of evaporating fuel from the engine oil to the fuel demand (model based)	<=	0	-		
					and					
					Ratio total charge to charge in cylinder	<	15	-		
					)					
					and					
					(					
					Number of injections since start	>=	1200	-		
					OR					
					Number of injections since start	>=	1000	-		
					)					
					)					
					and					
					FRA adaption physically enabled	=	TRUE	-		
					(					
					Torque commanded to charge control (see Look-Up-Table #P2177-2)	>=	8.00018 to 99.98932	%		
					and					
					Torque commanded to charge control (see Look-Up-Table #P2177-1)	<=	0 to 44.99969	%		
					)					
					)					
					and					
					Operating mode dependent Readiness LRA	=	TRUE	-		
					(					
					(					
					Lambda closed loop control upstream catalyst, bank 1	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-6)	>=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichmen	<=	19.0078	%/seg		
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					for time (see Look-Up-Table #P2177-5)	>=	0.3 to 1	sec		
					)					
					)					
					and					
					Upstream Lambda closed loop control for bank 1	=	TRUE	-		
					(					
					Lambda control disabled during after	=	FALSE	-		
					and					
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					and					
					(					
						>	8	sec		
					enabling lambda control					
					OR					
					(					
					Absolute value of diffence in lambda of bank 1	<=	0.1001	-		
					and					
					Difference of counter time and plant time constant a-(b+c) where a is Time running down after fuel b is plant time constant for continuous air/fuel control c is plant parameter for dead time for lambda control	>	0	sec		
					)					
					)					
					)					
					and					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1 signal quality	<=	12	-		
					)					
					and					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					and					
					Injector power stage fault is active	=	FALSE	-		
					and					
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					and					
					lambda control is active since warmup is finished	=	TRUE	-		
					and					
					Relative air charge	>	0	%		
					(					
					for time	>=	2	sec		
					)					
					and					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					and					
					Lambda set point	>=	0.6499	-		
					and					
					Minimum injection time limitation for GDI mode is active	=	FALSE	-		
					and					
					Width of dead zone for lambda control deviation	<	0.999969	-		
					and					
					(					
					Width of dead zone for lambda control deviation	<	0	-		
					OR					
					Lambda control continuos error	>	0	-		
					)					
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					OR					
					(					
					Unrestricted operation of Upstream closed loop lambda controller of bank 2 is active	=	TRUE	-		
					(					
					Enleanment protection of lambda controller	=	FALSE	-		
					(					
					(					
					Large deceleration enleanment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient component threshold for deceleration enleanment	>=	-10.0078	%/seg		
					Relative fuel mass transient component threshold for deceleration enleanment in bank 2	>=	-10.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-6)	<=	0.5 to 1	sec		
					)					
					OR					
					(					
					Large acceleration enrichment protection of lambda controller	=	FALSE	-		
					(					
					Relative fuel mass transient componet threshold for acceleration enrichment	<=	19.0078	%/seg		
					Relative fuel mass transient componet threshold for acceleration enrichmen	<=	19.0078	%/seg		
					)					
					for time (see Look-Up-Table #P2177-5)	<=	0.3 to 1	sec		
					)					
					)					
					and					
					Upstream Lambda closed loop control for bank 2	=	TRUE	-		
					(					
					Lambda control disabled during after	=	FALSE	-		
					and					
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					and					
					(					
						>	8	sec		
					enabling lambda control					
					OR					
					(					
					Absolute value of diffence in lambda of bank 2	<=	0.1001	-		
					and					
					Difference of counter time and plant time constant	>	0	sec		
					a-(b+c)					
					where a is Time running down after fuel					
					b is plant time constant of bank 2 for continuous air/fuel control					
					c is plant parameter of bank 2 for dead time for lambda control					
					)					
					)					
					)					
					and					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					Level of lambda sensor 1, bank 2 signal quality	<=	12	-		
					)					
					and					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					and					
					Injector power stage fault is active	=	FALSE	-		
					and					
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					and					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					lambda control is active since warmup is finished	=	TRUE	-		
					and					
					Relative air charge	>	0	%		
					for time	>=	2	sec		
					)					
					and					
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					and					
					Lambda set point	>=	0.6499	-		
					and					
					Minimum injection time limitation for GDI mode of bank 2 is active	=	FALSE	-		
					and					
					Width of dead zone for Width of dead zone for lambda control deviation	<	0.999969	-		
					and					
					(					
					Width of dead zone for lambda control deviation	=	0	-		
					OR					
					Lambda control continuos error	>	0	-		
					)					
					)					
					for time	>=	3	sec		
					)					
					and					
					(					
					Difference between lambda value referenced to sensor fitting of bank 1 and bank 2	>=	0	-		
					and					
					Lambda set point	<	1.04004	-		
					and					
					(					
					Detection of fuel mixture adaption	=	TRUE	-		
					(					
					Lambda set point of bank 2	>	0.8999	-		
					)					
					OR					
					Lambda set point of bank 2	>	0.95996	-		
					)					
					for time	>=	Max(A,B)	sec		
					where A - delay time for lambda fuel adaption (rich condition)		0	sec		
					where B - delay time for lambda fuel adaption (lean condition)		0	sec		
					)					
					and					
					Limitation due to fuel in oil is deactivated	=	TRUE	-		
					and					
					Limitation due to fuel in oil is deactivated for bank 2	=	TRUE	-		
					)					
					and					
					(					
					Half Engine mode is deactivated	=	TRUE	-		
					for time	>=	10	sec		
					)					
					)					
					and					
					Lambda closed loop control upstream catalyst, bank 2	=	TRUE	-		
					)					
					Multiplicative adaptation correction factor, bank 2	>	0	-		
					)					
					)					
					and					
					(					
					LTFT additive part Bank 2 Integrator is stable which is of the following conditions	=	TRUE	-		
					(					
					(					
					Condition diagnostic thresholds of additive correction currently exceeded of bank 2 is stable	=	TRUE	-		
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Additive part of LTFT for bank 2	>	5.484	%		
					OR					
					Additive part of LTFT for bank 2	<	-5.484	%		
					)					
					OR					
					Similar conditions for additive fuel adaptation fulfilled, bank 2	=	TRUE	-		
					(					
					Difference between Measured and reference Engine speed, bank 2	<=	375	rpm		
					and					
					Difference between reference and measured Engine speed, bank 2	<=	375	rpm		
					and					
					Difference between measured load value to reference load, bank 2	<=	20	-		
					and					
					Difference between reference load value to measured load, bank 2	<=	20	-		
					)					
					)					
					and					
					LTFT additive part Bank 2 is stable, which is the following conditions for time	>=	10	sec		
					(					
					(					
					Condition diagnostic thresholds of additive correction currently exceeded of bank 2 is stable	=	TRUE	-		
					(					
					Absolute change of LTFT additive part, Bank 2	<=	0.188	%		
					)					
					OR					
					Absolute change of LTFT additive part, Bank 2	<=	0.188	%		
					)					
					and					
					(					
					Condition diagnostic thresholds of additive correction currently exceeded of bank 2 is stable	=	TRUE	-		
					OR					
					Change in short term fuel trim, Bank 2	<=	0.049988	-		
					)					
					and					
					Absolute difference between LTFT multiplicative part, Bank 2 and its fixed value at beginning of additive steady state phase	<=	0.049988	%		
					and					
					Additive mixture adaptation is active, bank2	=	TRUE	-		
					(					
					(					
					Additive mixture adaptation is active, which is the following conditions:	=	TRUE	-		
					(					
					Ora operational readiness independent of the operating mode is active, which is the following conditions for time	>=	0	sec		
					(					
					Fundamental operating mode independent operation readiness of mixture adaption	=	TRUE	-		
					and					
					ORA adaption physically enabled	=	TRUE	-		
					(					
					Torque commanded to charge control (see Look-Up-Table #P2187-2)	>=	3.99933 to 99.98932	%		
					and					
					Torque commanded to charge control (see Look-Up-Table #P2187-1)	<=	0 to 14.99939	%		
					)					
					)					
					and					
					Operating mode dependent Readiness LRA	=	TRUE	-		
					)					
					and					
					Lambda closed loop control upstream catalyst, bank 2	=	TRUE	-		
					)					
					and					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Additive adaptation correction factor, bank 2	>	0	-		
							)					
							)					
							)					
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
							Basic enable conditions met	=	see sheet enable tables	-		
	P2096	Fuel trim fault diagnosis of upstream exhaust gas sensor when the lambda offset is not within the calibrated threshold range - out of range low	(				Debounce condition for fault confirmation by offset adaptation (sensor 1, bank 1)	=	TRUE	-	once per driving cycle	2 Trips
			Lambda offset of upstream exhaust gas sensor	<	-0.03009	-	(					
			Lambda offset of upstream exhaust gas sensor	>=	-0.059998	-	Debouncing of offset fault by slow offset adaptation	=	TRUE	-		
			Difference between lambda offset of the sensor and lambda offset at the beginning of the driving cycle	<	0.019989	-	(					
			(				Slow offset adaptation	=	TRUE	-		
			(				(					
			Maximum offset fault is healed in the current driving cycle	=	TRUE	-	Bit p-part controlability primary control enable	=	TRUE	-		
			Minimum offset fault is healed in the current driving cycle	=	TRUE	-	(					
			)				(					
			OR				Lambda regulator setpoint active	=	TRUE	-		
			(				(					
			Maximum offset fault is set in the previous driving cycle	=	TRUE	-	Width of dead zone for lambda control deviation	>=	0.999969	-		
			OR				OR					
			Minimum offset fault is set in the previous driving cycle	=	TRUE	-	(					
			)				Lambda closed loop control (upstream catalyst), bank 1	=	TRUE	-		
			OR				OR					
			(				(					
			Fuel trim maximum fault is set in the previous driving cycle	=	TRUE	-	Lambda setpoint for sensor after addition of trim control action is not eqaul to 0	=	TRUE	-		
			OR				Difference between upper limit action value lambda control and temporary value before test for enleanment protection	>=	0	-		
			Fuel trim minimum fault is set in the previous driving cycle	=	TRUE	-	Difference between temporary value before test for enleanment protection and lower bound of dfr during enleanmant protection	>=	0	-		
			)				Lambda (measured and setpoint) is below minimal measurable lambda (bank 1)	=	FALSE	-		
			)				TEMIN-limitation active, bench 1	=	FALSE	-		
			)				)					
			OR				)					
			(				)					
			(				Current lowpass value of p-part control upstream primary control enable	>	0	%		
			Fuel trim maximum fault is set in the previous driving cycle	=	TRUE	-	Lambda closed loop control (upstream catalyst), bank 1	=	TRUE	-		
			OR				(					
			Fuel trim minimum fault is set in the previous driving cycle	=	TRUE	-	Lambda control disabled during or after	=	FALSE	-		
			)				Lambda swtiched ON after fuel cutoff	=	TRUE	-		
			Lambda offset of upstream exhaust gas sensor	<	0.059998	-	(					
			)				Fuel cut off is active	=	FALSE	-		
							(					
							enabling lambda control	>	8	sec		
							OR					
							(					
							Absolute value of control difference in lambda, bank 1	<=	0.1001	-		
							Difference of counter time and plant time constant a-(b+c) where a is Time running down after fuel	>	0	sec		
							b is plant time constant for continuous air/fuel control					
							c is plant parameter for dead time for lambda control					
							)					
							)					
							)					
							LSU sensor upstream to catalyst ready for operation	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					lambda sensor 1 temperature, bank 1	>=	654.998	deg C		
					)					
					Lambda control disabled by a fault	=	FALSE	-		
					lambda control is active since warmup is finished	=	TRUE	-		
					Relative air charge	>	0	%		
					for time	>=	2	sec		
					)					
					HEM condition to block lambda closed loop control upstream catalyst	=	FALSE	-		
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					(					
					Lambda control enabled for Cold operation sensor 2 bank 1	=	TRUE	-		
					OR					
					HEGO sensor 2 bank 1, signal valid	=	TRUE	-		
					(					
					Status of heating enable conditions for the sensor operating readiness	=	TRUE	-		
					(					
					Protective heating is finished	=	TRUE	-		
					for time	>=	15	sec		
					OR					
					Internal resistance OK for operating readiness	=	TRUE	-		
					(					
					Unfiltered internal resistance of HEGO sensor	<=	2000	Ohm		
					Protective heating is finished	=	TRUE	-		
					Counter for valid internal resistance measurements	>=	3	counts		
					)					
					)					
					Status of sensor signal enable conditions for the sensor operating readiness	=	TRUE	-		
					(					
					Internal resistance OK for operating readiness	=	TRUE	-		
					OR					
					(					
					(					
					Output voltage of HEGO Sensor	>=	0.551758	V		
					Output voltage of HEGO Sensor	<=	1.201172	V		
					)					
					OR					
					Output voltage of HEGO Sensor	<=	0.322266	V		
					)					
					OR					
					Sensor voltage stuck in countervoltage band	=	TRUE	-		
					(					
					(					
					(					
					Output voltage of HEGO Sensor	<	0.551758	V		
					Output voltage of HEGO Sensor	>	0.322266	V		
					)					
					(					
					Sensor open circuit fault existed in previous trip	=	TRUE	-		
					OR					
					Sensor open circuit fault currently not detected	=	TRUE	-		
					)					
					Electrical diagnostics enabled	=	TRUE	-		
					)					
					for time	>=	20	sec		
					)					
					)					
					for time	>=	0.2	sec		
					)					
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					)					
					Bit p-part system balanced primary control enable	=	TRUE	-		
					(					
					(					
					Lambda setpoint for sensor is set equal to 1	=	TRUE	-		
					OR					
					Lambda setpoint for sensor is set equal to 1	=	FALSE	-		
					for time	>=	10	sec		
					)					
					Rich catalyst purge	=	FALSE	-		
					Mass flow of exhaust gas, sensor 2	>	25	g		
					)					
					P-part active from temperature and dynamic diagnosis	=	TRUE	-		
					(					
					Temperature of catalyst 1	>=	349.96	deg C		
					Temperature of catalyst 1	<	899.96	deg C		
					)					
					)					
					Bit I-part global primary control enable	=	TRUE	-		
					(					
					(					
					Current lowpass value of I-part load primary control enable	>	-1.5938	%		
					Current lowpass value of I-part load primary control enable	<=	1.5938	%		
					)					
					Diagnosis of canister purge system is active	=	FALSE	-		
					Ratio total charge to charge in cylinder	<=	1	-		
					Width of dead zone for lambda control deviation	=	0	-		
					Maximum value among the engine coolant temperature and model-based substitute value for engine temperature signal in case of error	>	-48.04	deg C		
					(					
					Bit I-part global load and engine speed control enable	=	TRUE	-		
					(					
					Engine speed with low resolution	<	2600	rpm		
					Engine speed with low resolution	>=	1000	rpm		
					(					
					Half engine mode active	=	TRUE	-		
					(					
					Relative air mass during half engine mode (see Look-Up table #P2096-2)	<	99.8	%		
					Relative air mass during half engine mode (see Look-Up table #P2096-3)	>=	20.3	%		
					)					
					OR					
					Half engine mode active	=	FALSE	-		
					(					
					Relative air mass (see Look-Up table #P2096-4)	<	30 to 90	%		
					Relative air mass (see Look-Up table #P2096-5)	>=	15 to 20.3	%		
					)					
					)					
					)					
					)					
					)					
					(					
					Bit i-part system primary control enable	=	TRUE	-		
					(					
					Current integrator value of P-part balanced primary control enable	>	150	g		
					(					
					(					
					Dew point end of sensor 2 Bank1 is reached	=	TRUE	-		
					End of start is reached	=	TRUE	-		
					Exhaust gas mass flow sensor 2 Bank 1	>	179.91	g		
					)					
					OR					
					(					
					(					
					Dew point end of sensor 2 reached	=	FALSE	-		
					OR					
					End of start is reached	=	FALSE	-		
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Exhaust gas mass flow sensor 2	>	199.82	g		
					)					
					)					
					)					
					Bit i-part system temperature primary control enable	=	TRUE	-		
					(					
					Temperature of catalyst 1	>	349.96	deg C		
					Temperature of catalyst 1	<	869.96	deg C		
					)					
					)					
					)					
					Cumulated time in which slow offset adaptation was active	>=	150	sec		
					)					
					Debounce condition for fault confirmation by fast offset adaptation (sensor 1, bank 1)	=	TRUE	-		
					General enabling condition of fast offset adaptation					
					(					
					Enabling condition of fast offset adaptation due to catalyst conditioning	=	TRUE	-		
					(					
					(					
					Bit signal valid, HEGO sensor 2 bank 1	=	TRUE	-		
					Flag lambda setpoint for sensor equal to 1	=	TRUE	-		
					Rich catalyst purge	=	FALSE	-		
					Bank-independent disabling conditions of fast offset adaptation	=	FALSE	-		
					(					
					Fuel cut-off	=	TRUE	-		
					Mass flow exhaust gas catalyst 1	>	300	g		
					)					
					OR					
					(					
					Fuel cut-off	=	FALSE	-		
					Mass flow exhaust gas catalyst 1	>	180	g		
					)					
					)					
					(					
					(					
					Parallelization done at least once from LSU plausibility diagnosis point of view (sensor 1, bank 1)	=	TRUE	-		
					(					
					(					
					Target sensor voltage for rich during active parallelisation reached once, sensor 1, bank 2	=	TRUE	-		
					Oil gas mass flow by active lambda shifting minus the maximal possible influence of LSU offset part, segment 1, bank 1	>=	1.6	g		
					for time	>=	1	sec		
					)					
					OR					
					(					
					Lean target sensor voltage during active parallelisation reached once, sensor 1, bank 2	=	TRUE	-		
					Oxygen mass flow in catalyst 1, deduct from maximum present LSU Offset in a fault free system	>=	1.3	g		
					for time	>=	1	sec		
					)					
					)					
					OR					
					Dynamic diagnosis error of upstream exhaust gas sensor is not set	=	TRUE	-		
					)					
					OR					
					(					
					(					
					lambda control is set when lambda controller reaches lower limit FRMIN	=	TRUE	-		
					Lambda actual value sensor 1 bank 1	<	1	-		
					Output voltage of HEGO sensor 2 bank 1	<	0.4	-		
					)					
					OR					
					(					
					lambda control is set when lambda controller reaches lower limit FRMAX	=	TRUE	-		
					Lambda actual value sensor 1 bank 1	>	1			
					Output voltage of HEGO sensor 2 bank 1	>	0.6			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					)					
					for time	>=	2	sec		
					Condition for Lambda closed loop control upstream catalyst; bank 1	=	TRUE	-		
					)					
					for time	>=	1	sec		
					)					
					(					
					(					
					Temperature of catalyst 1	>	499.96	deg C		
					Temperature of catalyst 1	<	899.96	deg C		
					)					
					for time	=	0	sec		
					)					
					(					
					(					
					Mass flow exhaust gas catalyst 1	>	3.888888889	g/sec		
					Mass flow exhaust gas catalyst 1	<	69.44444444	g/sec		
					)					
					OR					
					(					
					(					
					Mass flow exhaust gas catalyst 1	>	2.083333333	g/sec		
					Mass flow exhaust gas catalyst 1	<=	3.888888889	g/sec		
					)					
					for time	>=	4	sec		
					)					
					)					
					Condition for upstream cat LSU ready for operation f(lamsons_w)	=	TRUE	-		
					(					
					lambda sensor 1 temperature, bank 1	>=	654.998	deg C		
					)					
					Hydrogen-correction-voltage, HEGO sensor 2 bank 1 with high resolution	<=	0.08057	V		
					(					
					CAT damage during past interval	=	FALSE	-		
					(					
					Ratio total charge to charge in cylinder	<=	1.02002	-		
					Width of dead zone for lambda control deviation	=	0	-		
					)					
					)					
					Mass flow of exhaust gas catalyst 1	>=	200	g		
					Difference betweeen Lambda offset (sensor 1, bank 1) and Lambda offset (delayed by one calculation raster)	<=	0.0079956	-		
					(					
					Counter for no step in offset or increasing offset in a row	>=	2	counts		
					OR					
					Counter for exhaust masses to debounce fault with fast offset adaptation	>=	4	counts		
					)					
					)					
					)					
					)					
					)					
					No pending or confirmed DTCs	=	see sheet inhibit table	-		
					Basic enable conditions met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
	P2097	Fuel trim fault diagnosis of upstream exhaust gas sensor when the lambda offset is not within the calibrated threshold range-out of range high	(				Debounce condition for fault confirmation by offset adaptation (sensor 1, bank 1)	=	TRUE	-	once per driving cycle	2 Trips
			Lambda offset of upstream exhaust gas sensor	>	0.03009	-	(					
			Lambda offset of upstream exhaust gas sensor	<=	0.059998	-	Debouncing of offset fault by slow offset adaptation	=	TRUE	-		
			Difference between lambda offset at the beginning of the driving cycle and lambda offset of the sensor	<	0.019989	-	(					
			(				Slow offset adaptation	=	TRUE	-		
			(				(					
			Maximum offset fault is healed in the current driving cycle	=	TRUE	-	Bit p-part controlability primary control enable	=	TRUE	-		
			Minimum offset fault is healed in the current driving cycle	=	TRUE	-	(					
			)				(					
			OR				Lambda regulator setpoint active	=	TRUE	-		
			(				(					
			Maximum offset fault is set in the previous driving cycle	=	TRUE	-	Width of dead zone for lambda control deviation	>=	0.999969	-		
			OR				OR					
			Minimum offset fault is set in the previous driving cycle	=	TRUE	-	(					
			)				Lambda closed loop control (upstream catalyst), bank 1	=	TRUE	-		
			OR				OR					
			(				(					
			Fuel trim maximum fault is set in the previous driving cycle	=	TRUE	-	Lambda setpoint for sensor after addition of trim control action is not eqaul to 0	=	TRUE	-		
			OR				Difference between upper limit action value lambda control and temporary value before test for enleanment protection	>=	0	-		
			Fuel trim minimum fault is set in the previous driving cycle	=	TRUE	-	Difference between temporary value before test for enleanment protection and lower bound of dfr during enleanmant protection	>=	0	-		
			)				Lambda (measured and setpoint) is below minimal measurable lambda (bank 1)	=	FALSE	-		
			)				TEMIN-limitation active, bench 1	=	FALSE	-		
			)				)					
			OR				)					
			(				)					
			(				Current lowpass value of p-part control upstream primary control enable	>	0	%		
			Fuel trim maximum fault is set in the previous driving cycle	=	TRUE	-	Lambda closed loop control (upstream catalyst), bank 1	=	TRUE	-		
			OR				(					
			Fuel trim minimum fault is set in the previous driving cycle	=	TRUE	-	Lambda control disabled during or after	=	FALSE	-		
			)				Lambda swtiched ON after fuel cutoff	=	TRUE	-		
			Lambda offset of upstream exhaust gas sensor	>	0.059998	-	(					
			)				Fuel cut off is active	=	FALSE	-		
							(					
								>	8	sec		
							enabling lambda control					
							OR					
							(					
							Absolute value of control difference in lambda, bank 1	<=	0.1001	-		
							Difference of counter time and plant time constant a-(b+c) where a is Time running down after fuel b is plant time constant for continuous air/fuel control c is plant parameter for dead time for lambda control	>	0	sec		
							)					
							)					
							)					
							LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
							(					
							lambda sensor 1 temperature, bank 1	>=	654.998	deg C		
							)					
							Lambda control disabled by a fault	=	FALSE	-		
							lambda control is active since warmup is finished	=	TRUE	-		
							Relative air charge	>	0	%		
							for time	>=	2	sec		
							)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					HEM condition to block lambda closed loop control upstream catalyst	=	FALSE	-		
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					(					
					Lambda control enabled for Cold operation sensor 2 bank 1	=	TRUE	-		
					OR					
					HEGO sensor 2 bank 1, signal valid	=	TRUE	-		
					(					
					Status of heating enable conditions for the sensor operating readiness	=	TRUE	-		
					(					
					Protective heating is finished	=	TRUE	-		
					for time	>=	15	sec		
					OR					
					Internal resistance OK for operating readiness	=	TRUE	-		
					(					
					Unfiltered internal resistance of HEGO sensor	<=	2000	Ohm		
					Protective heating is finished	=	TRUE	-		
					Counter for valid internal resistance measurements	>=	3	counts		
					)					
					)					
					Status of sensor signal enable conditions for the sensor operating readiness	=	TRUE	-		
					(					
					Internal resistance OK for operating readiness	=	TRUE	-		
					OR					
					(					
					(					
					Output voltage of HEGO Sensor	>=	0.551758	V		
					Output voltage of HEGO Sensor	<=	1.201172	V		
					)					
					OR					
					Output voltage of HEGO Sensor	<=	0.322266	V		
					)					
					OR					
					Sensor voltage stuck in countervoltage band	=	TRUE	-		
					(					
					(					
					(					
					Output voltage of HEGO Sensor	<	0.551758	V		
					Output voltage of HEGO Sensor	>	0.322266	V		
					)					
					(	=	TRUE	-		
					Sensor open circuit fault existed in previous trip					
					OR					
					Sensor open circuit fault currently not detected	=	TRUE	-		
					)					
					Electrical diagnostics enabled	=	TRUE	-		
					)					
					for time	>=	20	sec		
					)					
					)					
					for time	>=	0.2	sec		
					)					
					)					
					)					
					Bit p-part system balanced primary control enable	=	TRUE	-		
					(					
					(					
					Lambda setpoint for sensor is set equal to 1	=	TRUE	-		
					OR					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Lambda setpoint for sensor is set equal to 1	=	FALSE	-		
					for time	>=	10	sec		
					)					
					Rich catalyst purge	=	FALSE	-		
					Mass flow of exhaust gas, sensor 2	>	25	g		
					)					
					P-part active from temperature and dynamic diagnosis	=	TRUE	-		
					(					
					Temperature of catalyst 1	>=	349.96	deg C		
					Temperature of catalyst 1	<	899.96	deg C		
					)					
					)					
					Bit I-part global primary control enable	=	TRUE	-		
					(					
					(					
					Current lowpass value of I-part load primary control enable	>	-1.5938	%		
					Current lowpass value of I-part load primary control enable	<=	1.5938	%		
					)					
					Diagnosis of canister purge system is active	=	FALSE	-		
					Ratio total charge to charge in cylinder	<=	1	-		
					Width of dead zone for lambda control deviation	=	0	-		
					Maximum value among the engine coolant temperature and model-based substitute value for engine temperature signal in case of error	>	-48.04	deg C		
					(					
					Bit I-part global load and engine speed control enable	=	TRUE	-		
					(					
					Engine speed with low resolution	<	2600	rpm		
					Engine speed with low resolution	>=	1000	rpm		
					(					
					Half engine mode active	=	TRUE	-		
					(					
					Relative air mass during half engine mode (see Look-Up table #P2096-2)	<	99.8	%		
					Relative air mass during half engine mode (see Look-Up table #P2096-3)	>=	20.3	%		
					)					
					OR					
					Half engine mode active	=	FALSE	-		
					(					
					Relative air mass (see Look-Up table #P2096-4)	<	30 to 90	%		
					Relative air mass (see Look-Up table #P2096-5)	>=	15 to 20.3	%		
					)					
					)					
					)					
					)					
					)					
					(					
					Bit i-part system primary control enable	=	TRUE	-		
					(					
					Current integrator value of P-part balanced primary control enable	>	150	g		
					(					
					(					
					Dew point end of sensor 2 Bank1 is reached	=	TRUE	-		
					End of start is reached	=	TRUE	-		
					Exhaust gas mass flow sensor 2 Bank 1	>	179.91	g		
					)					
					OR					
					(					
					(					
					Dew point end of sensor 2 reached	=	FALSE	-		
					OR					
					End of start is reached	=	FALSE	-		
					)					
					Exhaust gas mass flow sensor 2	>	199.82	g		
					)					
					)					
					)					
					Bit i-part system temperature primary control enable	=	TRUE	-		
					(					
					Temperature of catalyst 1	>	349.96	deg C		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Temperature of catalyst 1	<	869.96	deg C		
					)					
					)					
					)					
					Cumulated time in which slow offset adaptation was active	>=	150	sec		
					)					
					Debounce condition for fault confirmation by fast offset adaptation (sensor 1, bank 1)	=	TRUE	-		
					General enabling condition of fast offset adaptation					
					(					
					Enabling condition of fast offset adaptation due to catalyst conditioning	=	TRUE	-		
					(					
					(					
					Bit signal valid, HEGO sensor 2 bank 1	=	TRUE	-		
					Flag lambda setpoint for sensor equal to 1	=	TRUE	-		
					Rich catalyst purge	=	FALSE	-		
					Bank-independent disabling conditions of fast offset adaptation	=	FALSE	-		
					(					
					Fuel cut-off	=	TRUE	-		
					Mass flow exhaust gas catalyst 1	>	300	g		
					)					
					OR					
					(					
					Fuel cut-off	=	FALSE	-		
					Mass flow exhaust gas catalyst 1	>	180	g		
					)					
					)					
					(					
					(					
					Parallelization done at least once from LSU plausibility diagnosis point of view (sensor 1, bank 1)	=	TRUE	-		
					(					
					(					
					Target sensor voltage for rich during active parallelisation reached once, sensor 1, bank 2	=	TRUE	-		
					Oil gas mass flow by active lambda shifting minus the maximal possible influence of LSU offset part, segment 1, bank 1	>=	1.6	g		
					for time	>=	1	sec		
					)					
					OR					
					(					
					Lean target sensor voltage during active parallelisation reached once, sensor 1, bank 2	=	TRUE	-		
					Oxygen mass flow in catalyst 1, deduct from maximum present LSU Offset in a fault free system	>=	1.3	g		
					for time	>=	1	sec		
					)					
					)					
					OR					
					Dynamic diagnosis error of upstream exhaust gas sensor is not set	=	TRUE	-		
					)					
					OR					
					(					
					(					
					lambda control is set when lambda controller reaches lower limit FRMIN	=	TRUE	-		
					Lambda actual value sensor 1 bank 1	<	1	-		
					Output voltage of HEGO sensor 2 bank 1	<	0.4	-		
					)					
					OR					
					(					
					lambda control is set when lambda controller reaches lower limit FRMAX	=	TRUE	-		
					Lambda actual value sensor 1 bank 1	>	1			
					Output voltage of HEGO sensor 2 bank 1	>	0.6			
					)					
					for time	>=	2	sec		
					Condition for Lambda closed loop control upstream catalyst; bank 1	=	TRUE	-		
					)					
					for time	>=	1	sec		
					)					
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					Temperature of catalyst 1	>	499.96	deg C		
					Temperature of catalyst 1	<	899.96	deg C		
					)					
					for time	=	0	sec		
					)					
					(					
					(					
					Mass flow exhaust gas catalyst 1	>	3.888888889	g/sec		
					Mass flow exhaust gas catalyst 1	<	69.44444444	g/sec		
					)					
					OR					
					(					
					(					
					Mass flow exhaust gas catalyst 1	>	2.083333333	g/sec		
					Mass flow exhaust gas catalyst 1	<=	3.888888889	g/sec		
					)					
					for time	>=	4	sec		
					)					
					)					
					Condition for upstream cat LSU ready for operation f(lamsons_w)	=	TRUE	-		
					(					
					lambda sensor 1 temperature, bank 1	>=	654.998	deg C		
					)					
					Hydrogen-correction-voltage, HEGO sensor 2 bank 1 with high resolution	<=	0.08057	V		
					(					
					CAT damage during past interval	=	FALSE	-		
					(					
					Ratio total charge to charge in cylinder	<=	1.02002	-		
					Width of dead zone for lambda control deviation	=	0	-		
					)					
					)					
					Mass flow of exhaust gas catalyst 1	>=	200	g		
					Difference betweeen Lambda offset (sensor 1, bank 1) and Lambda offset (delayed by one calculation raster)	<=	0.0079956	-		
					(					
					Counter for no step in offset or increasing offset in a row	>=	2	counts		
					OR					
					Counter for exhaust masses to debounce fault with fast offset adaptation	>=	4	counts		
					)					
					)					
					)					
					)					
					)					
					No pending or confirmed DTCs	=	see sheet inhibit table	-		
					Basic enable conditions met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
	P2098	Fuel trim fault diagnosis of upstream exhaust gas sensor when the lambda offset is not within the calibrated threshold range - out of range low	(				Debounce condition for fault confirmation by offset adaptation (sensor 1, bank 2)	=	TRUE	-	once per driving cycle	2 Trips
			Lambda offset of upstream exhaust gas sensor, bank 2	<	-0.03009	-	(					
			Lambda offset of upstream exhaust gas sensor, bank 2	>=	-0.059998	-	Debouncing of offset fault by slow offset adaptation, bank 2	=	TRUE	-		
			Difference between lambda offset of the sensor, bank 2 and lambda offset at the beginning of the driving cycle, bank 2	<	0.019989	-	(					
			(				Slow offset adaptation, bank 2	=	TRUE	-		
			(				(					
			Maximum offset fault of the bank 2 sensor is healed in the current driving cycle	=	TRUE	-	Bit p-part controlability primary control enable 2	=	TRUE	-		
			Minimum offset fault of the bank 2 sensor is healed in the current driving cycle	=	TRUE	-	(					
			)				(					
			OR				Lambda regulator setpoint active, bank 2	=	TRUE	-		
			(				(					
			Maximum offset fault of the bank 2 sensor is set in the previous driving cycle	=	TRUE	-	Width of dead zone for lambda control deviation	>=	0.999969	-		
			OR				OR					
			Minimum offset fault of the bank 2 sensor is set in the previous driving cycle	=	TRUE	-	(					
			)				Lambda closed loop control (upstream catalyst), bank 2	=	TRUE	-		
			OR				OR					
			(				(					
			Fuel trim maximum fault of the bank 2 sensor is set in the previous driving cycle	=	TRUE	-	Lambda setpoint for sensor after addition of trim control action, bank 2 is not eqaul to 0	=	TRUE	-		
			OR				Difference between upper limit action value lambda control and temporary value before test for enleanment protection, bank 2	>=	0	-		
			Fuel trim minimum fault of the bank 2 sensor is set in the previous driving cycle	=	TRUE	-	Difference between temporary value before test for enleanment protection, bank 2 and lower bound of dfr during enleanmant protection	>=	0	-		
			)				Lambda (measured and setpoint) is below minimal measurable lambda (bank 2)	=	FALSE	-		
			)				TEMIN-limitation active, bench 2	=	FALSE	-		
			)				)					
			OR				)					
			(				)					
			(				Current lowpass value of p-part control upstream primary control enable 2	>	0	%		
			Fuel trim maximum fault of the bank 2 sensor is set in the previous driving cycle	=	TRUE	-	Lambda closed loop control (upstream catalyst), bank 2	=	TRUE	-		
			OR				(					
			Fuel trim minimum fault of the bank 2 sensor is set in the previous driving cycle	=	TRUE	-	Lambda control disabled during or after	=	FALSE	-		
			)				Lambda swtiched ON after fuel cutoff, bank 2	=	TRUE	-		
			Lambda offset of upstream exhaust gas sensor, bank 2	>	0.059998	-	(					
			)				Fuel cut off is active, bank 2	=	FALSE	-		
							(					
								>	8	sec		
							enabling lambda control					
							OR					
							(					
							Absolute value of control difference in lambda, bank 2	<=	0.1001	-		
							Difference of counter time and plant time constant a-(b+c) where a is Time running down after fuel	>	0	sec		
							b is plant time constant for continuous air/fuel control, bank 2					
							c is plant parameter for dead time for lambda control, bank 2					
							)					
							)					
							)					
							LSU sensor upstream to catalyst ready for operation, bank 2	=	TRUE	-		
							(					
							lambda sensor 1 temperature, bank 2	>=	654.998	deg C		
							)					
							Lambda control disabled by a fault, bank 2	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					lambda control is active since warmup is finished	=	TRUE	-		
					Relative air charge	>	0	%		
					for time	>=	2	sec		
					)					
					HEM condition to block lambda closed loop control upstream catalyst, bank 2	=	FALSE	-		
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					(					
					Lambda control enabled for Cold operation sensor 2 bank 2	=	TRUE	-		
					OR					
					HEGO sensor 2 bank 2, signal valid	=	TRUE	-		
					(					
					Status of heating enable conditions for the sensor operating readiness	=	TRUE	-		
					(					
					Protective heating is finished, bank 2	=	TRUE	-		
					for time	>=	15	sec		
					OR					
					Internal resistance OK for operating readiness, bank 2	=	TRUE	-		
					(					
					Unfiltered internal resistance of HEGO sensor, bank 2	<=	2000	Ohm		
					Protective heating is finished, bank 2	=	TRUE	-		
					Counter for valid internal resistance measurements, bank 2	>=	3	counts		
					)					
					)					
					Status of sensor signal enable conditions for the sensor operating readiness, bank 2	=	TRUE	-		
					(					
					Internal resistance OK for operating readiness	=	TRUE	-		
					OR					
					(					
					(					
					Output voltage of HEGO Sensor, bank 2	>=	0.551758	V		
					Output voltae of HEGO Sensor, bank 2	<=	1.201172	V		
					)					
					OR					
					Output voltae of HEGO Sensor, bank 2	<=	0.322266	V		
					)					
					OR					
					Sensor voltage stuck in countervoltage band	=	TRUE	-		
					(					
					(					
					(					
					Output voltage of HEGO Sensor, bank 2	<	0.551758	V		
					Output voltage of HEGO Sensor, bank 2	>	0.322266	V		
					)					
					(					
					Sensor open circuit fault existed in previous trip	=	TRUE	-		
					OR					
					Sensor open circuit fault currently not detected	=	TRUE	-		
					)					
					Electrical diagnostics enabled, bank 2	=	TRUE	-		
					)					
					for time	>=	20	sec		
					)					
					)					
					for time	>=	0.2	sec		
					)					
					)					
					)					
					Bit p-part system balanced primary control enable 2	=	TRUE	-		
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					Lambda setpoint for sensor is set equal to 1, bank 2	=	TRUE	-		
					OR					
					Lambda setpoint for sensor is set equal to 1, bank 2	=	FALSE	-		
					for time	>=	10	sec		
					)					
					Rich catalyst purge, bank 2	=	FALSE	-		
					Mass flow of exhaust gas, sensor 1, bank 2	>	25	g		
					)					
					P-part active from temperature and dynamic diagnosis, bank 2	=	TRUE	-		
					(					
					Temperature of catalyst 1, bank 2	>=	349.96	deg C		
					Temperature of catalyst 1, bank 2	<	899.96	deg C		
					)					
					)					
					Bit I-part global primary control enable	=	TRUE	-		
					(					
					(					
					Current lowpass value of I-part load primary control enable	>	-1.5938	%		
					Current lowpass value of I-part load primary control enable	<=	1.5938	%		
					)					
					Diagnosis of canister purge system is active	=	FALSE	-		
					Ratio total charge to charge in cylinder	<=	1	-		
					Width of dead zone for lambda control deviation	=	0	-		
					Maximum value among the engine coolant temperature and model-based substitute value for engine temperature signal in case of error	>	-48.04	deg C		
					(					
					Bit I-part global load and engine speed control enable	=	TRUE	-		
					(					
					Engine speed with low resolution	<	2600	rpm		
					Engine speed with low resolution	>=	1000	rpm		
					(					
					Half engine mode active	=	TRUE	-		
					(					
					Relative air mass during half engine mode (see Look-Up table #P2096-2)	<	99.8	%		
					Relative air mass during half engine mode (see Look-Up table #P2096-3)	>=	20.3	%		
					)					
					OR					
					Half engine mode active	=	FALSE	-		
					(					
					Relative air mass (see Look-Up table #P2096-4)	<	30 to 90	%		
					Relative air mass (see Look-Up table #P2096-5)	>=	15 to 20.3	%		
					)					
					)					
					)					
					)					
					)					
					(					
					Bit i-part system primary control enable, bank 2	=	TRUE	-		
					(					
					Current integrator value of P-part balanced primary control enable, bank 2	>	150	g		
					(					
					(					
					Dew point end of sensor 1 Bank 2 is reached	=	TRUE	-		
					End of start is reached	=	TRUE	-		
					Exhaust gas mass flow sensor 1 Bank 2	>	179.91	g		
					)					
					OR					
					(					
					(					
					Dew point end of sensor 2 reached, bank 2	=	FALSE	-		
					OR					
					End of start is reached	=	FALSE	-		
					)					
					Exhaust gas mass flow sensor 1 Bank 2	>	199.82	g		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					)			
					)			
					)			
					Bit i-part system temperature primary control enable, bank 2	= TRUE -		
					(			
					Temperature of catalyst 1, bank 2	> 349.96 deg C		
					Temperature of catalyst 1, bank 2	< 869.96 deg C		
					)			
					)			
					)			
					Cumulated time in which slow offset adaptation was active, bank 2	>= 150 sec		
					)			
					Debounce condition for fault confirmation by fast offset adaptation (sensor 1, bank 2)	= TRUE -		
					General enabling condition of fast offset adaptation, bank 2			
					(			
					Enabling condition of fast offset adaptation due to catalyst conditioning, bank 2	= TRUE -		
					(			
					(			
					Bit signal valid, HEGO sensor 2 bank 2	= TRUE -		
					Flag lambda setpoint for sensor equal to 1, bank 2	= TRUE -		
					and			
					Rich catalyst purge, bank 2	= FALSE -		
					Bank-independent disabling conditions of fast offset adaptation	= FALSE -		
					(			
					Fuel cut-off, bank	= TRUE -		
					Mass flow exhaust gas catalyst 1, bank 2	> 300 g		
					)			
					OR			
					(			
					Fuel cut-off	= FALSE -		
					Mass flow exhaust gas catalyst 1, bank 2	> 180 g		
					)			
					)			
					(			
					(			
					Parallelization done at least once from LSU plausibility diagnosis point of view (sensor 1, bank 2)	= TRUE -		
					(			
					(			
					Target sensor voltage for rich during active parallelisation reached once, sensor 1, bank 2	= TRUE -		
					Oil gas mass flow by active lambda shifting minus the maximal possible influence of LSU offset part, segment 1, bank 2	>= 1.6 g		
					for time	>= 1 sec		
					)			
					OR			
					(			
					Lean target sensor voltage during active parallelisation reached once, sensor 1, bank 2	= TRUE -		
					Oxygen mass flow in catalyst 1, deduct from maximum present LSU Offset in a fault free system, bank 2	>= 1.3 g		
					for time	>= 1 sec		
					)			
					)			
					OR			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Dynamic diagnosis error of upstream exhaust gas sensor is not set	=	FALSE	-		
					)					
					OR					
					(					
					(					
					lambda control is set when lambda controller reaches lower limit FRMIN, bank 2	=	TRUE	-		
					Lambda actual value sensor 1 bank 2	<	1	-		
					Output voltage of HEGO sensor 2 bank 2	<	0.4	-		
					)					
					OR					
					(					
					lambda control is set when lambda controller reaches lower limit FRMAX, bank 2	=	TRUE	-		
					Lambda actual value sensor 1 bank 2	>	1			
					Output voltage of HEGO sensor 2 bank 2	>	0.6			
					)					
					for time	>=	2	sec		
					Condition for Lambda closed loop control upstream catalyst; bank 2	=	TRUE	-		
					)					
					for time	>=	1	sec		
					)					
					(					
					(					
					Temperature of catalyst 1, bank 2	>	499.96	deg C		
					Temperature of catalyst 1, bank 2	<	899.96	deg C		
					)					
					for time	=	0	sec		
					)					
					(					
					(					
					Mass flow exhaust gas catalyst 1, bank 2	>	3.888888889	g/sec		
					Mass flow exhaust gas catalyst 1, bank 2	<	69.44444444	g/sec		
					)					
					OR					
					(					
					(					
					Mass flow exhaust gas catalyst 1, bank 2	>	2.083333333	g/sec		
					Mass flow exhaust gas catalyst 1, bank 2	<=	3.888888889	g/sec		
					)					
					for time	>=	4	sec		
					)					
					)					
					Condition for upstream cat LSU ready for operation f(lamsons_w), bank 2	=	TRUE	-		
					(					
					lambda sensor 1 temperature, bank 2	>=	654.998	deg C		
					)					
					Hydrogen-correction-voltage, HEGO sensor 2 bank 2 with high resolution	<=	0.08057	V		
					(					
					CAT damage during past interval	=	FALSE	-		
					(					
					Ratio total charge to charge in cylinder	<=	1.02002	-		
					Width of dead zone for lambda control deviation	=	0	-		
					)					
					)					
					Mass flow of exhaust gas catalyst 1, bank 2	>=	200	g		
					Difference betweeen Lambda offset (sensor 1, bank 2) and Lambda offset (delayed by one calculation raster)	<=	0.0079956	-		
					(					
					Counter for no step in offset or increasing offset in a row, bank 2	>=	2	counts		
					OR					
					Counter for exhaust masses to debounce fault with fast offset adaptation, bank 2	>=	4	counts		
					)					
					)					
					)					
					)					
					)					
					No pending or confirmed DTCs	=	see sheet inhibit table	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Basic enable conditions met	=	see sheet enable tables	-		
	P2099	Fuel trim fault diagnosis of upstream exhaust gas sensor when the lambda offset is not within the calibrated threshold range - out of range high	(				Debounce condition for fault confirmation by offset adaptation (sensor 1, bank 2)	=	TRUE	-	once per driving cycle	2 Trips
			Lambda offset of upstream exhaust gas sensor, bank 2	>	0.03009	-	(					
			Lambda offset of upstream exhaust gas sensor, bank 2	<=	0.059998	-	Debouncing of offset fault by slow offset adaptation, bank 2	=	TRUE	-		
			Difference between lambda offset at the beginning of the driving cycle, bank 2 and lambda offset of the sensor, bank 2	<	0.019989	-	(					
			(				Slow offset adaptation, bank 2	=	TRUE	-		
			(				(					
			Maximum offset fault of the bank 2 sensor is healed in the current driving cycle	=	TRUE	-	Bit p-part controlability primary control enable 2	=	TRUE	-		
			Minimum offset fault of the bank 2 sensor is healed in the current driving cycle	=	TRUE	-	(					
			)				(					
			OR				Lambda regulator setpoint active, bank 2	=	TRUE	-		
			(				(					
			Maximum offset fault of the bank 2 sensor is set in the previous driving cycle	=	TRUE	-	Width of dead zone for lambda control deviation	>=	0.999969	-		
			OR				OR					
			Minimum offset fault of the bank 2 sensor is set in the previous driving cycle	=	TRUE	-	(					
			)				Lambda closed loop control (upstream catalyst), bank 2	=	TRUE	-		
			OR				OR					
			(				(					
			Fuel trim maximum fault of the bank 2 sensor is set in the previous driving cycle	=	TRUE	-	Lambda setpoint for sensor after addition of trim control action, bank 2 is not eqaul to 0	=	TRUE	-		
			OR				Difference between upper limit action value lambda control and temporary value before test for enleanment protection, bank 2	>=	0	-		
			Fuel trim minimum fault of the bank 2 sensor is set in the previous driving cycle	=	TRUE	-	Difference between temporary value before test for enleanment protection, bank 2 and lower bound of dfr during enleanmant protection	>=	0	-		
			)				Lambda (measured and setpoint) is below minimal measurable lambda (bank 2)	=	FALSE	-		
			)				and					
			)				TEMIN-limitation active, bench 2	=	FALSE	-		
			OR				)					
			(				)					
			(				)					
			Fuel trim maximum fault of the bank 2 sensor is set in the previous driving cycle	=	TRUE	-	Current lowpass value of p-part control upstream primary control enable 2	>	0	%		
			OR				Lambda closed loop control (upstream catalyst), bank 2	=	TRUE	-		
			Fuel trim minimum fault of the bank 2 sensor is set in the previous driving cycle	=	TRUE	-	(					
			)				Lambda control disabled during or after	=	FALSE	-		
			Lambda offset of upstream exhaust gas sensor, bank 2	>	0.059998	-	Lambda swtiched ON after fuel cutoff, bank 2	=	TRUE	-		
			)				(					
							Fuel cut off is active, bank 2	=	FALSE	-		
							(					
							enabling lambda control	>	8	sec		
							OR					
							(					
							Absolute value of control difference in lambda, bank 2	<=	0.1001	-		
							Difference of counter time and plant time constant	>	0	sec		
							a-(b+c)					
							where a is Time running down after fuel					
							b is plant time constant for continuous air/fuel control, bank 2					
							c is plant parameter for dead time for lambda control, bank 2					
							)					
							)					
							)					
							LSU sensor upstream to catalyst ready for operation, bank 2	=	TRUE	-		
							(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					lambda sensor 1 temperature, bank 1	>= 654.998 deg C		
					)			
					Lambda control disabled by a fault, bank 2	= FALSE -		
					lambda control is active since warmup is finished	= TRUE -		
					Relative air charge	> 0 %		
					for time	>= 2 sec		
					)			
					HEM condition to block lambda closed loop control upstream catalyst, bank 2	= FALSE -		
					Lamda control active due to GDI mode change	= TRUE -		
					(			
					GDI mode homogeneous	= TRUE -		
					for time	>= 0.8 sec		
					)			
					)			
					(			
					Lambda control enabled for Cold operation sensor 2 bank 2	= TRUE -		
					OR			
					HEGO sensor 2 bank 2, signal valid	= TRUE -		
					(			
					Status of heating enable conditions for the sensor operating readiness	= TRUE -		
					(			
					Protective heating is finished, bank 2	= TRUE -		
					for time	>= 15 sec		
					OR			
					Internal resistance OK for operating readiness, bank 2	= TRUE -		
					(			
					Unfiltered internal resistance of HEGO sensor, bank 2	<= 2000 Ohm		
					Protective heating is finished, bank 2	= TRUE -		
					Counter for valid internal resistance measurements, bank 2	>= 3 counts		
					)			
					)			
					Status of sensor signal enable conditions for the sensor operating readiness, bank 2	= TRUE -		
					(			
					Internal resistance OK for operating readiness	= TRUE -		
					OR			
					(			
					(			
					Output voltage of HEGO Sensor, bank 2	>= 0.551758 V		
					Output voltae of HEGO Sensor, bank 2	<= 1.201172 V		
					)			
					OR			
					Output voltae of HEGO Sensor, bank 2	<= 0.322266 V		
					)			
					OR			
					Sensor voltage stuck in countervoltage band	= TRUE -		
					(			
					(			
					(			
					Output voltage of HEGO Sensor, bank 2	< 0.551758 V		
					Output voltage of HEGO Sensor, bank 2	> 0.322266 V		
					)			
					(			
					Sensor open circuit fault existed in previous trip	= TRUE -		
					OR			
					Sensor open circuit fault currently not detected	= TRUE -		
					)			
					Electrical diagnostics enabled, bank 2	= TRUE -		
					)			
					for time	>= 20 sec		
					)			
					)			
					for time	>= 0.2 sec		
					)			
					)			
					)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Bit p-part system balanced primary control enable 2	=	TRUE	-		
					(					
					(					
					Lambda setpoint for sensor is set equal to 1, bank 2	=	TRUE	-		
					OR					
					Lambda setpoint for sensor is set equal to 1, bank 2	=	FALSE	-		
					for time	>=	10	sec		
					)					
					Rich catalyst purge, bank 2	=	FALSE	-		
					Mass flow of exhaust gas, sensor 1, bank 2	>	25	g		
					)					
					P-part active from temperature and dynamic diagnosis, bank 2	=	TRUE	-		
					(					
					Temperature of catalyst 1, bank 2	>=	349.96	deg C		
					Temperature of catalyst 1, bank 2	<	899.96	deg C		
					)					
					)					
					Bit I-part global primary control enable	=	TRUE	-		
					(					
					(					
					Current lowpass value of I-part load primary control enable	>	-1.5938	%		
					Current lowpass value of I-part load primary control enable	<=	1.5938	%		
					)					
					Diagnosis of canister purge system is active	=	FALSE	-		
					Ratio total charge to charge in cylinder	<=	1	-		
					Width of dead zone for lambda control deviation	=	0	-		
					Maximum value among the engine coolant temperature and model-based substitute value for engine temperature signal in case of error	>	-48.04	deg C		
					(					
					Bit I-part global load and engine speed control enable	=	TRUE	-		
					(					
					Engine speed with low resolution	<	2600	rpm		
					Engine speed with low resolution	>=	1000	rpm		
					(					
					Half engine mode active	=	TRUE	-		
					(					
					Relative air mass during half engine mode (see Look-Up table #P2096-2)	<	99.8	%		
					Relative air mass during half engine mode (see Look-Up table #P2096-3)	>=	20.3	%		
					)					
					OR					
					Half engine mode active	=	FALSE	-		
					(					
					Relative air mass (see Look-Up table #P2096-4)	<	30 to 90	%		
					Relative air mass (see Look-Up table #P2096-5)	>=	15 to 20.3	%		
					)					
					)					
					)					
					)					
					)					
					(					
					Bit i-part system primary control enable, bank 2	=	TRUE	-		
					(					
					Current integrator value of P-part balanced primary control enable, bank 2	>	150	g		
					(					
					(					
					Dew point end of sensor 1 Bank 2 is reached	=	TRUE	-		
					End of start is reached	=	TRUE	-		
					Exhaust gas mass flow sensor 1 Bank 2	>	179.91	g		
					)					
					OR					
					(					
					(					
					Dew point end of sensor 2 reached, bank 2	=	FALSE	-		
					OR					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					End of start is reached	=	FALSE	-		
					)					
					Exhaust gas mass flow sensor 1 Bank 2	>	199.82	g		
					)					
					)					
					)					
					Bit i-part system temperature primary control enable, bank 2	=	TRUE	-		
					(					
					Temperature of catalyst 1, bank 2	>	349.96	deg C		
					Temperature of catalyst 1, bank 2	<	869.96	deg C		
					)					
					)					
					)					
					Cumulated time in which slow offset adaptation was active, bank 2	>=	150	sec		
					)					
					Debounce condition for fault confirmation by fast offset adaptation (sensor 1, bank 2)	=	TRUE	-		
					General enabling condition of fast offset adaptation, bank 2					
					(					
					Enabling condition of fast offset adaptation due to catalyst conditioning, bank 2	=	TRUE	-		
					(					
					(					
					Bit signal valid, HEGO sensor 2 bank 2	=	TRUE	-		
					Flag lambda setpoint for sensor equal to 1, bank 2	=	TRUE	-		
					Rich catalyst purge, bank 2	=	FALSE	-		
					Bank-independent disabling conditions of fast offset adaptation	=	FALSE	-		
					(					
					Fuel cut-off, bank	=	TRUE	-		
					Mass flow exhaust gas catalyst 1, bank 2	>	300	g		
					)					
					OR					
					(					
					Fuel cut-off	=	FALSE	-		
					Mass flow exhaust gas catalyst 1, bank 2	>	180	g		
					)					
					)					
					(					
					(					
					Parallelization done at least once from LSU plausibility diagnosis point of view (sensor 1, bank 2)	=	TRUE	-		
					(					
					(					
					Target sensor voltage for rich during active parallelisation reached once, sensor 1, bank 2	=	TRUE	-		
					Oil gas mass flow by active lambda shifting minus the maximal possible influence of LSU offset part, segment 1, bank 2	>=	1.6	g		
					for time	>=	1	sec		
					)					
					OR					
					(					
					Lean target sensor voltage during active parallelisation reached once, sensor 1, bank 2	=	TRUE	-		
					Oxygen mass flow in catalyst 1, deduct from maximum present LSU Offset in a fault free system, bank 2	>=	1.3	g		
					for time	>=	1	sec		
					)					
					)					
					OR					
					Dynamic diagnosis error of upstream exhaust gas sensor is not set	=	FALSE	-		
					)					
					OR					
					(					
					(					
					lambda control is set when lambda controller reaches lower limit FRMIN, bank 2	=	TRUE	-		
					Lambda actual value sensor 1 bank 2	<	1	-		
					Output voltage of HEGO sensor 2 bank 2	<	0.4	-		
					)					
					OR					
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					lambda control is set when lambda controller reaches lower limit FRMAX, bank 2	=	TRUE	-		
					Lambda actual value sensor 1 bank 2	>	1			
					Output voltage of HEGO sensor 2 bank 2	>	0.6			
					)					
					for time	>=	2	sec		
					Condition for Lambda closed loop control upstream catalyst; bank 2	=	TRUE	-		
					)					
					for time	>=	1	sec		
					)					
					(					
					(					
					Temperature of catalyst 1, bank 2	>	499.96	deg C		
					Temperature of catalyst 1, bank 2	<	899.96	deg C		
					)					
					for time	=	0	sec		
					)					
					(					
					(					
					Mass flow exhaust gas catalyst 1, bank 2	>	3.888888889	g/sec		
					Mass flow exhaust gas catalyst 1, bank 2	<	69.44444444	g/sec		
					)					
					OR					
					(					
					(					
					Mass flow exhaust gas catalyst 1, bank 2	>	2.083333333	g/sec		
					Mass flow exhaust gas catalyst 1, bank 2	<=	3.888888889	g/sec		
					)					
					for time	>=	4	sec		
					)					
					)					
					Condition for upstream cat LSU ready for operation f(lamsons_w), bank 2	=	TRUE	-		
					(					
					lambda sensor 1 temperature, bank 2	>=	654.998	deg C		
					)					
					Hydrogen-correction-voltage, HEGO sensor 2 bank 2 with high resolution	<=	0.08057	V		
					(					
					CAT damage during past interval	=	FALSE	-		
					(					
					Ratio total charge to charge in cylinder	<=	1.02002	-		
					Width of dead zone for lambda control deviation	=	0	-		
					)					
					)					
					Mass flow of exhaust gas catalyst 1, bank 2	>=	200	g		
					Difference betweeen Lambda offset (sensor 1, bank 2) and Lambda offset (delayed by one calculation raster)	<=	0.0079956	-		
					(					
					Counter for no step in offset or increasing offset in a row, bank 2	>=	2	counts		
					OR					
					Counter for exhaust masses to debounce fault with fast offset adaptation, bank 2	>=	4	counts		
					)					
					)					
					)					
					)					
					)					
					No pending or confirmed DTCs	=	see sheet inhibit table	-		
					Basic enable conditions met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
	P219C	Cylinder Specific air-fuel imbalance detection too lean	Cylinder individual air-fuel ratio considering deviation from bank average air-fuel ratio	>	1.179993	-	Enable conditions for lambda imbalance diagnosis	=	TRUE	-	once per driving cycle	2 Trips
							(					
							(					
	P219D						Basic enable conditions	=	TRUE	-		
							(					
	P219E						Engine roughness signal is valid, which is the following conditions:	=	TRUE	-		
							(					
	P219F						Status of trigger wheel adaptation for segment time correction for cylinder individual lambda control function	=	TRUE	-		
							and					
	P21A0						Condition segment duration plausible	=	TRUE	-		
							and					
	P21A1						Active rough road detection	=	FALSE	-		
							and					
	P21A2						Clutch operator is active	=	FALSE	-		
							and					
	P21A3						Engine synchronisation is completed and engine is in normal operation mode	=	TRUE	-		
							)					
							and					
							Engine operation point is within calibrated range (low or high operating range), as decribed below:	=	TRUE	-		
							(					
							Relative air charge (with AT)	<	A-B	%		
							where					
							A is Upper threshold for the relative air charge in order to determine the operating range LOW depending on the engine speed nmot for automatic transmission	=	60	%		
							B is the upper thresholds of the relative air charge for determining the operating ranges LOW and HIGH for automatic transmission	=	0.8	%		
							and					
							Relative air charge (with AT)	>	24.8	%		
							and					
							Engine speed (with AT)	<	A-B	rpm		
							where					
							A is Upper engine speed threshold for determining for operating range LOW, AT (See Look-Up-Table #1)	=	2160	rpm		
							B is the hystersis for upper thresholds of the relative air charge for determining the operating ranges LOW and HIGH for automatic transmission	=	40	rpm		
							and					
							Engine speed (with AT)	>	1280	rpm		
							)					
							OR					
							(					
							High operation range is released	=	TRUE	-		
							and					
							(					
							Relative air charge (with AT)	<	A-B	%		
							where					
							A is Upper threshold for the relative air charge in order to determine the operating range LOW depending on the engine speed nmot for automatic transmission	=	0	%		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					B is the upper thresholds of the relative air charge for determining the operating ranges LOW and HIGH for automatic transmission	=	0.8	%		
					and					
					Relative air charge (with AT)	>	191.3	%		
					and					
					Engine speed (with AT)	<	A-B	rpm		
					where					
					A is Upper engine speed threshold for determining for operating range HIGH, AT	=	0	rpm		
					B is the hysterisis for upper engine speed thresholds for determining the operating ranges LOW and HIGH for automatic transmission	=	40	rpm		
					and					
					Engine speed (with AT)	>	10200	rpm		
					)					
					)					
					for time	>=	0.5	sec		
					and					
					Environmental conditions are within calibrated range:	=	TRUE	-		
					(					
					Ambient pressure	>	50	kPa		
					and					
					Environment temperature	>	-40.04	deg C		
					)					
					and					
					Engine coolant temperature is within calibrated range:	=	TRUE	-		
					(					
					Engine coolant temperature	>	57.96	deg C		
					and					
					Engine coolant temperature	<	143.26	deg C		
					)					
					and					
					Catalyst temperature is within calibrated range, which is the following conditions:	=	TRUE	-		
					(					
					max(a,b)	<	949.96	deg C		
					Where:					
					a is Maximum catalyst 1 temperature at bank 1					
					b is Maximum catalyst 1 temperature at bank 2					
					and					
					max(a,b)	>	399.96	deg C		
					Where:					
					a is Minimum catalyst 1 temperature at bank 1					
					b is Minimum catalyst 1 temperature at bank 2					
					)					
					and					
					Inlet/outlet camshaft adjustment is released as follows:	=	TRUE	-		
					(					
					Condition release of intake camshaft control is valid	=	TRUE	-		
					and					
					State of camshaftw control is not in ready state	=	TRUE	-		
					and					
					Condition release of outlet camshaft control is valid	=	TRUE	-		
					and					
					State of camshaftw control is not in ready state	=	TRUE	-		
					and					
					)					
					and					
					The following combustion conditions are fulfilled:	=	TRUE	-		
					(					
					Closed loop lambda control is active for bank 1	=	TRUE	-		
					and					
					Flag lambda setpoint for sensor equal to 1	=	TRUE	-		
					and					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Closed loop lambda control is active for bank 2	= TRUE -		
					and			
					Flag lambda setpoint for sensor equal to 1, bank 2	= TRUE -		
					and			
					Catalyst heating is active	= FALSE -		
					and			
					Homogenous mode is activated	= 1 -		
					and			
					Air fuel ratio commanded rich for component protection is active	= FALSE -		
					)			
					and			
					Current gear position	>= 6 -		
					and			
					Current gear position	<= 10 -		
					and			
					Waiting time after first end of start in a driving cycle	> 0 sec		
					)			
					and			
					Sum of high and low range adaptions in current driving cycle	>= 1 -		
					and			
					Deviation of the worst test cylinder	<= 0.999969 -		
					)			
					for time	>= 15 sec		
					and			
					(			
					Switching state of intake camshaft position for the diagnosis for AFIM has been reached	= TRUE -		
					and			
					Switching state of outlet camshaft position for the diagnosis for AFIM has been reached	= TRUE -		
					and			
					Actual rail pressure is adjusted to set point	= TRUE -		
					and			
					Actual value of fuel part purge control	< 0.008 -		
					and			
					Half Engine Mode is active	= FALSE -		
					and			
					Switching of half engine mode is in instationary state	= FALSE -		
					and			
					Engine roughness signal is released	= TRUE -		
					)			
					for time	>= 0.1 sec		
					)			
					Counter for adaption time	>= 4294967295		
					and			
					Maximum number of cylinder enrichment is achieved	= FALSE -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
	P219C	Cylinder Specific air-fuel imbalance detection too rich	Cylinder individual air-fuel ratio considering deviation from bank average air-fuel ratio	<	0.829987	-	Enable conditions for lambda imbalance diagnosis	=	TRUE	-	once per driving cycle	2 Trips
							(					
							(					
	P219D						Basic enable conditions	=	TRUE	-		
							(					
	P219E						Engine roughness signal is valid, which is the following conditions:	=	TRUE	-		
							(					
	P219F						Status of trigger wheel adaptation for segment time correction for cylinder individual lambda control function	=	TRUE	-		
							and					
	P21A0						Condition segment duration plausible	=	TRUE	-		
							and					
	P21A1						Active rough road detection	=	FALSE	-		
							and					
	P21A2						Clutch operator is active	=	FALSE	-		
							and					
	P21A3						Engine synchronisation is completed and engine is in normal operation mode	=	TRUE	-		
							)					
							and					
							Engine operation point is within calibrated range (low or high operating range), as decribed below:	=	TRUE	-		
							(					
							Relative air charge (with AT)	<	A-B	%		
							where					
							A is Upper threshold for the relative air charge in order to determine the operating range LOW depending on the engine speed nmot for automatic transmission	=	60	%		
							B is the upper thresholds of the relative air charge for determining the operating ranges LOW and HIGH for automatic transmission	=	0.8	%		
							and					
							Relative air charge (with AT)	>	24.8	%		
							and					
							Engine speed (with AT)	<	A-B	rpm		
							where					
							A is Upper engine speed threshold for determining for operating range LOW, AT (See Look-Up-Table #1)	=	2160	rpm		
							B is the hystersis for upper thresholds of the relative air charge for determining the operating ranges LOW and HIGH for	=	40	rpm		
							and					
							Engine speed (with AT)	>	1280	rpm		
							)					
							OR					
							(					
							High operation range is released	=	TRUE	-		
							and					
							(					
							Relative air charge (with AT)	<	A-B	%		
							where					
							A is Upper threshold for the relative air charge in order to determine the operating range LOW depending on the engine speed nmot for automatic transmission	=	0	%		
							B is the upper thresholds of the relative air charge for determining the operating ranges LOW and HIGH for automatic transmission	=	0.8	%		
							and					
							Relative air charge (with AT)	>	191.3	%		
							and					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Engine speed (with AT)	<	A-B	rpm		
					where					
					A is Upper engine speed threshold for determining for operating range HIGH, AT	=	0	rpm		
					B is the hysterisis for upper engine speed thresholds for determining the operating ranges LOW and HIGH for automatic transmission	=	40	rpm		
					and					
					Engine speed (with AT)	>	10200	rpm		
					)					
					)					
					for time	>=	0.5	sec		
					and					
					Environmental conditions are within calibrated range:	=	TRUE	-		
					(					
					Ambient pressure	>	50	kPa		
					and					
					Environment temperature	>	-40.04	deg C		
					)					
					and					
					Engine coolant temperature is within calibrated range:	=	TRUE	-		
					(					
					Engine coolant temperature	>	57.96	deg C		
					and					
					Engine coolant temperature	<	143.26	deg C		
					)					
					and					
					Catalyst temperature is within calibrated range, which is the following conditions:	=	TRUE	-		
					(					
					max(a,b)	<	949.96	deg C		
					Where:					
					a is Maximum catalyst 1 temperature at bank 1					
					b is Maximum catalyst 1 temperature at bank 2					
					and					
					max(a,b)	>	399.96	deg C		
					Where:					
					a is Minimum catalyst 1 temperature at bank 1					
					b is Minimum catalyst 1 temperature at bank 2					
					)					
					and					
					Inlet/outlet camshaft adjustment is released as follows:	=	TRUE	-		
					(					
					Condition release of intake camshaft control is valid	=	TRUE	-		
					and					
					State of camshaftw control is not in ready state	=	TRUE	-		
					and					
					Condition release of outlet camshaft control is valid	=	TRUE	-		
					and					
					State of camshaftw control is not in ready state	=	TRUE	-		
					and					
					)					
					and					
					The following combustion conditions are fulfilled:	=	TRUE	-		
					(					
					Closed loop lambda control is active for bank 1	=	TRUE	-		
					and					
					Flag lambda setpoint for sensor equal to 1	=	TRUE	-		
					and					
					Closed loop lambda control is active for bank 2	=	TRUE	-		
					and					
					Flag lambda setpoint for sensor equal to 1, bank 2	=	TRUE	-		
					and					
					Catalyst heating is active	=	FALSE	-		
					and					
					Homogenous mode is activated	=	1	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and			
					Air fuel ratio commanded rich for component protection is active	= FALSE -		
					)			
					and			
					Current gear position	>= 6 -		
					and			
					Current gear position	>= 10 -		
					and			
					Waiting time after first end of start in a driving cycle	> 0 sec		
					)			
					and			
					Sum of high and low range adaptions in current driving cycle	>= 1 -		
					and			
					Deviation of the worst test cylinder	<= 0.999969 -		
					)			
					for time	>= 15 sec		
					and			
					(			
					Switching state of intake camshaft position for the diagnosis for AFIM has been reached	= TRUE -		
					and			
					Switching state of outlet camshaft position for the diagnosis for AFIM has been reached	= TRUE -		
					and			
					Actual rail pressure is adjusted to set point	= TRUE -		
					and			
					Actual value of fuel part purge control	< 0.008 -		
					and			
					Half Engine Mode is active	= FALSE -		
					and			
					Switching of half engine mode is in instationary state	= FALSE -		
					and			
					Engine roughness signal is released	= TRUE -		
					)			
					for time	>= 0.1 sec		
					)			
					Counter for adaption time	>= 4294967295		
					and			
					Maximum number of cylinder enrichment is achieved	= FALSE -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P10A4	**Monitor 1:** Rationality check of valve opening time delay (tantot) against default value	Difference between current opening time delay and default opening time delay	> 100 us	Base Adaption is active	= TRUE -	2 events continuous	2 Trips
	P10A6				No pending or confirmed DTCs	= see sheet inhibit tables -		2 Trips
	P10A8				Basic enable conditions met	= see sheet enable tables -		2 Trips
	P10AA							2 Trips
	P10AC	**Monitor 4:** Rationality check of the total calculated injection time correction (dti) value	(		Pulse type of current injection is ballistic	= 0 -	20 events	2 Trips
	P10AE		Desired Open time(ti) on ballisitic area for CVO base adaption	>= 200 us	and			2 Trips
	P10B0		and		Base Adaption is active	= FALSE -		2 Trips
	P10B2		Total calculated injection time correction (dti)	> 79 us	and			2 Trips
			)		(			
			OR		Pause time	= 0 -		
			(		OR			
			Desired Open time(ti) on ballisitic area for CVO base adaption	< 200 us	Pause time	>= 0.003 sec		
			and		)			
			Total calculated injection time correction (dti)	> 39 us	No pending or confirmed DTCs	= see sheet inhibit tables -		
			)		Basic enable conditions met	= see sheet enable tables -		
		Monitor 5:		< 620 us	Base Adaption is active	= FALSE -	20 events	
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
		Monitor 7: Rationality check of the ballistic dTi at the	Integrated dti value after the controller is stable during base adaption	> 39 us	Base Adaption is active	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P10A3	**Monitor 1:** Rationality check of valve opening time delay (tantot) against default value	Difference between current opening time delay and default opening time delay	<	-100	us	Base Adaption is active	=	TRUE	-	2	events	continuous	2 Trips
	P10A5		OR				No pending or confirmed DTCs	=	see sheet inhibit tables	-				2 Trips
	P10A7		Opening time delay is found	=	FALSE	-	Basic enable conditions met	=	see sheet enable tables	-				2 Trips
	P10A9													2 Trips
	P10AB	**Monitor 4:** Rationality check of the total calculated injection time correction (dti) value	(				Pulse type of current injection is ballistic	=	0	-	20	events		2 Trips
	P10AD		Desired Open time(ti) on ballisitic area for CVO base adaption	>=	200	us	and							2 Trips
	P10AF		and				Base Adaption is active	=	FALSE	-				2 Trips
	P10B1		Total calculated injection time correction (dti)	<	-79	us	and							2 Trips
			)				(							
			OR				Pause time	=	0	-				
			(				OR							
			Desired Open time(ti) on ballisitic area for CVO base adaption	<	200	us	Pause time	>=	0.003	sec				
			and				)							
			Total calculated injection time correction (dti)	<	-39	us	No pending or confirmed DTCs	=	see sheet inhibit tables	-				
			)				Basic enable conditions met	=	see sheet enable tables	-				
		Monitor 5:		>	200	us	Base Adaption is active	=	FALSE	-	20	events		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Monitor 6:	CVO controller is faulty and full lift closing could not be detected	=	TRUE	-	Base Adaption is active	=	FALSE	-	20	events		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Monitor 7: Rationality check of the ballistic dTi at the	Integrated dti value after the controller is stable during base adaption	<	-39	us	Base Adaption is active	=	TRUE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P064D	**ECU: Self Check for Sensor ASIC of UEGO Sensor 1 Bank 1** An error is reported if the ASIC detects it or it delivers unplausible measurement values	**Monitoring of ASIC power supply:** Undervoltage at UB: Battery voltage < 6V				Diagnosis register of the ASIC is valid	=	TRUE	-	0.01	sec	continuously	2 Trips
			ASIC has shut off due to low battery voltage (failure transition into IDLE state)	=	TRUE	-	(Battery voltage	<=	655.34	V				
			OR				Battery voltage	>=	10.9	V				
							)							
			Tests for production checks are active				for time	>=	0.1	sec				
			SPI test access port active	=	TRUE	-	Basic enable conditions met	=	see sheet enable tables	-				
			OR				No pending or confirmed DTCs	=	see sheet inhibit tables	-				
			Built-in self-test failed	=	TRUE	-								
			OR											
			Monitoring of ASIC internal sequencing											
			Internal sequencing does not work											
			Error of watchdog signal of the sequencer	=	TRUE	-								
			OR											
			Watchdog signal of the SP-unit Interrupt to close	=	TRUE	-								
			OR											
			Watchdog signal of the SP-unit reading error of the Program rom if set without Over- or Undervoltage Flags	=	TRUE	-								
			OR											
			Check ASIC Chip											
			ASIC chip ID is lower than BA-step	=	TRUE	-								

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Monitoring of ASIC interrupt handling Interrupt handling at ASIC base software does not work				Validity of IRQ diagnosis information	=	TRUE	-		
							(Battery voltage	<=	655.34	V		
			Bidirectional interrupt signal between ASIC and ECU-Microcontroller: too slow- or too fast response or no response	=	TRUE	-	Battery voltage)	>=	10.9	V		
							for time	>=	0.1	sec		
							Basic enable conditions met	=	see sheet enable tables	-		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			Monitoring of quantification of the analog digital converter Causes for error: ADC defect, 3,3V source not operational, low-pass defect				Cj135 is neither in IDLE nor in SWITCHON mode	=	TRUE	-		
							(Battery voltage	<=	655.34	V		
			Conversion value of the analog digital converter (amplifier mode 1) OR	<	0.00040007	V	Battery voltage)	>=	10.9	V		
							for time	>=	0.1	sec		
			Conversion value of the analog digital converter (amplifier mode 1) OR	>	0.0007	V	Basic enable conditions met	=	see sheet enable tables	-		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			Conversion value of the analog digital converter (amplifier mode 2) OR	<	0.00110006	V						
			Conversion value of the analog digital converter (amplifier mode 2) OR	>	0.00189996	V						
			Conversion value of the analog digital converter (amplifier mode 3) OR	<	0.00309992	V						
			Conversion value of the analog digital converter (amplifier mode 3)	>	0.00539994	V						
			Current source Isq/ Rgnd resistance check Causes for error: Isq defect, Rgnd damaged or wrong calibration value of Rgnd				Cj135 is not in IDLE mode	=	TRUE	-		
			Ratio of requested amplitude of the pump current source and measured pump current source	<	0.807447	-	Adjustment bits ISQ reference of sensor 1 bank 1 is same as register value of desired Isq sensor 1 bank 1	=	TRUE	-		
			OR				(Battery voltage	<=	655.34	V		
			Ratio of requested amplitude of the pump current source and measured pump current source	>	1.192553	-	Battery voltage)	>=	10.9	V		
							for time	>=	0.1	sec		
							Basic enable conditions met	=	see sheet enable tables	-		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			Current source Isqr/ Rcal resistance check Causes for error: Isqr defect, Rcal damaged				Cj135 is neither in IDLE nor in SWITCHON mode	=	TRUE	-		
			Ratio of requested amplitude of the pump current source and measured pump current source	<	0.807447	-	(Battery voltage	<=	655.34	V		
			OR				Battery voltage)	>=	10.9	V		
			Ratio of requested amplitude of the pump current source and measured pump current source	>	1.192553	-	for time	>=	0.1	sec		
							Basic enable conditions met	=	see sheet enable tables	-		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			Rmeas resistance check Since Rmeas cannot be alone measured by ECU, then the entire resistance between pin APE and MES (Rparl) will be checked here				Cj135 is in SWITCHON mode	=	TRUE	-		
							Calculated parallel resistance is valid	=	TRUE	-		
			Calculated parallel resistance between APE and MES	<	24	Ohm	(Battery voltage	<=	655.34	V		
			Calculated parallel resistance between APE and MES	>	360	Ohm	Battery voltage)	>=	10.9	V		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for time	>= 0.1 sec		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
			Monitoring of ASIC supply voltage deviations from 3.3V		(Battery voltage	<= 655.34 V		
			Measured reference voltage VCC3	< 2.96992 V	Battery voltage)	>= 10.9 V		
			Measured reference voltage VCC3	> 3.66656 V	for time	>= 0.1 sec		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
	P064E	**ECU: Self Check for Sensor ASIC of UEGO Sensor 1 Bank 2** An error is reported if the ASIC detects it or it delivers unplausible measurement values	**Monitoring of ASIC power supply:**		Diagnosis register of the ASIC is valid	= TRUE -	0.01 sec continuously	2 Trips
			Undervoltage at UB: Battery voltage < 6V. ASIC has shut off due to low battery voltage (failure transition into IDLE state) **OR**	= TRUE -	(Battery voltage	<= 655.34 V		
					Battery voltage)	>= 10.9 V		
			Tests for production checks are active		for time	>= 0.1 sec		
			SPI test access port active	= TRUE -	Basic enable conditions met	= see sheet enable tables -		
			OR		No pending or confirmed DTCs	= see sheet inhibit tables -		
			Built-in self-test failed **OR**	= TRUE -				
			Monitoring of ASIC internal sequencing Internal sequencing does not work					
			Error of watchdog signal of the sequencer OR	= TRUE -				
			Watchdog signal of the SP-unit Interrupt to close OR	= TRUE -				
			Watchdog signal of the SP-unit reading error of the Program rom if set without Over- or Undervoltage Flags **OR**	= TRUE -				
			Check ASIC Chip ASIC chip ID is lower than BA-step	= TRUE -				
			Monitoring of ASIC interrupt handling Interrupt handling at ASIC base software does not work		Validity of IRQ diagnosis information	= TRUE -		
					(Battery voltage	<= 655.34 V		
			Bidirectional interrupt signal between ASIC and ECU-Microcontroller: too slow- or too fast response or no response	= TRUE -	Battery voltage)	>= 10.9 V		
					for time	>= 0.1 sec		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
			Monitoring of quantification of the analog digital converter Causes for error: ADC defect, 3,3V source not operational, low-pass defect		Cj135 is neither in IDLE nor in SWITCHON mode	= TRUE -		
					(Battery voltage	<= 655.34 V		
			Conversion value of the analog digital converter (amplifier mode 1) OR	< 0.00040007 V	Battery voltage)	>= 10.9 V		
					for time	>= 0.1 sec		
			Conversion value of the analog digital converter (amplifier mode 1) OR	> 0.0007 V	Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
			Conversion value of the analog digital converter (amplifier mode 2) OR	< 0.00110006 V				
			Conversion value of the analog digital converter (amplifier mode 2)	> 0.00189996 V				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
			OR Conversion value of the analog digital converter (amplifier mode 3)	<	0.00309992	V								
			OR Conversion value of the analog digital converter (amplifier mode 3)	>	0.00539994	V								
			Current source Isq/ Rgnd resistance check Causes for error: Isq defect, Rgnd damaged or wrong calibration value of Rgnd				Cj135 is not in IDLE mode	=	TRUE	-				
			Ratio of requested amplitude of the pump current source and measured pump current source	<	0.807447	-	Adjustment bits ISQ reference of sensor 1 bank 2 is same as register value of desired Isq sensor 1 bank 2	=	TRUE	-				
			OR				(Battery voltage	<=	655.34	V				
			Ratio of requested amplitude of the pump current source and measured pump current source	>	1.192553	-	Battery voltage)	>=	10.9	V				
							for time	>=	0.1	sec				
							Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
			Current source Isqr/ Rcal resistance check Causes for error: Isqr defect, Rcal damaged				Cj135 is neither in IDLE nor in SWITCHON mode	=	TRUE	-				
			Ratio of requested amplitude of the pump current source and measured pump current source	<	0.807447	-	(Battery voltage	<=	655.34	V				
			OR				Battery voltage)	>=	10.9	V				
			Ratio of requested amplitude of the pump current source and measured pump current source	>	1.192553	-	for time	>=	0.1	sec				
							Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
			Rmeas resistance check Since Rmeas cannot be alone measured by ECU, then the entire resistance between pin APE and MES (Rparl) will be checked here				Cj135 is in SWITCHON mode	=	TRUE	-				
							Calculated parallel resistance is valid	=	TRUE	-				
			Calculated parallel resistance between APE and MES	<	24	Ohm	(Battery voltage	<=	655.34	V				
			Calculated parallel resistance between APE and MES	>	360	Ohm	Battery voltage)	>=	10.9	V				
							for time	>=	0.1	sec				
							Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
			Monitoring of ASIC supply voltage deviations from 3.3V				(Battery voltage	<=	655.34	V				
			Measured reference voltage VCC3	<	2.96992	V	Battery voltage)	>=	10.9	V				
			Measured reference voltage VCC3	>	3.66656	V	for time	>=	0.1	sec				
							Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
	P0135	**Path 1: Start diagnosis** Monitoring of ceramic temperature after engine start from end of dew point onwards	Ceramic temperature of upstream O2 sensor	<	734.991	deg C	Engine start has finished	=	TRUE	-	28	sec	once per driving cycle	2 Trips
							and Dew point end for O2 sensor 1 bank 1 has reached (heating up is released)	=	TRUE	-				
							and (Engine is running	=	TRUE	-				
							(Coolant temperature at engine start)	>=	-40.04	deg C				
							OR Engine is running (	=	FALSE	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Coolant temperature at engine output	>= -40.04 deg C		
					)			
					)			
					and			
					(			
					Battery voltage	>= 10.9 V		
					and			
					Battery voltage	<= 655.34 V		
					)			
					for time	>= 0.1 sec		
					and			
					Deactivation after release of Start Check	> 10 sec		
					Start Check will be aborted and deactivated for the rest of the driving cycle if any of the following conditions is not fulfilled for integrated sum time:			
					(			
					Battery voltage	<= 655.34 V		
					and			
					(			
					All injectors active in operation by running engine	= TRUE -		
					OR			
					Engine is running	= FALSE -		
					)			
					)			
					Basic enable conditions met	= see sheet enable tables -		
					and			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
		Path 2: Permanent diagnosis Monitoring of ceramic temperature against low rationality threshold	Ceramic temperature of upstream O2 sensor	< 734.991 deg C	(Battery voltage	<= 10.9 V	60 sec continuous	2 Trips
					and			
					Battery voltage	>= 655.34 V		
					)			
					for time	>= 0.1 sec		
					and			
					Engine is running	= TRUE -		
					and			
					Modelled exhaust gas temperature at upstream O2 sensor bank 1	>= 349.96 deg C		
					and			
					Fuel cut off is active	= FALSE -		
					for time	>= 50 sec		
					and			
					HO2S closed loop heating control (inaccurate), which is the following condition for time:	>= 50 sec		
					(			
					Deviation between actual temperature value and set point	> 64.9922 deg C		
					)			
					and			
					Basic enable conditions met	= see sheet enable tables -		
					and			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
		Path 3: Low Temperature Diagnosis Monitoring of ceramic temperature against very low rationality threshold (drops quickly to a critical low level)	Temperature of ceramic upstream O2 sensor	< 659.991 deg C	(Battery voltage	<= 10.9 V	10 sec continuous	2 Trips
					and			
					Battery voltage	>= 655.34 V		
					)			
					for time	>= 0.1 sec		
					and			
					Engine is running	= TRUE -		
					and			
					Modelled exhaust gas temperature at upstream O2 sensor bank 1	>= 349.96 deg C		
					and			
					Fuel cut off is active	= FALSE -		
					for time	>= 50 sec		
					and			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							HO2S closed loop heating control (inaccurate), which is the following condition for time:	>=	50	sec		
							(					
							Deviation between temperature value and set point	>	64.9922	deg C		
							)					
							and					
							Basic enable conditions met	=	see sheet enable tables	-		
							and					
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
	P2243	Lambda sensor wire diagnosis Circuit countinuity - open load at pin RE detected by means of aborted RAM check at WARMUP mode	**Aborted RAM check at ASIC shut-off when CJ135 in WARMUP mode** Open load at pin RE detected if countinuiuty measurement was done before ASIC abort				(Battery voltage	<=	655.34	V	continuous	2 Trips
			Short circuit to battery fault is detected at sensor lines IPE/APE/MES as per last accessed ASIC diagnostic register, means	=	FALSE	-	Battery voltage)	>=	10.9	V		
							for time	>=	0.1	sec		
			Voltage at least at one of the sensor lines IPE/APE/MES	<=	9.1 to 10.3	V	Requested mode of UEGO sensor 1 Bank 1 is in WARMUP mode	=	TRUE	-		
			Result of continuity measurement of sensor pumpcell using current source ISQ (in a state, where the ASIC-internal current source ISQr is connected to the sensor line "RE" via internal switches and the sensor line "IPE" is directly connected to RGnd) is available in RAM	=	TRUE	-	Upstream HO2S Sensor is heated up, which is the following conditions:	=	TRUE	-		
							(Upstream HO2S Sensor ceramic temperature	>	789.998	deg C		
							OR					
							completed	=	TRUE	-		
							)					
							Basic enable conditions met	=	see sheet enable tables	-		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
		Lambda sensor wire diagnosis Circuit countinuity - open load at pin RE detected by means of aborted RAM check at NORMAL mode	**Aborted RAM check at ASIC shut-off when CJ135 in NORMAL mode** Open load at pin RE detected if current via Nernst cell is not OK				(Battery voltage	<=	655.34	V		
			Current source ISQr is active: current via Nernst cell is OK	=	FALSE	-	Battery voltage)	>=	10.9	V		
							for time	>=	0.1	sec		
							Upstream HO2S Sensor is heated up, which is the following conditions:	=	TRUE	-		
							(Upstream HO2S Sensor ceramic temperature	>	789.998	deg C		
							OR					
							completed	=	TRUE	-		
							)					
							UEGO Signal ASIC mode request of sensor 1 bank 1 is in NORMAL operation mode	=	TRUE	-		
							Validity of REFPAT register sensor 1 bank 1	=	TRUE	-		
							Basic enable conditions met	=	see sheet enable tables	-		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
		Circuit continuity check - open circuit by means of nernst voltage monitoring during pump current operation	**Monitoring of abnormalities at sensor line IPE during normal ASIC operation** Open load at pin RE detected by means of nernst voltage monitoring				(Battery voltage	<=	655.34	V		
			Electrically corrected nernst voltage	>	1.8	V	Battery voltage)	>=	10.9	V		
							for time	>=	0.1	sec		
							Upstream HO2S Sensor is heated up, which is the following conditions:	=	TRUE	-		
							(Upstream HO2S Sensor ceramic temperature	>	789.998	deg C		
							OR					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							completed	=	TRUE	-		
							)					
							UEGO Signal ASIC mode request of sensor 1 bank 1 is not in IDLE mode (pumping current is active)	=	TRUE	-		
							Counter of verifications of the actual mode of the ASIC for sensor 1 bank 1	>=	10	-		
							Basic enable conditions met	=	see sheet enable tables	-		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
		Circuit continuity check - open circuit by means of continuity measurements of sensor pumpsell respectively nernst cell during normal or aborted ASIC operation in WARMUP mode	**Monitoring of abnormalities at sensor line RE during normal ASIC operation when CJ135 is in WARMUP mode** Open load at pin RE detected by means of continuity measurements of sensor pumpcell and sensor nernst cell using current source ISQr				(Battery voltage	<=	655.34	V		
			Difference of voltage drop at ECU-internal resistor RG in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" and the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RG in a state, where all sensor lines are opened (Ug0iai - Ug0)	>=	E * F		Battery voltage)	>=	10.9	V		
							for time	>=	0.1	sec		
			Difference of voltage drop at ECU-internal resistor RG in a state, where the ASIC-internal current source ISQr is connected to the sensor line "RE" and the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RG in a state, where all sensor lines are opened (Ug0iei - Ug0)	<	E * F		Upstream HO2S Sensor is heated up, which is the following conditions:	=	TRUE	-		
			(E) Measured amplitude of the reference pump current source	=	measured value		(					
			(F) Minimum sensitivity of the continuiuity measurements to resistance RGnd	=	66	Ohm	Upstream HO2S Sensor ceramic temperature OR	>	789.998	deg C		
							completed)	=	TRUE	-		
							Requested mode of UEGO sensor 1 Bank 1 is in WARMUP mode and (	=	TRUE	-		
							(Last packet transfer aborted of sensor 1 bank 1	=	FALSE	-		
							Counter of verifications of the actual mode of the ASIC for sensor 1 bank 2	>=	10	counts		
							Display for the validity of Isqr for UEGO sensor 1 Bank 1) OR	=	TRUE	-		
							(Last packet transfer aborted of sensor 1 bank 1	=	TRUE	-		
							Result of continuity measurement of sensor pumpcell using current source ISQ (in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" via internal switches and the sensor line "IPE" is directly connected to RGnd) is available in RAM	=	TRUE	-		
							Short circuit to battery fault is detected at sensor lines RE/IPE/APE/MES as per last accessed ASIC diagnostic register, means	=	TRUE	-		
							Voltage at least at one of the sensor lines (RE/IPE/APE/MES)))	>	9.1 to 10.3	V		
							Basic enable conditions met	=	see sheet enable tables	-		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
	P0155	**Path 1: Start diagnosis** Monitoring of ceramic temperature after engine start from end of dew point onwards	Ceramic temperature of upstream O2 sensor	<	734.991	deg C	Engine start has finished	=	TRUE	-	28	sec	once per driving cycle	2 Trips
							and							
							Dew point end for O2 sensor 1 bank 2 has reached (heating up is released)	=	TRUE	-				
							and							
							(							
							Engine is running	=	TRUE	-				
							(							
							Coolant temperature at engine start	>=	-40.04	deg C				
							)							
							OR							
							Engine is running	=	FALSE	-				
							(							
							Coolant temperature at engine output	>=	-40.04	deg C				
							)							
							)							
							and							
							(							
							Battery voltage	>=	10.9	V				
							and							
							Battery voltage	<=	655.34	V				
							)							
							for time	>=	0.1	sec				
							and							
							Deactivation after release of Start Check Start Check will be aborted and deactivated for the rest of the driving cycle if any of the following conditions is not fulfilled for integrated sum time:	>	10	sec				
							(							
							Battery voltage	<=	655.34	V				
							and							
							(							
							All injectors active in operation by running engine	=	TRUE	-				
							OR							
							Engine is running	=	FALSE	-				
							)							
							)							
							Basic enable conditions met	=	see sheet enable tables	-				
							and							
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
		Path 2: Permanent diagnosis Monitoring of ceramic temperature against low rationality threshold	Ceramic temperature of upstream O2 sensor	<	734.991	deg C	(	<=	10.9	V	60	sec	continuous	2 Trips
							Battery voltage							
							and							
							Battery voltage	>=	655.34	V				
							)							
							for time	>=	0.1	sec				
							and							
							Engine is running	=	TRUE	-				
							and							
							Modelled exhaust gas temperature at upstream O2 sensor bank 2	>=	349.96	deg C				
							and							
							Fuel cut off is active	=	FALSE	-				
							for time	>=	50	sec				
							and							
							HO2S closed loop heating control (inaccurate), which is the following condition for time:	>=	50	sec				
							(							
							Deviation between actual temperature value and set point	>	64.9922	deg C				
							)							
							and							
							Basic enable conditions met	=	see sheet enable tables	-				
							and							
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
		Path 3: Low Temperature Diagnosis Monitoring of ceramic temperature against very low rationality threshold (drops quickly to a critical low level)	Temperature of ceramic upstream O2 sensor	<	659.991	deg C	(	<=	10.9	V	10	sec	continuous	2 Trips
							Battery voltage							

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							and					
							Battery voltage	>=	655.34	V		
							)					
							for time	>=	0.1	sec		
							and					
							Engine is running	=	TRUE	-		
							and					
							Modelled exhaust gas temperature at upstream O2 sensor bank 2	>=	349.96	deg C		
							and					
							Fuel cut off is active	=	FALSE	-		
							for time	>=	50	sec		
							and					
							HO2S closed loop heating control (inaccurate), which is the following condition for time:	>=	50	sec		
							(					
							Deviation between temperature value and set point	>	64.9922	deg C		
							)					
							and					
							Basic enable conditions met	=	see sheet enable tables	-		
							and					
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
	P2247	Lambda sensor wire diagnosis Circuit countinuity - open load at pin RE detected by means of aborted RAM check at WARMUP mode	**Aborted RAM check at ASIC shut-off when CJ135 in WARMUP mode** Open load at pin RE detected if countinuiuty measurement was done before ASIC abort				(Battery voltage	<=	655.34	V		2 Trips
			Short circuit to battery fault is detected at sensor lines IPE/APE/MES as per last accessed ASIC diagnostic register, means	=	FALSE	-	Battery voltage	>=	10.9	V		
							)					
							for time	>=	0.1	sec		
			Voltage at least at one of the sensor lines IPE/APE/MES	<=	9.1 to 10.3	V	Requested mode of UEGO sensor 1 Bank 2 is in WARMUP mode	=	TRUE	-		
			Result of continuity measurement of sensor pumpcell using current source ISQ (in a state, where the ASIC-internal current source ISQr is connected to the sensor line "RE" via internal switches and the sensor line "IPE" is directly connected to RGnd) is available in RAM	=	TRUE	-	Upstream HO2S Sensor is heated up, which is the following conditions:	=	TRUE	-		
							(					
							Upstream HO2S Sensor ceramic temperature	>	789.998	deg C		
							OR					
							completed	=	TRUE	-		
							)					
							Basic enable conditions met	=	see sheet enable tables	-		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
		Lambda sensor wire diagnosis Circuit countinuity - open load at pin RE detected by means of aborted RAM check at NORMAL mode	**Aborted RAM check at ASIC shut-off when CJ135 in NORMAL mode** Open load at pin RE detected if current via Nernst cell is not OK				(Battery voltage	<=	655.34	V		
			Current source ISQr is active: current via Nernst cell is OK	=	FALSE	-	Battery voltage	>=	10.9	V		
							)					
							for time	>=	0.1	sec		
							Upstream HO2S Sensor is heated up, which is the following conditions:	=	TRUE	-		
							(					
							Upstream HO2S Sensor ceramic temperature	>	789.998	deg C		
							OR					
							completed	=	TRUE	-		
							)					
							UEGO Signal ASIC mode request of sensor 1 bank 2 is in NORMAL operation mode	=	TRUE	-		
							Validity of REFPAT register sensor 1 bank 2	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Basic enable conditions met	=	see sheet enable tables	-		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
		Circuit continuity check - open circuit by means of nernst voltage monitoring during pump current operation	**Monitoring of abnormalities at sensor line IPE during normal ASIC operation** Open load at pin RE detected by means of nernst voltage monitoring				(Battery voltage	<=	655.34	V		
			Electrically corrected nernst voltage	>	1.8	V	Battery voltage)	>=	10.9	V		
							for time	>=	0.1	sec		
							Upstream HO2S Sensor is heated up, which is the following conditions: (	=	TRUE	-		
							Upstream HO2S Sensor ceramic temperature OR	>	789.998	deg C		
							completed)	=	TRUE	-		
							UEGO Signal ASIC mode request of sensor 1 bank 2 is not in IDLE mode (pumping current is active)	=	TRUE	-		
							Counter of verifications of the actual mode of the ASIC for sensor 1 bank 2	>=	10	-		
							Basic enable conditions met	=	see sheet enable tables	-		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
		Circuit continuity check - open circuit by means of continuity measurements of sensor pumpsell respectively nernst cell during normal or aborted ASIC operation in WARMUP mode	**Monitoring of abnormalities at sensor line RE during normal ASIC operation when CJ135 is in WARMUP mode** Open load at pin RE detected by means of continuity measurements of sensor pumpcell and sensor nernst cell using current source ISQr				(Battery voltage	<=	655.34	V		
			Difference of voltage drop at ECU-internal resistor RG in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" and the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RG in a state, where all sensor lines are opened (Ug0iai - Ug0)	>=	E * F		Battery voltage)	>=	10.9	V		
							for time	>=	0.1	sec		
			Difference of voltage drop at ECU-internal resistor RG in a state, where the ASIC-internal current source ISQr is connected to the sensor line "RE" and the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RG in a state, where all sensor lines are opened (Ug0iei - Ug0)	<	E * F		Upstream HO2S Sensor is heated up, which is the following conditions:	=	TRUE	-		
			(E) Measured amplitude of the reference pump current source	=	measured value		(					
			(F) Minimum sensitivity of the continuiuity measurements to resistance RGnd	=	66	Ohm	Upstream HO2S Sensor ceramic temperature OR	>	789.998	deg C		
							completed)	=	TRUE	-		
							Requested mode of UEGO sensor 1 Bank 2 is in WARMUP mode and ((	=	TRUE	-		
							Last packet transfer aborted of sensor 1 bank 2	=	FALSE	-		
							Counter of verifications of the actual mode of the ASIC for sensor 1 bank 2	>=	10	counts		
							Display for the validity of Isqr for UEGO sensor 1 Bank 2) OR (	=	TRUE	-		
							Last packet transfer aborted of sensor 1 bank 2	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Result of continuity measurement of sensor pumpcell using current source ISQ (in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" via internal switches and the sensor line "IPE" is directly connected to RGnd) is available in RAM	= TRUE -		
					Short circuit to battery fault is detected at sensor lines RE/IPE/APE/MES as per last accessed ASIC diagnostic register, means	= TRUE -		
					Voltage at least at one of the sensor lines (RE/IPE/APE/MES)	> 9.1 to 10.3 V		
					)			
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
	P0032	Diagnoses the UEGO heater control powerstage of bank 1 sensor 1 for short circuit to battery fault at the low side of the driver circuit	Voltage high during driver ON state (indicates short-to-power)	- Short to power: - between signal and controller power	Release condition of heater powerstage diagnosis is enabled	= TRUE -	0.5 sec continuous	2 Trips
					The following release condition of diagnosis report of bank 1 sensor 1 is satisfied	= TRUE -		
					(			
					(			
					Battery Voltage	>= 10.9 V		
					for time	= 1.5 sec		
					Battery Voltage	<= 655.34 V		
					)			
					for time	>= 0.1 sec		
					)			
					Duty cycle control powerstage heater sensor 1 bank 1	>= 4.0009 %		
					Basic enable conditions met	= see sheet enable tables -		
					No Pending or Confirmed DTCs	= see sheet inhibit tables -		
	P0031	Diagnoses the UEGO heater control powerstage of bank 1 sensor 1 for short circuit to ground fault at the low side of the driver circuit	Voltage low during driver OFF state (indicates short-to-ground)	= Short to ground: <= - between signal and controller ground	Release condition of heater powerstage diagnosis is enabled	= TRUE -	2 sec continuous	2 Trips
					The following release condition of diagnosis report of bank 1 sensor 1 is satisfied	= TRUE -		
					(			
					(			
					Battery Voltage	>= 10.9 V		
					for time	= 1.5 sec		
					Battery Voltage	<= 655.34 V		
					)			
					for time	>= 0.1 sec		
					)			
					Basic enable conditions met	= see sheet enable tables -		
					No Pending or Confirmed DTCs	= see sheet inhibit tables -		
	P0030	Diagnoses the UEGO heater control powerstage of bank 1 sensor 1 for open circuit faults	Voltage low during driver OFF state (indicates open circuit)	= Open Circuit:>= 200 K - ECU pin and load	Release condition of heater powerstage diagnosis is enabled	= TRUE -	0.5 sec continuous	2 Trips
					The following release condition of diagnosis report of bank 1 sensor 1 is satisfied	= TRUE -		
					(			
					(			
					Battery Voltage	>= 10.9 V		
					for time	= 1.5 sec		
					Battery Voltage	<= 655.34 V		
					)			
					for time	>= 0.1 sec		
					)			
					Basic enable conditions met	= see sheet enable tables -		
					No Pending or Confirmed DTCs	= see sheet inhibit tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
	P0052	Diagnoses the UEGO heater control powerstage of bank 1 sensor 2 for short circuit to battery fault at the low side of the driver circuit	Voltage high during driver ON state (indicates short-to-power)	-	Short to power: between signal and controller power	-	Release condition of heater powerstage diagnosis is enabled	=	TRUE	-	2	sec	continuous	2 Trips
							The following release condition of diagnosis report of bank 2 sensor 1 is satisfied	=	TRUE	-				
							(							
							(							
							Battery Voltage	>=	10.9	V				
							for time	=	1.5	sec				
							Battery Voltage	<=	655.34	V				
							)							
							for time	>=	0.1	sec				
							)							
							Duty cycle control powerstage heater sensor 1 bank 2	>=	4.0009	%				
							Basic enable conditions met	=	see sheet enable tables	-				
							No Pending or Confirmed DTCs	=	see sheet inhibit tables	-				
	P0051	Diagnoses the UEGO heater control powerstage of bank 2 sensor 1 for short circuit to ground fault at the low side of the driver circuit	Voltage low during driver OFF state (indicates short-to-ground)	=	Short to ground: <= between signal and controller ground	-	Release condition of heater powerstage diagnosis is enabled	=	TRUE	-	0.5	sec	continuous	2 Trips
							The following release condition of diagnosis report of bank 2 sensor 1 is satisfied	=	TRUE	-				
							(							
							(							
							Battery Voltage	>=	10.9	V				
							for time	=	1.5	sec				
							Battery Voltage	<=	655.34	V				
							)							
							for time	>=	0.1	sec				
							)							
							Basic enable conditions met	=	see sheet enable tables	-				
							No Pending or Confirmed DTCs	=	see sheet inhibit tables	-				
	P0050	Diagnoses the UEGO heater control powerstage of bank 2 sensor 1 for open circuit faults	Voltage low during driver OFF state (indicates open circuit)	=	Open Circuit:>= 200 K ECU pin and load	-	Release condition of heater powerstage diagnosis is enabled	=	TRUE	-	0.5	sec	continuous	2 Trips
							The following release condition of diagnosis report of bank 2 sensor 1 is satisfied	=	TRUE	-				
							(							
							(							
							Battery Voltage	>=	10.9	V				
							for time	=	1.5	sec				
							Battery Voltage	<=	655.34	V				
							)							
							for time	>=	0.1	sec				
							)							
							Basic enable conditions met	=	see sheet enable tables	-				
							No Pending or Confirmed DTCs	=	see sheet inhibit tables	-				
	P2237	Lambda sensor wire diagnosis for UEGO sensor 1 bank 1 Circuit continiuity - open circuit at pin Apes	**Monitoring of abnormalities at sensor line Apes during normal ASIC operation when CJ135 in WARMUP mode** Open load at pin Apes detected by means of continuity measurements of sensor pumpcell and sensor nernst cell using current source ISQr				(Battery voltage	<=	655.34	V			continuous	2 Trips
			Difference of voltage drop at ECU-internal resistor RG in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" and the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RG in a state, where all sensor lines are opened (Ug0iai - Ug0)	<	E * F	V	Battery voltage)	>=	10.9	V				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Difference of voltage drop at ECU-internal resistor RG in a state, where the ASIC-internal current source ISQr is connected to the sensor line "RE" and the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RG in a state, where all sensor lines are opened (Ug0iei - Ug0)	>=	E * F	V	for time	>=	0.1	sec		
			(E) Measured amplitude of the reference pump current source	=	measured value	A	Upstream HO2S Sensor is heated up, which is the following conditions:	=	TRUE	-		
			(F) Minimum sensitivity of the continuiuity measurements to resistance RGnd	=	66	Ohm	(					
							Upstream HO2S Sensor ceramic temperature	>	789.998	deg C		
			Aborted RAM check at ASIC shut-off when CJ135 in WARMUP mode				OR					
			Open load at pin Apes detected by means of continuity measurements of sensor pumpcell and sensor nernst cell using current source ISQr									
			Result of continuity measurement of sensor pumpcell using current source ISQ (in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" via internal switches and the sensor line "IPE" is directly connected to RGnd) is available in RAM	=	TRUE	-	completed	=	TRUE	-		
			Short circuit to battery fault is detected at sensor lines RE/IPE/APE/MES as per last accessed ASIC diagnostic register, means	=	TRUE	-	)					
			Voltage at least at one of the sensor lines RE/IPE/APE/MES	>	9.1 to 10.3	V	Basic enable conditions met	=	see sheet enable tables	-		
			Difference of voltage drop at ECU-internal resistor RG in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" and the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RG in a state, where all sensor lines are opened (Ug0iai - Ug0)	<	D * F	V	No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			Difference of voltage drop at ECU-internal resistor RG in a state, where the ASIC-internal current source ISQr is connected to the sensor line "RE" and the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RG in a state, where all sensor lines are opened (Ug0iei - Ug0)	>=	D * F	V						
			(D) Requested amplitude of the reference pump current source	=	commanded value	A						
			(F) Minimum sensitivity of the continuiuity measurements to resistance RGnd	=	66	Ohm						
			Aborted RAM check at ASIC shut-off when CJ135 in NORMAL mode									
			Open load at pin Apes detected if countinuiuty measurement was done before abort									
			Result of continuity measurement of sensor pumpcell using current source ISQ (in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" via internal switches and the sensor line "IPE" is directly connected to RGnd) is available in RAM	=	TRUE	-						
		Path 1 : Monitoring of prolonged activation of the blackening protection	Blackening protection is active for at least number of 16 successive checks	>	5	counts	(				10 - Continuous	2 Trips
			for time	>=	2.55	sec	Release of diagnosis report sensor 1 bank 1	=	TRUE	-		
							(					
							(					
							Battery voltage	>=	10.9	V		
							for time	>=	1.5	sec		
							Battery voltage	<=	655.34	V		
							)					
							for time	>=	0.1	sec		
							)					
							Sensor in hot state	=	TRUE	-		
							(					
							Sensor operation release, Sensor 1 Bank 1	=	TRUE	-		
							(					
							Battery voltage	<=	655.34	V		
							for time	>=	0.06	sec		
							(					
							(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					End of start reached	=	FALSE	-		
					OR					
					Engine operation in stopping and finish state	=	FALSE	-		
					(					
					Heat quantity to dew-point end exceeds heat quantity threshold for dew-point end	=	TRUE	-		
					)					
					)					
					OR					
					(					
					Dew point end is reset for TSP sensor 1	=	FALSE	-		
					Counter for repeated cold starts dew-point end not reached sensor 1	<=	2	counts		
					(					
					(					
					Catalyst heating request by cold engine	=	TRUE	-		
					and					
					Catalyst heating request in connection with engine speed	=	TRUE	-		
					Ratio of heat quantity for dew-point end detection sensor 1 and heat quantity threshold for dew-point end detection sensor 1 bank 1 (see Look-Up Table #P2237-1)	>=	0 to 0.40625	-		
					)					
					OR					
					Ratio of heat quantity for dew-point end detection sensor 1 and heat quantity threshold for dew-point end detection sensor 1 bank 1	>=	1	-		
					)					
					)					
					)					
					)					
					(					
					(					
					(					
					Engine is stopping	=	TRUE	-		
					OR					
					Engine in stop phase	=	TRUE	-		
					)					
					for time	>=	2	sec		
					)					
					OR					
					Engine in running state	=	TRUE	-		
					)					
					OR					
					(					
					Status of fast light-off for Lambda sensor	=	TRUE	-		
					OR					
					Function demand for oxygen sensor heating before start	=	TRUE	-		
					)					
					OR					
					Dew point release requested by service tester	=	TRUE	-		
					)					
					(					
					Battery voltage	>=	10.9	V		
					for time	>=	1.5	sec		
					OR					
					Heating up of open loop completed, sensor 1, bank 1	=	TRUE	-		
					)					
					Error with heater, sensor 1, bank 1	=	FALSE	-		
					UEGO Signal ASIC mode request of sensor 1 bank 1	=	0	-		
					Battery voltage	>	9.8	V		
					for time	>=	0.5	sec		
					Battery voltage	>	8	V		
					for time	>=	0.05	sec		
					Status auxillary power relay	=	TRUE	-		
					ECU in drive state	=	TRUE	-		
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Evaluation temperature is valid, sensor 1 bank 1	=	TRUE	-		
							(					
							Temperature of ceramic sensor 1 bank 1 where	>	A - B	deg C		
							(A) temperature set point for heater control	=	800.006	deg C		
							(B) large temperature threshold of the control deviation of heater control	=	64.9922	deg C		
							OR					
							Heating up open loop is completed, sensor 1, bank 1	=	TRUE	-		
							(					
							Open loop ramp phase finished	=	TRUE	-		
							for time	>=	0	sec		
							OR					
							Temperature of ceramic sensor 1 bank 1	>=	789.998	deg C		
							)					
							)					
							)					
							for time	>=	0.1	sec		
							Pump current operation for sensor 1 bank 1 is active	=	TRUE	-		
							Counter of verifications of the actual mode of the ASIC for sensor 1 bank 1	>	30	counts		
							UEGO Signal ASIC mode request of sensor 1 bank 1	=	0	-		
							Current pump package is valid	=	TRUE	-		
							)					
							No pending or confirmed DTCs	=	see sheet inhibit table	-		
							Basic enable conditions met	=	see sheet enable tables	-		
		Path 2: Monitoring of negative voltage drop deviation at ECU-internal resistor Rgnd by means of continuity measurements of sensor pumpcell	Negative voltage drop deviation, sensor 1 bank 1	<=	-0.15008	V	**Common conditions for voltage drop deviation:**					
			and				(					
			Negative voltage drop deviation, sensor 1 bank 1	>=	0.15008	V	Release of diagnosis report sensor 1 bank 1	=	TRUE	-		
							(					
							(					
							Battery voltage	>=	10.9	V		
							for time	>=	1.5	sec		
							and					
							Battery voltage	<=	655.34	V		
							)					
							for time	>=	0.1	sec		
							)					
							Sensor in hot state	=	TRUE	-		
							(					
							Sensor operation release, Sensor 1 Bank 1	=	TRUE	-		
							(					
							Battery voltage	<=	655.34	V		
							for time	>=	0.06	sec		
							(					
							(					
							(					
							End of start reached	=	FALSE	-		
							OR					
							Engine operation in stopping and finish state	=	FALSE	-		
							(					
							Heat quantity to dew-point end exceeds heat quantity threshold for dew-point end	=	TRUE	-		
							)					
							)					
							OR					
							(					
							Dew point end is reset for TSP sensor 1	=	FALSE	-		
							Counter for repeated cold starts dew-point end not reached sensor 1	<=	2	counts		
							(					
							Catalyst heating request by cold engine	=	TRUE	-		
							Catalyst heating request in connection with engine speed	=	TRUE	-		
							(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Ratio of heat quantity for dew-point end detection sensor 1 and heat quantity threshold for dew-point end detection sensor 1 bank 1 (see Look-Up Table #P2237-1)	>=	0 to 0.40625	-		
					)					
					OR					
					Ratio of heat quantity for dew-point end detection sensor 1 and heat quantity threshold for dew-point end detection sensor 1 bank 1	>=	1	-		
					)					
					)					
					)					
					(					
					(					
					(					
					Engine is stopping	=	TRUE	-		
					OR					
					Engine in stop phase	=	TRUE	-		
					)					
					for time	>=	2	sec		
					)					
					OR					
					Engine in running state	=	TRUE	-		
					)					
					OR					
					(					
					Status of fast light-off for Lambda sensor	=	TRUE	-		
					OR					
					Function demand for oxygen sensor heating before start	=	TRUE	-		
					)					
					OR					
					Dew point release requested by service tester	=	TRUE	-		
					)					
					(					
					Battery voltage	>=	10.9	V		
					for time	>=	1.5	sec		
					OR					
					Heating up of open loop completed, sensor 1, bank 1	=	TRUE	-		
					)					
					Error with heater, sensor 1, bank 1	=	FALSE	-		
					UEGO Signal ASIC mode request of sensor 1 bank 1	=	0	-		
					Battery voltage	>	9.8	V		
					for time	>=	0.5	sec		
					Battery voltage	>	8	V		
					for time	>=	0.05	sec		
					Status auxillary power relay	=	TRUE	-		
					ECU in drive state	=	TRUE	-		
					)					
					Evaluation temperature is valid, sensor 1 bank 1	=	TRUE	-		
					(					
					Temperature of ceramic sensor 1 bank 1	>	A - B	deg C		
					where					
					(A) temperature set point for heater control	=	800.006	deg C		
					(B) large temperature threshold of the control deviation of heater control	=	64.9922	deg C		
					OR					
					Heating up open loop is completed, sensor 1, bank 1	=	TRUE	-		
					(					
					Open loop ramp phase finished	=	TRUE	-		
					for time	>=	0	sec		
					OR					
					Temperature of ceramic sensor 1 bank 1	>=	789.998	deg C		
					)					
					)					
					)					
					for time	>=	0.1	sec		
					Pump current operation for sensor 1 bank 1 is active	=	TRUE	-		
					Counter of verifications of the actual mode of the ASIC for sensor 1 bank 1	>	30	counts		
					UEGO Signal ASIC mode request of sensor 1 bank 1	!=	0	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Current pump package is valid	= TRUE -		
					)			
					No pending or confirmed DTCs	= see sheet inhibit table -		
					Basic enable conditions met	= see sheet enable tables -		
		Path 3: Monitoring of positive voltage drop deviation at ECU-internal resistor Rgnd by means of continuity measurements of sensor pumpcell	Positive voltage drop deviation, sensor 1 bank 1	<= -0.15008 V	**Common conditions for voltage drop deviation**	= TRUE -		
			Positive voltage drop deviation, sensor 1 bank 1	>= 0.15008 V	Basic enable conditions met	= see sheet enable tables -		
		Path 4: Monitoring of the non-availability of the sensor signals for a prolonged duration	(		(			
			Physical release conditions for oxygen sensor are fulfilled	= FALSE -	Release of diagnosis report sensor 1 bank 1	= TRUE -		
			OR		(			
			Oxygen sensor signals are of high precision	= FALSE -	(			
			)		Battery voltage	>= 10.9 V		
			for time	>= 10 sec	for time	>= 1.5 sec		
					Battery voltage	<= 655.34 V		
					)			
					for time	>= 0.1 sec		
					)			
					Sensor in hot state	= TRUE -		
					(			
					Sensor operation release, Sensor 1 Bank 1	= TRUE -		
					(			
					Battery voltage	<= 655.34 V		
					for time	>= 0.06 sec		
					(			
					(			
					(			
					End of start reached	= FALSE -		
					OR			
					Engine operation in stopping and finish state	= FALSE -		
					(			
					Heat quantity to dew-point end exceeds heat quantity threshold for dew-point end	= TRUE -		
					)			
					)			
					OR			
					(			
					Dew point end is reset for TSP sensor 1	= FALSE -		
					Counter for repeated cold starts dew-point end not reached sensor 1	<= 2 counts		
					(			
					Catalyst heating request by cold engine	= TRUE -		
					Catalyst heating request in connection with engine speed	= TRUE -		
					(			
					Ratio of heat quantity for dew-point end detection sensor 1 and heat quantity threshold for dew-point end detection sensor 1 bank 1 (see Look-Up Table #P2237-1)	>= 0 to 0.40625 -		
					)			
					OR			
					Ratio of heat quantity for dew-point end detection sensor 1 and heat quantity threshold for dew-point end detection sensor 1 bank 1	>= 1 -		
					)			
					)			
					)			
					(			
					(			
					(			
					Engine is stopping	= TRUE -		
					OR			
					Engine in stop phase	= TRUE -		
					)			
					for time	>= 2 sec		
					)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					OR Engine in running state) OR (Status of fast light-off for Lambda sensor OR Function demand for oxygen sensor heating before start) OR Dew point release requested by service tester) (Battery voltage for time OR Heating up of open loop completed, sensor 1, bank 1) Error with heater, sensor 1, bank 1 UEGO Signal ASIC mode request of sensor 1 bank 1 Battery voltage for time Battery voltage for time Status auxillary power relay ECU in drive state) Evaluation temperature is valid, sensor 1 bank 1 (Temperature of ceramic sensor 1 bank 1 where (A) temperature set point for heater control (B) large temperature threshold of the control deviation of heater control OR Heating up open loop is completed, sensor 1, bank 1 (Open loop ramp phase finished for time OR Temperature of ceramic sensor 1 bank 1))) for time Pump current operation for sensor 1 bank 1 is active Counter of verifications of the actual mode of the ASIC for sensor 1 bank 1 UEGO Signal ASIC mode request of sensor 1 bank 1 Current pump package is valid) No pending or confirmed DTCs Basic enable conditions met	= = = = >= >= = = = > >= > >= = = = > = = = = >= >= >= = > = = = =	TRUE TRUE TRUE TRUE 10.9 1.5 TRUE FALSE 0 9.8 0.5 8 0.05 TRUE TRUE TRUE A - B 800.006 64.9922 TRUE TRUE 0 789.998 0.1 TRUE 30 0 TRUE see sheet inhibit table see sheet enable tables	- - - - V sec - - - V sec V sec - - - deg C deg C deg C - - sec deg C sec - - - - - -		
	P2240	Lambda sensor wire diagnosis for UEGO sensor 1 bank 2 Circuit continiuity - open circuit at pin Apes	**Monitoring of abnormalities at sensor line Apes during normal ASIC operation when CJ135 in WARMUP mode** Open load at pin Apes detected by means of continuity measurements of sensor pumpcell and sensor nernst cell using current source ISQr Difference of voltage drop at ECU-internal resistor RG in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" and the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RG in a state, where all sensor lines are opened (Ug0iai - Ug0)	< E * F V	(Battery voltage Battery voltage)	<= >=	655.34 10.9	V V	continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Difference of voltage drop at ECU-internal resistor RG in a state, where the ASIC-internal current source ISQr is connected to the sensor line "RE" and the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RG in a state, where all sensor lines are opened (Ug0iei - Ug0)	>=	E * F	V	for time	>=	0.1	sec		
			(E) Measured amplitude of the reference pump current source	=	measured value	A	Upstream HO2S Sensor is heated up, which is the following conditions:	=	TRUE	-		
			(F) Minimum sensitivity of the continuiuity measurements to resistance RGnd	=	66	Ohm	(					
							Upstream HO2S Sensor ceramic temperature	>	789.998	deg C		
			Aborted RAM check at ASIC shut-off when CJ135 in WARMUP mode Open load at pin Apes detected by means of continuity measurements of sensor pumpcell and sensor nernst cell using current source ISQr				OR					
			Result of continuity measurement of sensor pumpcell using current source ISQ (in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" via internal switches and the sensor line "IPE" is directly connected to RGnd) is available in RAM	=	TRUE	-	completed	=	TRUE	-		
			Short circuit to battery fault is detected at sensor lines RE/IPE/APE/MES as per last accessed ASIC diagnostic register, means	=	TRUE	-	)					
			Voltage at least at one of the sensor lines RE/IPE/APE/MES	>	9.1 to 10.3	V	Basic enable conditions met	=	see sheet enable tables	-		
			Difference of voltage drop at ECU-internal resistor RG in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" and the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RG in a state, where all sensor lines are opened (Ug0iai - Ug0)	<	D * F	V	No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			Difference of voltage drop at ECU-internal resistor RG in a state, where the ASIC-internal current source ISQr is connected to the sensor line "RE" and the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RG in a state, where all sensor lines are opened (Ug0iei - Ug0)	>=	D * F	V						
			(D) Requested amplitude of the reference pump current source	=	commanded value	A						
			(F) Minimum sensitivity of the continuiuity measurements to resistance RGnd	=	66	Ohm						
			Aborted RAM check at ASIC shut-off when CJ135 in NORMAL mode Open load at pin Apes detected if countinuiuty measurement was done before abort									
			Result of continuity measurement of sensor pumpcell using current source ISQ (in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" via internal switches and the sensor line "IPE" is directly connected to RGnd) is available in RAM	=	TRUE	-						
	P2240	Path 1 : Monitoring of prolonged activation of the blackening protection	Blackening protection is active for at least number of 16 successive checks	>	5	counts	(				10 - Continuous	2 Trips
			for time	>=	2.55	sec	Release of diagnosis report sensor 1 bank 2	=	TRUE	-		
							(					
							(					
							Battery voltage	>=	10.9	V		
							for time	>=	1.5	sec		
							and					
							Battery voltage	<=	655.34	V		
							)					
							for time	>=	0.1	sec		
							)					
							Sensor in hot state	=	TRUE	-		
							(					
							Sensor operation release, Sensor 1 Bank 2	=	TRUE	-		
							(					
							Battery voltage	<=	655.34	V		
							for time	>=	0.06	sec		
							(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					(			
					End of start reached	= FALSE -		
					OR			
					Engine operation in stopping and finish state	= FALSE -		
					(			
					Heat quantity to dew-point end exceeds heat quantity threshold for dew-point end	= TRUE -		
					)			
					)			
					OR			
					(			
					Dew point end is reset for TSP sensor 1	= FALSE -		
					Counter for repeated cold starts dew-point end not reached sensor 1	<= 2 counts		
					(			
					(			
					Catalyst heating request by cold engine	= TRUE -		
					and			
					Catalyst heating request in connection with engine speed	= TRUE -		
					Ratio of heat quantity for dew-point end detection sensor 1 and heat quantity threshold for dew-point end detection sensor 1 bank 2 (see Look-Up Table #P2240-1)	>= 0 to 0.40625 -		
					)			
					OR			
					Ratio of heat quantity for dew-point end detection sensor 1 and heat quantity threshold for dew-point end detection sensor 1 bank 2	>= 1 -		
					)			
					)			
					)			
					)			
					(			
					(			
					(			
					Engine is stopping	= TRUE -		
					OR			
					Engine in stop phase	= TRUE -		
					)			
					for time	>= 2 sec		
					)			
					OR			
					Engine in running state	= TRUE -		
					)			
					OR			
					(			
					Status of fast light-off for Lambda sensor	= TRUE -		
					OR			
					Function demand for oxygen sensor heating before start	= TRUE -		
					)			
					OR			
					Dew point release requested by service tester	= TRUE -		
					)			
					(			
					Battery voltage	>= 10.9 V		
					for time	>= 1.5 sec		
					OR			
					Heating up of open loop completed, sensor 1, bank 2	= TRUE -		
					)			
					Error with heater, sensor 1, bank 2	= FALSE -		
					UEGO Signal ASIC mode request of sensor 1 bank 2	= 0 -		
					Battery voltage	> 9.8 V		
					for time	>= 0.5 sec		
					Battery voltage	> 8 V		
					for time	>= 0.05 sec		
					Status auxillary power relay	= TRUE -		
					ECU in drive state	= TRUE -		
					)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Evaluation temperature is valid, sensor 1 bank 2	=	TRUE	-		
							(					
							Temperature of ceramic sensor 1 bank 2 where	>	A - B	deg C		
							(A) temperature set point for heater control	=	800.006	deg C		
							(B) large temperature threshold of the control deviation of heater control	=	64.9922	deg C		
							OR					
							Heating up open loop is completed, sensor 1, bank 2	=	TRUE	-		
							(					
							Open loop ramp phase finished	=	TRUE	-		
							for time	>=	0	sec		
							OR					
							Temperature of ceramic sensor 1 bank 2	>=	789.998	deg C		
							)					
							)					
							)					
							for time	>=	0.1	sec		
							Pump current operation for sensor 1 bank 2 is active	=	TRUE	-		
							Counter of verifications of the actual mode of the ASIC for sensor 1 bank 2	>	30	counts		
							UEGO Signal ASIC mode request of sensor 1 bank 2	=	0	-		
							Current pump package is valid	=	TRUE	-		
							)					
							No pending or confirmed DTCs	=	see sheet inhibit table	-		
							Basic enable conditions met	=	see sheet enable tables	-		
		Path 2: Monitoring of negative voltage drop deviation at ECU-internal resistor Rgnd by means of continuity measurements of sensor pumpcell	Negative voltage drop deviation, sensor 1 bank 2	<=	-0.15008	V	**Common conditions for voltage drop deviation:**					
			and				(					
			Negative voltage drop deviation, sensor 1 bank 2	>=	0.15008	V	Release of diagnosis report sensor 1 bank 2	=	TRUE	-		
							(					
							(					
							Battery voltage	>=	10.9	V		
							for time	>=	1.5	sec		
							Battery voltage	<=	655.34	V		
							)					
							for time	>=	0.1	sec		
							)					
							Sensor in hot state	=	TRUE	-		
							(					
							Sensor operation release, Sensor 1 bank 2	=	TRUE	-		
							(					
							Battery voltage	<=	655.34	V		
							for time	>=	0.06	sec		
							(					
							(					
							(					
							End of start reached	=	FALSE	-		
							OR					
							Engine operation in stopping and finish state	=	FALSE	-		
							(					
							Heat quantity to dew-point end exceeds heat quantity threshold for dew-point end	=	TRUE	-		
							)					
							)					
							OR					
							(					
							Dew point end is reset for TSP sensor 1	=	FALSE	-		
							Counter for repeated cold starts dew-point end not reached sensor 1	<=	2	counts		
							(					
							Catalyst heating request by cold engine	=	TRUE	-		
							Catalyst heating request in connection with engine speed	=	TRUE	-		
							(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Ratio of heat quantity for dew-point end detection sensor 1 and heat quantity threshold for dew-point end detection sensor 1 bank 2 (see Look-Up Table #P2240-1)	>=	0 to 0.40625	-		
					)					
					OR					
					Ratio of heat quantity for dew-point end detection sensor 1 and heat quantity threshold for dew-point end detection sensor 1 bank 2	>=	1	-		
					)					
					)					
					)					
					(					
					(					
					(					
					Engine is stopping	=	TRUE	-		
					OR					
					Engine in stop phase	=	TRUE	-		
					)					
					for time	>=	2	sec		
					)					
					OR					
					Engine in running state	=	TRUE	-		
					)					
					OR					
					(					
					Status of fast light-off for Lambda sensor	=	TRUE	-		
					OR					
					Function demand for oxygen sensor heating before start	=	TRUE	-		
					)					
					OR					
					Dew point release requested by service tester	=	TRUE	-		
					)					
					(					
					Battery voltage	>=	10.9	V		
					for time	>=	1.5	sec		
					OR					
					Heating up of open loop completed, sensor 1, bank 2	=	TRUE	-		
					)					
					Error with heater, sensor 1, bank 2	=	FALSE	-		
					UEGO Signal ASIC mode request of sensor 1 bank 2	=	0	-		
					Battery voltage	>	9.8	V		
					for time	>=	0.5	sec		
					Battery voltage	>	8	V		
					for time	>=	0.05	sec		
					Status auxillary power relay	=	TRUE	-		
					ECU in drive state	=	TRUE	-		
					)					
					Evaluation temperature is valid, sensor 1 bank 2	=	TRUE	-		
					(					
					Temperature of ceramic sensor 1 bank 2 where	>	A - B	deg C		
					(A) temperature set point for heater control	=	800.006	deg C		
					(B) large temperature threshold of the control deviation of heater control	=	64.9922	deg C		
					OR					
					Heating up open loop is completed, sensor 1, bank 2	=	TRUE	-		
					(					
					Open loop ramp phase finished	=	TRUE	-		
					for time	>=	0	sec		
					OR					
					Temperature of ceramic sensor 1 bank 2	>=	789.998	deg C		
					)					
					)					
					)					
					for time	>=	0.1	sec		
					Pump current operation for sensor 1 bank 2 is active	=	TRUE	-		
					Counter of verifications of the actual mode of the ASIC for sensor 1 bank 2	>	30	counts		
					UEGO Signal ASIC mode request of sensor 1 bank 2	!=	0	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Current pump package is valid	=	TRUE	-		
							)					
							No pending or confirmed DTCs	=	see sheet inhibit table	-		
							Basic enable conditions met	=	see sheet enable tables	-		
		Path 3: Monitoring of positive voltage drop deviation at ECU-internal resistor Rgnd by means of continuity measurements of sensor pumpcell	Positive voltage drop deviation, sensor 1 bank 2	<=	-0.15008	V	**Common conditions for voltage drop deviation**	=	TRUE	-		
			Positive voltage drop deviation, sensor 1 bank 2	>=	0.15008	V	Basic enable conditions met	=	see sheet enable tables	-		
		Path 4: Monitoring of the non-availability of the sensor signals for a prolonged duration	(				(					
			Physical release conditions for oxygen sensor are fulfilled	=	FALSE	-	Release of diagnosis report sensor 1 bank 2	=	TRUE	-		
			OR				(					
			Oxygen sensor signals are of high precision	=	FALSE	-	(					
			)				Battery voltage	>=	10.9	V		
			for time	>=	10	sec	for time	>=	1.5	sec		
							Battery voltage	<=	655.34	V		
							)					
							for time	>=	0.1	sec		
							)					
							Sensor in hot state	=	TRUE	-		
							(					
							Sensor operation release, Sensor 1 bank 2	=	TRUE	-		
							(					
							Battery voltage	<=	655.34	V		
							for time	>=	0.06	sec		
							(					
							(					
							(					
							End of start reached	=	FALSE	-		
							OR					
							Engine operation in stopping and finish state	=	FALSE	-		
							(					
							Heat quantity to dew-point end exceeds heat quantity threshold for dew-point end	=	TRUE	-		
							)					
							)					
							OR					
							(					
							Dew point end is reset for TSP sensor 1	=	FALSE	-		
							Counter for repeated cold starts dew-point end not reached sensor 1	<=	2	counts		
							(					
							Catalyst heating request by cold engine	=	TRUE	-		
							Catalyst heating request in connection with engine speed	=	TRUE	-		
							(					
							Ratio of heat quantity for dew-point end detection sensor 1 and heat quantity threshold for dew-point end detection sensor 1 bank 2 (see Look-Up Table #P2240-1)	>=	0 to 0.40625	-		
							)					
							OR					
							Ratio of heat quantity for dew-point end detection sensor 1 and heat quantity threshold for dew-point end detection sensor 1 bank 2	>=	1	-		
							)					
							)					
							)					
							(					
							(					
							(					
							Engine is stopping	=	TRUE	-		
							OR					
							Engine in stop phase	=	TRUE	-		
							)					
							for time	>=	2	sec		
							)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR			
					Engine in running state	= TRUE -		
					)			
					OR			
					(			
					Status of fast light-off for Lambda sensor	= TRUE -		
					OR			
					Function demand for oxygen sensor heating before start	= TRUE -		
					)			
					OR			
					Dew point release requested by service tester	= TRUE -		
					)			
					(			
					Battery voltage	>= 10.9 V		
					for time	>= 1.5 sec		
					OR			
					Heating up of open loop completed, sensor 1, bank 2	= TRUE -		
					)			
					Error with heater, sensor 1, bank 2	= FALSE -		
					UEGO Signal ASIC mode request of sensor 1 bank 2	= 0 -		
					Battery voltage	> 9.8 V		
					for time	>= 0.5 sec		
					Battery voltage	> 8 V		
					for time	>= 0.05 sec		
					Status auxillary power relay	= TRUE -		
					ECU in drive state	= TRUE -		
					)			
					Evaluation temperature is valid, sensor 1 bank 2	= TRUE -		
					(			
					Temperature of ceramic sensor 1 bank 2 where	> A - B deg C		
					(A) temperature set point for heater control	= 800.006 deg C		
					(B) large temperature threshold of the control deviation of heater control	= 64.9922 deg C		
					OR			
					Heating up open loop is completed, sensor 1, bank 2	= TRUE -		
					(			
					Open loop ramp phase finished	= TRUE -		
					for time	>= 0 sec		
					OR			
					Temperature of ceramic sensor 1 bank 2	>= 789.998 deg C		
					)			
					)			
					)			
					for time	>= 0.1 sec		
					Pump current operation for sensor 1 bank 2 is active	= TRUE -		
					Counter of verifications of the actual mode of the ASIC for sensor 1 bank 2	> 30 -		
					UEGO Signal ASIC mode request of sensor 1 bank 2	= 0 -		
					Current pump package is valid	= TRUE -		
					)			
					No pending or confirmed DTCs	= see sheet inhibit table -		
					Basic enable conditions met	= see sheet enable tables -		
	P2251	Lambda sensor wire diagnosis for UEGO sensor 1 bank 1 Circuit countinuiuty - open circuit at pin IPE	**Monitoring of abnormalities at sensor line IPE during normal ASIC operation when CJ135 is in NORMAL mode** Open load at pin IPE detected by means of continuity measurements of sensor pumpcell during negative pump current pulse		(Battery voltage	<= 655.34 V	continuous	2 Trips
			Result of continuity measurement of sensor pumpcell using current source ISQ (in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" via internal switches and the sensor line "IPE" is directly connected to RGnd) is available in RAM	= FALSE -	Battery voltage)	>= 10.9 V		
			(		for time	>= 0.1 sec		
			If control deviation of heater control of upstream HO2S Sensor (HO2S Sensor heater control is inaccurate)	>= 64.9922 deg C	Upstream HO2S Sensor is heated up, which is the following conditions:	= TRUE -		
			for time	>= 0.1 sec	(			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(				Upstream HO2S Sensor ceramic temperature	>	789.998	deg C		
			Negated difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "APE" is directly connected to RGnd and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0 - Uga)	>	0.5008	V	OR					
			for time	>=	0.1	sec	completed)	=	TRUE	-		
			OR Negated difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0 - Ugi)	>	0.5008	V	Basic enable conditions met	=	see sheet enable tables	-		
			for time	>=	0.1	sec	No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			)									
			OR If control deviation of heater control of upstream HO2S Sensor (HO2S Sensor heater control is accurate)	<	64.9922	deg C						
			(Negated difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "APE" is directly connected to RGnd and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0 - Uga)	>	A + (B * C)							
			for time	>=	0.1	sec						
			OR Negated difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0 - Ugi)	>	A + (B * C)							
			for time	>=	0.1	sec						
			) (A) Initial threshold for negative voltage deviation during Delta Ugx check		0.08992	V						
			(B) Voltage step for negative voltage deviation in delta Ugx check		0.08	V						
			(C) Number of negative overshoots of continuity measurement values Ugx		measured value							
			) **Monitoring of abnormalities at sensor line IPE during normal ASIC operation when CJ135 is in WARMUP mode** Open load at pin IPE detected by means of continuity measurements of sensor pumpcell and sensor nernst cell using current source ISQr									
			Difference of voltage drop at ECU-internal resistor RG in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" and the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RG in a state, where all sensor lines are opened (Ug0iai - Ug0)	<	E * F							
			Difference of voltage drop at ECU-internal resistor RG in a state, where the ASIC-internal current source ISQr is connected to the sensor line "RE" and the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RG in a state, where all sensor lines are opened (Ug0iei - Ug0)	<	E * F							
			(E) Measured amplitude of the reference pump current source	=	measured value							
			(F) Minimum sensitivity of the continuiuity measurements to resistance RGnd	=	66	Ohm						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Aborted RAM check at ASIC shut-off when CJ135 in WARMUP mode Open load at pin IPE detected by means of continuity measurements of sensor pumpcell and sensor nernst cell using current source ISQr									
			Result of continuity measurement of sensor pumpcell using current source ISQ (in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" via internal switches and the sensor line "IPE" is directly connected to RGnd) is available in RAM	=	TRUE	-						
			Voltage at least at one of the sensor lines (RE/IPE/APE/MES)	>	9.1 to 10.3	V						
			Difference of voltage drop at ECU-internal resistor RG in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" and the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RG in a state, where all sensor lines are opened (Ug0iai - Ug0)	<	D * F							
			Difference of voltage drop at ECU-internal resistor RG in a state, where the ASIC-internal current source ISQr is connected to the sensor line "RE" and the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RG in a state, where all sensor lines are opened (Ug0iei - Ug0)	<	D * F							
			(D) Requested amplitude of the reference pump current source	=	commanded value							
			(F) Minimum sensitivity of the continuiuity measurements to resistance RGnd	=	66	Ohm						
			Aborted RAM check at ASIC shut-off when CJ135 in NORMAL mode Open load at pin IPE detected if no countinuiuty measurement was done before ASIC abort									
			Result of continuity measurement of sensor pumpcell using current source ISQ (in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" via internal switches and the sensor line "IPE" is directly connected to RGnd) is available in RAM	=	FALSE	-						
	P2254	Lambda sensor wire diagnosis for UEGO sensor 1 bank 2 Circuit countinuiuty - open circuit at pin IPE	**Monitoring of abnormalities at sensor line IPE during normal ASIC operation when CJ135 is in NORMAL mode** Open load at pin IPE detected by means of continuity measurements of sensor pumpcell during negative pump current pulse				(Battery voltage	<=	655.34	V	continuous	2 Trips
			Result of continuity measurement of sensor pumpcell using current source ISQ (in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" via internal switches and the sensor line "IPE" is directly connected to RGnd) is available in RAM	=	FALSE	-	Battery voltage)	>=	10.9	V		
			(				for time	>=	0.1	sec		
			If control deviation of heater control of upstream HO2S Sensor (HO2S Sensor heater control is inaccurate)	>=	64.9922	deg C	Upstream HO2S Sensor is heated up, which is the following conditions:	=	TRUE	-		
			for time (	>=	0.1	sec	(Upstream HO2S Sensor ceramic temperature	>	789.998	deg C		
			Negated difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "APE" is directly connected to RGnd and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0 - Uga)	>	0.5008	V	OR					
			for time	>=	0.1	sec	completed)	=	TRUE	-		
			OR Negated difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0 - Ugi)	>	0.5008	V	Basic enable conditions met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			for time	>= 0.1 sec	No pending or confirmed DTCs	= see sheet inhibit tables -		
			) OR					
			If control deviation of heater control of upstream HO2S Sensor (HO2S Sensor heater control is accurate)	< 64.9922 deg C				
			(					
			Negated difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "APE" is directly connected to RGnd and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0 - Uga)	> A + (B * C)				
			for time	>= 0.1 sec				
			OR					
			Negated difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0 - Ugi)	> A + (B * C)				
			for time	>= 0.1 sec				
			)					
			(A) Initial threshold for negative voltage deviation during Delta Ugx check	0.08992 V				
			(B) Voltage step for negative voltage deviation in delta Ugx check	0.08 V				
			(C) Number of negative overshoots of continuity measurement values Ugx	measured value				
			)					
			Monitoring of abnormalities at sensor line IPE during normal ASIC operation when CJ135 is in WARMUP mode Open load at pin IPE detected by means of continuity measurements of sensor pumpcell and sensor nernst cell using current source ISQr					
			Difference of voltage drop at ECU-internal resistor RG in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" and the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RG in a state, where all sensor lines are opened (Ug0iai - Ug0)	< E * F				
			Difference of voltage drop at ECU-internal resistor RG in a state, where the ASIC-internal current source ISQr is connected to the sensor line "RE" and the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RG in a state, where all sensor lines are opened (Ug0iei - Ug0)	< E * F				
			(E) Measured amplitude of the reference pump current source	= measured value A				
			(F) Minimum sensitivity of the continuiuity measurements to resistance RGnd	= 66 Ohm				
			Aborted RAM check at ASIC shut-off when CJ135 in WARMUP mode Open load at pin IPE detected by means of continuity measurements of sensor pumpcell and sensor nernst cell using current source ISQr					
			Result of continuity measurement of sensor pumpcell using current source ISQ (in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" via internal switches and the sensor line "IPE" is directly connected to RGnd) is available in RAM	= TRUE -				
			Voltage at least at one of the sensor lines (RE/IPE/APE/MES)	> 9.1 to 10.3 V				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Difference of voltage drop at ECU-internal resistor RG in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" and the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RG in a state, where all sensor lines are opened (Ug0iai - Ug0)	< D * F				
			Difference of voltage drop at ECU-internal resistor RG in a state, where the ASIC-internal current source ISQr is connected to the sensor line "RE" and the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RG in a state, where all sensor lines are opened (Ug0iei - Ug0)	< D * F				
			(D) Requested amplitude of the reference pump current source	= commanded value				
			(F) Minimum sensitivity of the continuiuity measurements to resistance RGnd	= 66 Ohm				
			Aborted RAM check at ASIC shut-off when CJ135 in NORMAL mode Open load at pin IPE detected if no countinuiuty measurement was done before ASIC abort					
			Result of continuity measurement of sensor pumpcell using current source ISQ (in a state, where the ASIC-internal current source ISQr is connected to the sensor line "APE" via internal switches and the sensor line "IPE" is directly connected to RGnd) is available in RAM	= FALSE -				
	P2626	Lambda sensor wire diagnosis for UEGO sensor 1 bank 1 Circuit countinuity - open circuit at Rcmp (compensation resistor)	Calculated parallel resistance between APE and MES for UEGO sensor 1 bank 1	> 240 Ohm	(Battery voltage	<= 655.34 V	continuous	2 Trips
					Battery voltage)	>= 10.9 V		
					for time	>= 0.1 sec		
					Upstream HO2S Sensor is heated up, which is the following conditions: (	= TRUE -		
					Upstream HO2S Sensor ceramic temperature OR	> 789.998 deg C		
					completed)	= TRUE -		
					Last packet transfer aborted of sensor 1 bank 1	= FALSE -		
					Requested mode of UEGO sensor 1 Bank 1 is in SWITCHON mode	= TRUE -		
					Counter of verifications of the actual mode of the ASIC for sensor 1 bank 1	>= 10 counts		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
	P2629	Lambda sensor wire diagnosis for UEGO sensor 1 bank 2 Circuit countinuity - open circuit at Rcmp (compensation resistor)	Calculated parallel resistance between APE and MES for UEGO sensor 1 bank 2	> 240 Ohm	(Battery voltage	<= 655.34 V	continuous	2 Trips
					Battery voltage)	>= 10.9 V		
					for time	>= 0.1 sec		
					Upstream HO2S Sensor is heated up, which is the following conditions: (	= TRUE -		
					Upstream HO2S Sensor ceramic temperature OR	> 789.998 deg C		
					completed)	= TRUE -		
					Last packet transfer aborted of sensor 1 bank 2	= FALSE -		
					Requested mode of UEGO sensor 1 Bank 2 is in SWITCHON mode	= TRUE -		
					Counter of verifications of the actual mode of the ASIC for sensor 1 bank 2	>= 10 counts		
					Basic enable conditions met	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
	P0132	Lambda sensor wire diagnosis for sensor 1 bank 1 Circuit continuity - short circuit to battery	**Path1: Monitoring of abnormalities at sensor lines RE/IPE/APE/MES during the normal ASIC operation when CJ135 is in IDLE mode** Short circuit to battery detected by means of voltage monitoring at sensor lines RE/IPE/APE/MES as per last accessed ASIC diagnostic register				(Battery voltage	<=	655.34	V	continuous	2 Trips
			Voltage at least at one of the sensor lines RE/IPE/APE/MES	>	9.1 to 10.3	V	and					
							Battery voltage)	>=	10.9	V		
							for time	>=	0.1	sec		
							Last packet transfer aborted of sensor 1 bank 1	=	FALSE	-		
							Requested mode of UEGO Sensor 1 Bank 1	=	TRUE	-		
							Validity of the diagnosis register of the ASIC of sensor 1 bank 1	=	TRUE	-		
							Basic enable conditions met	=	see sheet enable tables	-		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			Path2 : Monitoring of abnormalities at sensor lines APE/IPE during the normal ASIC operation when CJ135 is in SWITCHON or WARMUP mode Short circuit to battery detected by means of contact measurements at sensor lines APE/IPE				(Battery voltage	<=	655.34	V		
			Difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "APE" is directly connected to RGnd (no current flows through the sensor) and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0a - Ug0)	>	0.07008	V	and					
			OR				Battery voltage)	>=	10.9	V		
			Difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "IPE" is directly connected to RGnd (no current flows through the sensor) and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0i - Ug0)	>	0.07008	V	for time	>=	0.1	sec		
			OR				Last packet transfer aborted of sensor 1 bank 1	=	FALSE	-		
			(				Requested mode of UEGO Sensor 1 Bank 1 is in SWITCHON mode or WARMUP mode	=	TRUE	-		
			Clamping structure of the nerst cell active for sensor 1 bank 1	=	TRUE	-	Counter of verifications of the actual mode of the ASIC for sensor 1 bank 1	>=	10	counts		
			Difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "RE" is directly connected to RGnd (no current flows through the sensor) and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0e - Ug0)	>	0.07008	V	Basic enable conditions met	=	see sheet enable tables	-		
			)				No pending or confirmed DTCs	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Path 3 : **Aborted RAM check at ASIC shut-off when CJ135 not in IDLE mode** Short circuit to battery detected by means of voltage monitoring at RGnd resistor or by means of contact measurements at sensor lines APE/IPE as per last accessed ASIC diagnostic register				(Battery voltage	<=	655.34	V		
			Voltage at RGnd resistor	>	4	V	and					
			OR				Battery voltage	>=	10.9	V		
			Difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "APE" is directly connected to RGnd (no current flows through the sensor) and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0a - Ug0)	>	0.0438	V	)					
			OR				for time	>=	0.1	sec		
			Difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "IPE" is directly connected to RGnd (no current flows through the sensor) and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0i - Ug0)	>	0.0438	V	Measured CJ135 Mode sensor 1 bank 1 is not in IDLE mode	=	TRUE	-		
			OR				Last packet transfer aborted of sensor 1 bank	=	TRUE	-		
			Short circuit to battery detected at sensor lines IPE/APE/MES or by checking availability of continuity measurements in last accessed ASIC diagnostic register				Basic enable conditions met	=	see sheet enable tables	-		
			Voltage at least at one of the sensor lines RE/IPE/APE/MES	>	9.1 to 10.3	V	No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			Path 4: **Aborted RAM check at ASIC shut-off when CJ135 in WARMUP mode** Short circuit to battery detected at sensor lines IPE/APE/MES or by checking availability of continuity measurements in last accessed ASIC diagnostic register				(Battery voltage	<=	655.34	V		
			Voltage at least at one of the sensor lines IPE/APE/MES	>	9.1 to 10.3	V	and					
			OR				Battery voltage	>=	10.9	V		
			(Upstream HO2S Sensor is heated up, means	=	TRUE	-	)					
			(				for time	>=	0.1	sec		
			Upstream HO2S Sensor ceramic temperature	>	789.998	deg C	Measured CJ135 Mode sensor 1 bank 1 is in WARMUP mode	=	TRUE	-		
			OR				Last packet transfer aborted of sensor 1 bank 1	=	TRUE	-		
				=	TRUE	-	Basic enable conditions met	=	see sheet enable tables	-		
			)				No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			AND (									
			Results of both continuity measurements of sensor pumpcell using current source ISQr are available in RAM accessed ASIC diagnostic register	=	FALSE	-						
			OR Aborted RAM check at ASIC shut-off when CJ135 in WARMUP mode Short circuit to battery detected as per last accessed ASIC diagnostic register									
			Results of both continuity measurement of sensor pumpcell using current source ISQr are available in RAM accessed ASIC diagnistic register	=	TRUE	-						
			Voltage at least at one of the sensor lines (RE/IPE/APE/MES)	>	9.1 to 10.3	V						
			AND (									
			Difference of voltage drop at ECU-internal resistor RGnd in a state, where the ASIC -internal current source ISQr is connected to the sensor line "APE" and the sensor line "IPE" is directly connected to RGnd (current flows through the sensor and RGnd) and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0iai-Ug0)	>=	D * F	V						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
			AND Difference of voltage drop at ECU-internal resistor RGnd in a state, where the ASIC -internal current source ISQr is connected to the sensor line "RE" and the sensor line "IPE" is directly connected to RGnd (current flows through the sensor and RGnd) and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0iei-Ug0)	>=	D * F	V								
			(D) Requested amplitude of the reference pump current source ISQr	=	commanded value	A								
			(F) Minimum sensitivity of the continuiuity measurements to resistance RGnd)))	=	66	Ohm								
	P0152	Lambda sensor wire diagnosis for sensor 1 bank 2 Circuit continuity - short circuit to battery	**Path1:** **Monitoring of abnormalities at sensor lines RE/IPE/APE/MES during the normal ASIC operation when CJ135 is in IDLE mode** Short circuit to battery detected by means of voltage monitoring at sensor lines RE/IPE/APE/MES as per last accessed ASIC diagnostic register				(Battery voltage	<=	655.34	V	0.5	sec	continuous	2 Trips
			Voltage at least at one of the sensor lines RE/IPE/APE/MES	>	9.1 to 10.3	V	and							
							Battery voltage)	>=	10.9	V				
							for time	>=	0.1	sec				
							Last packet transfer aborted of sensor 1 bank 2	=	FALSE	-				
							Requested mode of UEGO sensor 1 bank 2	=	TRUE	-				
							Validity of the diagnosis register of the ASIC of sensor 1 bank 2	=	TRUE	-				
							Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
			Path2 : **Monitoring of abnormalities at sensor lines APE/IPE during the normal ASIC operation when CJ135 is in SWITCHON or WARMUP mode** Short circuit to battery detected by means of contact measurements at sensor lines APE/IPE				(Battery voltage	<=	655.34	V				
			Difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "APE" is directly connected to RGnd and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0a - Ug0) OR	>	0.07008	V	and							
							Battery voltage)	>=	10.9	V				
			Difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "IPE" is directly connected to RGnd and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0i - Ug0)	>	0.07008	V	for time	>=	0.1	sec				
							Last packet transfer aborted of sensor 1 bank 2	=	FALSE	-				
			OR				Requested mode of UEGO Sensor 1 Bank 2 is in SWITCHON or WARMUP mode	=	TRUE	-				
			Clamping structure of the nerst cell active for sensor 1 bank 2	=	TRUE	-	Counter of verifications of the actual mode of the ASIC for sensor 1 bank 2	>=	10	counts				
			Difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "RE" is directly connected to RGnd and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0e - Ug0)	>	0.07008	V	Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Path 3 : **Aborted RAM check at ASIC shut-off when CJ135 not in IDLE mode** Short circuit to battery detected by means of voltage monitoring at RGnd resistor or by means of contact measurements at sensor lines APE/IPE as per last accessed ASIC diagnostic register				(Battery voltage	<=	655.34	V		
			Voltage at RGnd resistor	>	4	V	and					
							Battery voltage	<=	10.9	V		
							)					
			OR				for time	>=	0.1	sec		
			Difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "APE" is directly connected to RGnd (no current flows through the sensor) and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0a - Ug0)	>	0.0438	V	Measured CJ135 Mode sensor 1 bank 2 is not in IDLE mode	=	TRUE	-		
			OR				Last packet transfer aborted of sensor 1 bank 2	=	TRUE	-		
			Difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "IPE" is directly connected to RGnd (no current flows through the sensor) and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0i - Ug0)	>	0.0438	V	Basic enable conditions met	=	see sheet enable tables	-		
			OR				No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			Short circuit to battery detected at sensor lines IPE/APE/MES or by checking availability of continuity measurements in last accessed ASIC diagnostic register									
			Voltage at least at one of the sensor lines RE/IPE/APE/MES	>	9.1 to 10.3	V						
			Path4: **Aborted RAM check at ASIC shut-off when CJ135 in WARMUP mode** Short circuit to battery detected at sensor lines IPE/APE/MES or by checking availability of continuity measurements in last accessed ASIC diagnostic register				(Battery voltage	<=	655.34	V		
			Voltage at least at one of the sensor lines IPE/APE/MES	>	9.1 to 10.3	V	and					
			OR				Battery voltage	>=	10.9	V		
							)					
			(									
			Upstream HO2S Sensor is heated up, means	=	TRUE	-	for time	>=	0.1	sec		
			(				Measured CJ135 Mode sensor 1 bank 2 is in WARMUP mode	=	TRUE	-		
			Upstream HO2S Sensor ceramic temperature	>	789.998	deg C	Last packet transfer aborted of sensor 1 bank 2	=	TRUE	-		
			OR				Basic enable conditions met	=	see sheet enable tables	-		
				=	TRUE	-	No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			)									
			AND									
			(									
			Results of both continuity measurements of sensor pumpcell using current source ISQr are available in RAM accessed ASIC diagnostic register	=	FALSE	-						
			OR									
			Aborted RAM check at ASIC shut-off when CJ135 in WARMUP mode Short circuit to battery detected as per last accessed ASIC diagnostic register									
			Results of both continuity measurement of sensor pumpcell using current source ISQr are available in RAM accessed ASIC diagnistic register	=	TRUE	-						
			Voltage at least at one of the sensor lines (RE/IPE/APE/MES)	>	9.1 to 10.3	V						
			AND									
			(									

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Difference of voltage drop at ECU-internal resistor RGnd in a state, where the ASIC -internal current source ISQr is connected to the sensor line "APE" and the sensor line "IPE" is directly connected to RGnd (current flows through the sensor and RGnd) and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0iai-Ug0)	>= D * F V				
			OR					
			Difference of voltage drop at ECU-internal resistor RGnd in a state, where the ASIC -internal current source ISQr is connected to the sensor line "RE" and the sensor line "IPE" is directly connected to RGnd (current flows through the sensor and RGnd) and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0iei-Ug0)	>= D * F V				
			(D) Requested amplitude of the reference pump current source of UEGO sensor 1 Bank 2	= commanded value A				
			(F) Minimum sensitivity of the continuiuity measurements to resistance RGnd	= 66 Ohm				
			)					
			)					
			)					
	P0131	Lambda sensor wire diagnosis for sensor 1 bank 1 Circuit continuity - short circuit to ground	**Path 1:** **Monitoring of abnormalities at sensor lines RE/APE/IPE during the normal ASIC operation when CJ135 in IDLE mode** Short circuit to ground detected at sensor lines RE/IPE/APE/MES by means of voltage monitoring		(		continuous	3rd cycle
					Battery voltage	>= 10.9 V		
			Voltage at least at one of the sensor lines RE/IPE/APE/MES	< -0.15 V	and			
					Battery voltage	<= 655.34 V		
			where RE: Nernst voltage (reference voltage) IPE: Virtual ground (inner electrode) APE: Pumping current (external electrode) MES: Trim current (output sensor line trim resistance)		)			
					for time	>= 0.1 sec		
					Requested mode of UEGO Sensor 1 bank 1 in IDLE mode	= TRUE -		
					Validity of the diagnosis register of the ASIC c	= TRUE -		
					Last packet transfer aborted of sensor 1 bank	= FALSE -		
					Internal Control Module O2 Sensor Processor Performance Bank 1	= FALSE -		
					Control Module Processor Serial Peripheral Interface Bus 3	= FALSE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
			Path 2: **Aborted RAM check at ASIC shut-off when CJ135 in SWITCHON or WARMUP mode** Short circuit to ground detected by means of voltage monitoring at sensor lines RE/IPE/APE/MES or by means of contact measurements at sensor line APE/IPE as per last accessed ASIC diagnostic register		(			
			(Voltage at least at one of the sensor lines RE/IPE/APE/MES	< -0.15 V	Battery voltage	>= 10.9 V		
			OR		and			
			Negated difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "APE" is directly connected to RGnd (no current flows through the sensor) and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0 - Ug0a)	> 0.0438 V	Battery voltage	<= 655.34 V		
			OR		)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Negated difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "IPE" is directly connected to RGnd (no current flows through the sensor) and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0 - Ug0i))	>	0.0438	V	for time	>=	0.1	sec		
							Requested mode of UEGO Sensor 1 bank 1 in SWITCH ON mode or WARM UP mode	=	TRUE	-		
							Last packet transfer aborted of sensor 1 bank	=	TRUE	-		
							Internal Control Module O2 Sensor Processor Performance Bank 1	=	FALSE	-		
							Control Module Processor Serial Peripheral Interface Bus 3	=	FALSE	-		
							Basic enable conditions met	=	see sheet enable tables	-		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			Path 3: Monitoring of abnormalities at sensor lines RE/APE/IPE during the normal ASIC operation when CJ135 is in SWITCHON or WARMUP mode Short circuit to ground detected by means of contact measurements at sensor lines APE/RE//IPE				(					
			(Negated difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "APE" is directly connected to RGnd (no current flows through the sensor) and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0 - Ug0a) OR	>	0.07008	V	Battery voltage	>=	10.9	V		
			Negated difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "RE" is directly connected to RGnd (no current flows through the sensor) and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0 - Ug0e) OR	>	0.07008	V	and Battery voltage	<=	655.34	V		
			Negated difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "IPE" is directly connected to RGnd (no current flows through the sensor) and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0 - Ug0i))	>	0.07008	V	) for time	>=	0.1	sec		
							(Requested mode of UEGO Sensor 1 bank 1 in SWITCHON mode or WARMUP mode	=	TRUE	-		
							for number of counts)	>=	10	counts		
							Last packet transfer aborted of sensor 1 bank	=	FALSE	-		
							Internal Control Module O2 Sensor Processor Performance Bank 1	=	FALSE	-		
							Control Module Processor Serial Peripheral Interface Bus 3	=	FALSE	-		
							Basic enable conditions met	=	see sheet enable tables	-		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
	P0151	Lambda sensor wire diagnosis for sensor 1 bank 2 Circuit continuity - short circuit to ground	**Path 1: Monitoring of abnormalities at sensor lines RE/APE/IPE during the normal ASIC operation when CJ135 in IDLE mode** Short circuit to ground detected at sensor lines RE/IPE/APE/MES by means of voltage monitoring				(				continuous	3rd cycle
							Battery voltage and	>=	10.9	V		
			Voltage at least at one of the sensor lines RE/IPE/APE/MES	<	-0.15	V						
							Battery voltage	<=	655.34	V		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			where RE: Nernst voltage (reference voltage) IPE: Virtual ground (inner electrode) APE: Pumping current (external electrode) MES: Trim current (output sensor line trim resistance)		)			
					for time	>= 0.1 sec		
					Requested mode of UEGO Sensor 1 bank 2 in IDLE mode	= TRUE -		
					Validity of the diagnosis register of the ASIC c	= TRUE -		
					Last packet transfer aborted of sensor 1 bank	= FALSE -		
					Internal Control Module O2 Sensor Processor Performance Bank 2	= FALSE -		
					Control Module Processor Serial Peripheral Interface Bus 4	= FALSE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
			Path 2: **Aborted RAM check at ASIC shut-off when CJ135 in SWITCHON or WARMUP mode** Short circuit to ground detected by means of voltage monitoring at sensor lines RE/IPE/APE/MES or by means of contact measurements at sensor line APE/IPE as per last accessed ASIC diagnostic register		(			
			(Voltage at least at one of the sensor lines RE/IPE/APE/MES	< -0.15 V	Battery voltage	>= 10.9 V		
			OR		and			
			Negated difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "APE" is directly connected to RGnd (no current flows through the sensor) and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0 - Ug0a)	> 0.0438 V	Battery voltage	<= 655.34 V		
			OR		)			
			Negated difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "IPE" is directly connected to RGnd (no current flows through the sensor) and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0 - Ug0i))	> 0.0438 V	for time	>= 0.1 sec		
					Requested mode of UEGO Sensor 1 bank 2 in SWITCH ON mode or WARM UP mode	= TRUE -		
					Last packet transfer aborted of sensor 1 bank	= TRUE -		
					Internal Control Module O2 Sensor Processor Performance Bank 2	= FALSE -		
					Control Module Processor Serial Peripheral Interface Bus 4	= FALSE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
			Path 3: **Monitoring of abnormalities at sensor lines RE/APE/IPE during the normal ASIC operation when CJ135 is in SWITCHON or WARMUP mode** Short circuit to ground detected by means of contact measurements at sensor lines APE/RE//IPE		(			
			(Negated difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "APE" is directly connected to RGnd (no current flows through the sensor) and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0 - Ug0a)	> 0.07008 V	Battery voltage	>= 10.9 V		
			OR		and			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Negated difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "RE" is directly connected to RGnd (no current flows through the sensor) and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0 - Ug0e)	>	0.07008	V	Battery voltage	<=	655.34	V		
			OR				)					
			Negated difference of voltage drop at ECU-internal resistor RGnd in a state, where only the sensor line "IPE" is directly connected to RGnd (no current flows through the sensor) and voltage drop at ECU-internal resistor RGnd in a state, where all sensor lines are opened (Ug0 - Ug0i)	>	0.07008	V	for time	>=	0.1	sec		
			)				(Requested mode of UEGO Sensor 1 bank 2 in SWITCHON mode or WARMUP mode	=	TRUE	-		
							for number of counts	>=	10	counts		
							)					
							Last packet transfer aborted of sensor 1 bank	=	FALSE	-		
							Internal Control Module O2 Sensor Processor Performance Bank 2	=	FALSE	-		
							Control Module Processor Serial Peripheral Interface Bus 4	=	FALSE	-		
							Basic enable conditions met	=	see sheet enable tables	-		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
	P30D8	**ECU: Self Check for Sensor ASIC of UEGO Sensor 1 Bank 1** An error is reported if the ASIC detects it or if it is not reacting to requests	**Monitoring of diagnosis register, working registers and RAM values:**				(Battery voltage	<=	655.34	V	continuously	2 Trips
			SPI error during transmission of diagnosis registers for time	>=	0.05	sec	Battery voltage	>=	10.9	V		
			OR				) for time	>=	0.1	sec		
			SPI error during transmission of data registers for time	>=	0.05	sec	Flag locking the fault report due to currently requested Idle mode	=	FALSE	-		
			OR				External reset request	=	FALSE	-		
			SPI error during transmission of RAM data for time	>=	0.05	sec	Basic enable conditions met	=	see sheet enable tables	-		
			OR				No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			Monitoring ASIC (Chip) response/error									
			Availability of diagnostic register	=	TRUE	-						
			(									
			ASIC initialization wasn't successful	=	TRUE	-						
			OR									
			Respond/actual state of the ASIC wasn't as expected of base software	=	TRUE	-						
			OR									
			The bank wasn't switched between interrupt change	=	TRUE	-						
			)									
			OR									
			Monitoring setting register and operation mode									
			Register could not be set	=	TRUE	-						
			Number of rejected requests	>	200	counts						
			OR									
			No values found in diagnosis register	=	TRUE	-						
			OR									
			The ASIC does not switch to the requested mode for time	>	2	sec						
	P30D9	**ECU: Self Check for Sensor ASIC of UEGO Sensor 1 Bank 2** An error is reported if the ASIC detects it or if it is not reacting to requests	**Monitoring of diagnosis register, working registers and RAM values:**				(Battery voltage	<=	655.34	V	continuously	2 Trips
			SPI error during transmission of diagnosis registers for time	>=	0.05	sec	Battery voltage	>=	10.9	V		
			OR				) for time	>=	0.1	sec		
			SPI error during transmission of data registers for time	>=	0.05	sec	Flag locking the fault report due to currently requested Idle mode	=	FALSE	-		
			OR				External reset request	=	FALSE	-		
			SPI error during transmission of RAM data for time	>=	0.05	sec	Basic enable conditions met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR		No pending or confirmed DTCs	= see sheet inhibit tables -		
			Monitoring ASIC (Chip) response/error					
			Availability of diagnostic register	= TRUE -				
			(					
			ASIC initialization wasn't successful	= TRUE -				
			OR					
			Respond/actual state of the ASIC wasn't as expected of base software	= TRUE -				
			OR					
			The bank wasn't switched between interrupt change	= TRUE -				
			)					
			OR					
			Monitoring setting register and operation mode					
			Register could not be set	= TRUE -				
			Number of rejected requests	> 200 counts				
			OR					
			No values found in diagnosis register	= TRUE -				
			OR					
			The ASIC does not switch to the requested mode for time	> 2 sec				
Upstream Exhaust Gas Sensor	P0133	Path 1: Step response/identifcation measurement of Oxygen sensor and pattern has been detected with Step-response measurement within parallelization	**Step response measurement:**		Non bank-specific enabling conditions for continuous identification	= TRUE -		1 Trip
			(		(			EWMA
			Arithmetical average value of delay time from step response measurement in lean-rich direction	> 0.2 sec	Vehicle speed	>= 3.107520199 mph		
			OR		Fuel purge adaptation factor	<= 40 -		
			Arithmetical average value of transition time from step response measurement in lean-rich direction	> 0.2 sec	(			
			OR		Integral of purge mass flow after a longer purge stop	>= 1.02 g		
			Arithmetical average value of delay time from step response measurement in rich-lean direction	> 0.2 sec	OR			
			OR		Purge mass flow for DTEV	< 0.027777778 g/sec		
			Arithmetical average value of transition time from step response measurement in rich-lean direction	> 0.2 sec	)			
			)		(			
			OR		Condition gear-shift in process	= FALSE -		
			Identification measurement:		Condition instationary state during half engine mode switching	= FALSE -		
			(		)			
			Status of step response measurement (detected pattern, bank 1)	> 0 -	End of start is reached	= TRUE -		
			(		for time	= 7 sec		
			Identified delay time in lean-rich direction	> 0.9 sec	(			
			OR		Absolute value of filling gradient	<= 12 %		
			Identified transition time in lean-rich direction	> 1.2 sec	for time	= 1 sec		
			OR		)			
			Identified delay time in rich-lean direction	> 0.9 sec	(			
			OR		Condition half engine mode (HEM) active	= TRUE -		
			Identified transition time in rich-lean direction	> 1.2 sec	(			
			)		Relative air mass / 2	> 22.008 %		
			)		for time	= 0 sec		
					)			
					OR			
					Condition half engine mode (HEM) active	= FALSE -		
					(			
					Relative air mass	> 22.008 %		
					for time	= 0 sec		
					)			
					)			
					Ambient pressure	> 0 kPa		
					)			
					Bank-specific enabling conditions for continuous identification	= TRUE -		
					(			
					Enabling conditions for lambda stability			
					(			
					(			
					Lambda closed loop control, Bank 1	= TRUE -		
					(			
					Lambda control disabled during after	= FALSE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					(					
						>	8	sec		
					enabling lambda control					
					OR					
					(					
					Absolute value of diffence in lambda of bank 1	<=	0.1001	-		
					Difference of counter time and plant time constant a-(b+c) where a is Time running down after fuel	>	0	sec		
					b is plant time constant for continuous air/fuel control					
					c is plant parameter for dead time for lambda control					
					)					
					)					
					)					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					lambda sensor 1 temperature	>=	654.998	deg C		
					)					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					Injector power stage fault is active	=	FALSE	-		
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					lambda control is active since warmup is finished	=	TRUE	-		
					Relative air charge	>	0	%		
					for time	>=	2	sec		
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					)					
					Rich catalyst purge is active	=	TRUE	-		
					(					
					Lambda for component protection is active	=	FALSE	-		
					OR					
					Number of the lambda requests determining the lambda setpoint	!=	5	-		
					)					
					for time	=	2	sec		
					)					
					Plant time constant of continuous af control, base value, linear quantization	<=	0.25	sec		
					(					
					Exhaust gas mass flow Cat 1, Bank 1	<=	55.55555556	g/sec		
					(					
					Difference between exhaust gas mass flow Cat 1, Bank 1 with its filtered value	>=	-55.55555556	g/sec		
					Difference between exhaust gas mass flow Cat 1, Bank 1 with its filtered value	<=	55.55555556	g/sec		
					)					
					for time	=	0.01	sec		
					)					
					Sensor LSU upstream cat ready for operation	=	TRUE	-		
					for time	=	10	sec		
					Enable LSU dynamic diagnosis w.r.t. scavenging	=	TRUE	-		
					(					
					Ratio of total air mass to mass in cylinder	<=	1.02002	-		
					Filtered air mass	>=	50	g		
					)					
					(					
					(					
					Transition time from step response measurement in rich-lean direction	<	0.2	sec		
					Transition time from step response measurement in lean-rich direction	<	0.2	sec		
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					Transition time from step response measurement in rich-lean direction	<	0.1	sec		
					Transition time from step response measurement in lean-rich direction	<	0.1	sec		
					)					
					)					
					Injection valve cut-off on Bank 1	=	FALSE	-		
					)					
					Identification trigger: rate of change of modeled lambda in lean to rich direction, bank 2	>=	0.019989	-		
					Identification trigger: rate of change of modeled lambda in rich to lean direction, bank 2	>=	0.019989	-		
					(					
					Number of step response measurements in lean-rich direction for driving cylce (sensor 1, bank 1)	=	0	-		
					(					
					Time to evaluate loss function	>=	30	sec		
					OR					
					Square of difference between band pass filtered reciprocal lambda and modelled reciprocal lambda values	>=	100	-		
					)					
					)					
					OR					
					Enabling conditions for step response measurement					
					(					
					(					
					(					
					(					
					Lean lambda is requested and the cat is filled with oxygen gas	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					Secondary O2 sensor voltage	<=	0.200195	V		
					(					
					Rich lambda is requested and the cat is filled with rich gas due to low sensor voltage	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda bank1	=	0.91992	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					OR					
					Rich lamda is requested to empty the oxygen gas from the cat	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	0.91992	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					(					
					Secondary O2 sensor voltage	>=	0.85083	V		
					Or					
					(					
					Secondary O2 sensor voltage	>=	0.749512	V		
					Secondary O2 sensor voltage	<=	0.09944	V/s		
					Secondary O2 sensor voltage	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 1	>	0.15	g		
					))					
					(					
					Primary A/F sensor lambda	<=	(a) + (b)			
					(a) Primary lambda control set point	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated rich exhaust gas mass flow bank 1	>=	15	g		
					)					
					)					
					for time	=	A * 0.8	sec		
					where in					
					(A) LRS-plantparameter deadtime					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and			
					(			
					Reciprocal of actual lambda value where in	> (A + (B*C)) -		
					(A) Minimal or maximal value of reciprocal lambda after step			
					(B) Fraction of step height to end step response measurement	= 0.3000031 -		
					(C) Step height in reciprocal lambda			
					OR			
					Difference between time after step measurement and LRS-plantparameter deadtime	> 2.5 sec		
					)			
					)			
					OR			
					(			
					(			
					Rich lamda is requested to empty the oxygen gas from the cat	= TRUE -		
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda	= 0.91992 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					(			
					Secondary O2 sensor voltage	>= 0.85083 V		
					Or			
					(			
					Secondary O2 sensor voltage	>= 0.749512 V		
					Secondary O2 sensor voltage	<= 0.09944 V/s		
					Secondary O2 sensor voltage	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 1	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda	<= (a) + (b)		
					(a) Primary lambda control set point	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 1	>= 15 g		
					and			
					(			
					Lean lambda is requested and the cat is filled with oxygen gas due to high sensor voltage	= TRUE -		
					a commanded lambda active	**=** TRUE -		
					primary A/F commanded lambda	= 1.08008 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					((			
					Secondary O2 sensor voltage	<= 0.150146 V		
					for time	>= 0.1 sec		
					)			
					Or			
					(			
					Secondary O2 sensor voltage	<= 0.150146 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 1	> 0.1 g		
					))			
					(			
					Primary A/F sensor lambda	<= (a) + (b)		
					(a) Primary lambda control set point	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated lean exhaust gas mass flow bank 1	>= 15 g		
					)			
					OR			
					Lean lambda is requested and the cat is filled with oxygen gas	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					Secondary O2 sensor voltage	<=	0.200195	V		
					)					
					)					
					for time	=	A * 0.8	sec		
					where in					
					(A) LRS-plantparameter deadtime					
					(					
					Reciprocal of actual lambda value	<	(A - (B*C))	-		
					where in					
					(A) Minimal or maximal value of reciprocal lambda after step					
					(B) Fraction of step height to end step response measurement	=	0.3000031	-		
					(C) Step height in reciprocal lambda					
					OR					
					Difference between time after step measurement and LRS-plantparameter deadtime	>	2.5	sec		
					)					
					)					
					)					
					Absolute difference between reciprocal of desired lamda limitation and reciprocal lambda setpoint in combustion chamber	>	0.05	-		
					for time	=	A * 0.8	sec		
					where in					
					(A) LRS-plantparameter deadtime					
					)					
					(					
					(					
					Number of evaluated steps in lean-rich direction (sensor 1, bank 1)	<	4	counts		
					Number of evaluated steps in lean-rich direction (sensor 1, bank 1)	>	0	-		
					(					
					(					
					Delay time from step response measurement in lean-rich direction (sensor 1, bank 1)	<=	A - ((A - B)* (C / D))	sec		
					where in					
					(A) Delay time of best part unacceptable	=	0	sec		
					(B) Fault threshold of delay time (step response, lean to rich)	=	0.2	sec		
					(C) Necessary number of measurements for fault-confirmation	=	4	counts		
					(D) Number of evaluated steps in lean-rich direction (sensor 1, bank 1)					
					Transition time from step response measurement in lean-rich direction (sensor 1, bank 1)	<=	A - ((A - B)* (C / D))	sec		
					where in					
					(A) Transition time of best part unacceptable	=	0	sec		
					(B) Fault threshold of transition time (step response, lean to rich)	=	0.2	sec		
					(C) Necessary number of measurements for fault-confirmation	=	4	counts		
					(D) Number of evaluated steps in lean-rich direction (sensor 1, bank 1)					
					)					
					OR					
					Number of evaluated steps in lean-rich direction (sensor 1, bank 1)	>=	4	counts		
					)					
					)					
					OR					
					(					
					Number of evaluated steps in rich-lean direction (sensor 1, bank 1)	<	4	counts		
					Number of evaluated steps in rich-lean direction (sensor 1, bank 1)	>	0	-		
					(					
					Delay time from step response measurement in rich-lean direction (sensor 1, bank 1)	<=	A - ((A - B)* (C / D))	sec		
					where in					
					(A) Delay time of best part unacceptable	=	0	sec		
					(B) Fault threshold of delay time (step response,rich to lean)	=	0.2	sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(C) Necessary number of measurements for fault-confirmation	= 4 counts		
					(D) Number of evaluated steps in rich-lean direction (sensor 1, bank 1)			
					Transition time from step response measurement in rich-lean direction (sensor 1, bank 1)	<= A - ((A - B)* (C / D)) sec		
					where in			
					(A) Transition time of best part unacceptable	= 0 sec		
					(B) Fault threshold of transition time (step response,rich to lean)	= 0.2 sec		
					(C) Necessary number of measurements for fault-confirmation	= 4 counts		
					(D) Number of evaluated steps in rich-lean direction (sensor 1, bank 1)			
					)			
					OR			
					Number of evaluated steps in rich-lean direction (sensor 1, bank 1)	>= 4 counts		
					)			
					)			
					EWMA filter strategy			
					Fast initialization mode (FIR)	= **TRUE**		
					EWMA filter initial value for FIR	= 0 sec		
					EWMA filter constant	= 0.28 -		
					Maximum number of samples per	= 2 counts		
					Total number of samples for FIR	= 4 counts		
					Response to Step Change mode (RSC)	= TRUE		
					Response to Step Change mode inactive	= TRUE		
					absolute difference : ABS((a) - (b)	> (c)		
					(a) measured tansition or delay time			
					(b) EWMA filtered normalized monitoring result			
					(c) Step change detection factor	0.14 sec		
					EWMA filter constant	= 0.28 -		
					Maximum number of samples per	= 2 counts		
					Total number of samples for RSC mode	= 4 counts		
					Stabilized mode			
					EWMA filter constant	= 0.28 -		
					Total number of samples for stablilized mode	= 1 counts		
					No pending or confirmed DTCs	= see sheet inhibit table -		
					Basic enable conditions met	= see sheet enable tables -		
		Path 2: Step response/identifcation measurement of Oxygen sensor and pattern not detected with Step-response measurement within parallelization	**Step response measurement:**		Non bank-specific enabling conditions for continuous identification	= TRUE -		
			(		(			
			Arithmetical average value of delay time from step response measurement in lean-rich direction	> 0.2 sec	Vehicle speed	>= 3.107520199 mph		
			OR		and			
			Arithmetical average value of transition time from step response measurement in lean-rich direction	> 0.2 sec	Factor fuel purge adaptation factor	<= 40		
			OR		and			
			Arithmetical average value of delay time from step response measurement in rich-lean direction	> 0.2 sec	(			
			OR		Integral of purge mass flow after a longer purge stop	>= 1.02 g		
			Arithmetical average value of transition time from step response measurement in rich-lean direction	> 0.2 sec	OR			
			)		Purge mass flow for DTEV	< 0.027777778 g/sec		
			OR		)			
			Identification measurement:		(			
			(		Condition gear-shift in process	= FALSE -		
			Status of step response measurement (pattern is not detected bank 1)	= 0 -	Condition instationary state during half engine mode switching	= FALSE -		
			(		)			
			Sum time of identification in lean-rich direction	> 1.5 sec	End of start is reached	= TRUE -		
			OR		for time	= 7 sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Sum time of identification in rich-lean direction	> 1.5 sec	(			
			)		Fault suspicion reported by continuous identification	= TRUE -		
			)		(			
					Sum of identified delay time and transition time in lean to rich direction	> 0.2 sec		
					OR			
					Sum of identified delay time and transition time in rich to lean direction	> 0.2 sec		
					OR			
					Difference between sum of delay times and transition times in lean to rich and rich to lean directions respectively	> 0.2 sec		
					where in			
					(A) Identified transition time in lean-rich direction (bank 1)			
					(B)Identified delay time in lean-rich direction (bank 1)			
					(C) Identified transition time in rich-lean direction (bank 1)			
					(D) Identified delay time in rich-lean direction (bank 1)			
					OR			
					Negative value of the sum of delay times and transition times in rich to lean and lean to rich directions respectively	> 0.2 sec		
					where in			
					(A) Identified transition time in lean-rich direction (bank 1)			
					(B)Identified delay time in lean-rich direction (bank 1)			
					(C) Identified transition time in rich-lean direction (bank 1)			
					(D) Identified delay time in rich-lean direction (bank 1)			
					(			
					Absolute value of filling gradient	<= 12 %		
					for time	= 3 sec		
					)			
					)			
					OR			
					Fault suspicion reported by continuous identification	= FALSE -		
					(			
					Absolute value of filling gradient	<= 12 %		
					for time	= 1 sec		
					)			
					)			
					(			
					Condition half engine mode (HEM) active	= TRUE -		
					(			
					Relative air mass / 2	> 22.008 %		
					for time	= 0 sec		
					)			
					OR			
					Condition half engine mode (HEM) active	= FALSE -		
					(			
					Relative air mass	> 22.008 %		
					for time	= 0 sec		
					)			
					)			
					Ambient pressure	> 0 kPa		
					)			
					Bank-specific enabling conditions for continuous identification	= TRUE -		
					(			
					Enabling conditions for lambda stability			
					(			
					(			
					Lambda closed loop control, Bank 1	= TRUE -		
					(			
					Lambda control disabled during after	= FALSE -		
					and			
					Lambda swtiched ON after fuel cutoff	= TRUE -		
					(			
					Fuel cut off is active	= FALSE -		
					(			
						> 8 sec		
					enabling lambda control			
					OR			
					(			
					Absolute value of diffence in lambda of bank 1	<= 0.1001 -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Difference of counter time and plant time constant a-(b+c) where a is Time running down after fuel b is plant time constant for continuous air/fuel control c is plant parameter for dead time for lambda control	>	0	sec		
					)					
					)					
					)					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					lambda sensor 1 temperature	>=	654.998	deg C		
					)					
					Lambda control disabled by a fault	=	FALSE	-		
					(					
					Catalyst damaging misfire rate exceeded	=	FALSE	-		
					Injector power stage fault is active	=	FALSE	-		
					Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
					)					
					lambda control is active since warmup is finished	=	TRUE	-		
					Relative air charge	>	0	%		
					for time	>=	2	sec		
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					)					
					Rich catalyst purge is active	=	TRUE	-		
					(					
					Lambda for component protection is active	=	FALSE	-		
					OR					
					Number of the lambda requests determining the lambda setpoint	!=	5	-		
					)					
					for time	=	2	sec		
					)					
					Plant time constant of continuous af control, base value, linear quantization	<=	0.25	sec		
					(					
					Exhaust gas mass flow Cat 1, Bank 1	<=	55.55555556	g/sec		
					(					
					Difference between exhaust gas mass flow Cat 1, Bank 1 with its filtered value	>=	-55.55555556	g/sec		
					Difference between exhaust gas mass flow Cat 1, Bank 1 with its filtered value	<=	55.55555556	g/sec		
					)					
					for time	=	0.01	sec		
					)					
					Sensor LSU upstream cat ready for operation	=	TRUE	-		
					for time	=	10	sec		
					Enable LSU dynamic diagnosis w.r.t. scavenging	=	TRUE	-		
					(					
					Ratio of total air mass to mass in cylinder	<=	1.02002	-		
					Filtered air mass	>=	50	g		
					)					
					(					
					(					
					Transition time from step response measurement in rich-lean direction	<	0.2	sec		
					Transition time from step response measurement in lean-rich direction	<	0.2	sec		
					)					
					(					
					Transition time from step response measurement in rich-lean direction	<	0.1	sec		
					Transition time from step response measurement in lean-rich direction	<	0.1	sec		
					)					
					)					
					Injection valve cut-off on Bank 1	=	FALSE	-		
					)	=	3	sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Identification trigger: rate of change of modeled lambda in lean to rich direction, bank 2	>= 0.019989 -		
					Identification trigger: rate of change of modeled lambda in rich to lean direction, bank 2	>= 0.019989 -		
					(			
					Number of step response measurements in lean-rich direction for driving cylce (sensor 1, bank 1)	= 0 -		
					(			
					Time to evaluate loss function	>= 30 sec		
					OR			
					Square of difference between band pass filtered reciprocal lambda and modelled reciprocal lambda values	>= 100 -		
					)			
					)			
					OR			
					Enabling conditions for step response measurement			
					(			
					(			
					(			
					(			
					Lean lambda is requested and the cat is filled with oxygen gas	= TRUE -		
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda	= 1.08008 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					Secondary O2 sensor voltage	<= 0.200195 V		
					(			
					Rich lambda is requested and the cat is filled with rich gas due to low sensor voltage	= TRUE -		
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda bank1	= 0.91992 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					OR			
					Rich lamda is requested to empty the oxygen gas from the cat	= TRUE -		
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda	= 0.91992 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					(			
					Secondary O2 sensor voltage	>= 0.85083 V		
					Or			
					(			
					Secondary O2 sensor voltage	>= 0.749512 V		
					Secondary O2 sensor voltage	<= 0.09944 V/s		
					Secondary O2 sensor voltage	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 1	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda	<= (a) + (b)		
					(a) Primary lambda control set point	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 1	>= 15 g		
					)			
					)			
					for time	= A * 0.8 sec		
					where in			
					(A) LRS-plantparameter deadtime			
					and			
					(			
					Reciprocal of actual lambda value	> (A + (B*C)) -		
					where in			
					(A) Minimal or maximal value of reciprocal lambda after step			
					(B) Fraction of step height to end step response measurement	= 0.3000031 -		
					(C) Step height in reciprocal lambda			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					OR					
					Difference between time after step measurement and LRS-plantparameter deadtime	>	2.5	sec		
					)					
					)					
					OR					
					(					
					(					
					Rich lamda is requested to empty the oxygen gas from the cat	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	0.91992	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					(					
					Secondary O2 sensor voltage	>=	0.85083	V		
					Or					
					(					
					Secondary O2 sensor voltage	>=	0.749512	V		
					Secondary O2 sensor voltage	<=	0.09944	V/s		
					Secondary O2 sensor voltage	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 1	>	0.15	g		
					))					
					(					
					Primary A/F sensor lambda	<=	(a) + (b)			
					(a) Primary lambda control set point	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated rich exhaust gas mass flow bank 1	>=	15	g		
					and					
					(					
					Lean lambda is requested and the cat is filled with oxygen gas due to high sensor voltage	=	TRUE	-		
					a commanded lambda active	**=**	TRUE	-		
					primary A/F commanded lambda	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					((					
					Secondary O2 sensor voltage	<=	0.150146	V		
					for time	>=	0.1	sec		
					)					
					Or					
					(					
					Secondary O2 sensor voltage	<=	0.150146	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 1	>	0.1	g		
					))					
					(					
					Primary A/F sensor lambda	<=	(a) + (b)			
					(a) Primary lambda control set point	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated lean exhaust gas mass flow bank 1	>=	15	g		
					)					
					OR					
					Lean lambda is requested and the cat is filled with oxygen gas	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					Secondary O2 sensor voltage	<=	0.200195	V		
					)					
					)					
					for time	=	A * 0.8	sec		
					where in					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(A) LRS-plantparameter deadtime			
					(			
					Reciprocal of actual lambda value where in	< (A - (B*C)) -		
					(A) Minimal or maximal value of reciprocal lambda after step			
					(B) Fraction of step height to end step response measurement	= 0.3000031 -		
					(C) Step height in reciprocal lambda			
					OR			
					Difference between time after step measurement and LRS-plantparameter deadtime	> 2.5 sec		
					)			
					)			
					)			
					Absolute difference between reciprocal of desired lamda limitation and reciprocal lambda setpoint in combustion chamber	> 0.05 -		
					for time where in	= A * 0.8 sec		
					(A) LRS-plantparameter deadtime			
					)			
					(			
					(			
					Number of evaluated steps in lean-rich direction (sensor 1, bank 1)	< 4 counts		
					Number of evaluated steps in lean-rich direction (sensor 1, bank 1)	> 0 -		
					(			
					(			
					Delay time from step response measurement in lean-rich direction (sensor 1, bank 1) where in	<= A - ((A - B)* (C / D)) sec		
					(A) Delay time of best part unacceptable	= 0 sec		
					(B) Fault threshold of delay time (step response, lean to rich)	= 0.2 sec		
					(C) Necessary number of measurements for fault-confirmation	= 4 counts		
					(D) Number of evaluated steps in lean-rich direction (sensor 1, bank 1)			
					Transition time from step response measurement in lean-rich direction (sensor 1, bank 1) where in	<= A - ((A - B)* (C / D)) sec		
					(A) Transition time of best part unacceptable	= 0 sec		
					(B) Fault threshold of transition time (step response, lean to rich)	= 0.2 sec		
					(C) Necessary number of measurements for fault-confirmation	= 4 counts		
					(D) Number of evaluated steps in lean-rich direction (sensor 1, bank 1)			
					)			
					OR			
					Number of evaluated steps in lean-rich direction (sensor 1, bank 1)	>= 4 counts		
					)			
					)			
					OR			
					(			
					Number of evaluated steps in rich-lean direction (sensor 1, bank 1)	< 4 counts		
					Number of evaluated steps in rich-lean direction (sensor 1, bank 1)	> 0 -		
					(			
					(			
					Delay time from step response measurement in rich-lean direction (sensor 1, bank 1) where in	<= A - ((A - B)* (C / D)) sec		
					(A) Delay time of best part unacceptable	= 0 sec		
					(B) Fault threshold of delay time (step response,rich to lean)	= 0.2 sec		
					(C) Necessary number of measurements for fault-confirmation	= 4 counts		
					(D) Number of evaluated steps in rich-lean direction (sensor 1, bank 1)			
					Transition time from step response measurement in rich-lean direction (sensor 1, bank 1) where in	<= A - ((A - B)* (C / D)) sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							(A) Transition time of best part unacceptable	=	0	sec		
							(B) Fault threshold of transition time (step response,rich to lean)	=	0.2	sec		
							(C) Necessary number of measurements for fault-confirmation	=	4	counts		
							(D) Number of evaluated steps in rich-lean direction (sensor 1, bank 1)					
							)					
							OR					
							Number of evaluated steps in rich-lean direction (sensor 1, bank 1)	>=	4	counts		
							)					
							)					
							)					
							EWMA filter strategy					
							Fast initialization mode (FIR)	**=**	**TRUE**			
							EWMA filter initial value for FIR	=	0	sec		
							EWMA filter constant	=	0.28	-		
							Maximum number of samples per	=	2	counts		
							Total number of samples for FIR	=	4	counts		
							Response to Step Change mode (RSC)	**=**	TRUE			
							Response to Step Change mode inactive	=	TRUE			
							absolute difference : ABS((a) - (b)	>	(c)			
							(a) measured tansition or delay time					
							(b) EWMA filtered normalized monitoring result					
							(c) Step change detection factor		0.14	sec		
							EWMA filter constant	=	0.28	-		
							Maximum number of samples per	=	2	counts		
							Total number of samples for RSC mode	=	4	counts		
							Stabilized mode					
							EWMA filter constant	=	0.28	-		
							Total number of samples for stablilized mode	=	1	counts		
							No pending or confirmed DTCs	=	see sheet inhibit table	-		
							Basic enable conditions met	=	see sheet enable tables	-		
	P0153	Path 1: Step response/identifcation measurement of Oxygen sensor of bank 2 and pattern has been detected with Step-response measurement within parallelization	**Step response measurement:**				Non bank-specific enabling conditions for continuous identification	=	TRUE	-		1 Trip
			(				(					EWMA
			Arithmetical average value of delay time from step response measurement in lean-rich direction (sensor 1, bank 2)	>	0.2	sec	Vehicle speed	>=	3.107520199	mph		
			OR				Fuel purge adaptation factor	<=	40	-		
			Arithmetical average value of transition time from step response measurement in lean-rich direction, (sensor 1, bank 2)	>	0.2	sec	(					
			OR				Integral of purge mass flow after a longer purge stop	>=	1.02	g		
			Arithmetical average value of delay time from step response measurement in rich-lean direction, (sensor 1, bank 2)	>	0.2	sec	OR					
			OR				Purge mass flow for DTEV	<	0.027777778	g/sec		
			Arithmetical average value of transition time from step response measurement in rich-lean direction, (sensor 1, bank 2)	>	0.2	sec	)					
			)				(					
			OR				Condition gear-shift in process	=	FALSE	-		
			Identification measurement:				and					
			(				Condition instationary state during half engine mode switching	=	FALSE	-		
			Status of step response measurement (detected pattern, bank 2)	>	0	-	)					
			(				End of start is reached	=	TRUE	-		
			Identified delay time in lean-rich direction, bank 2	>	0.9	sec	for time	=	7	sec		
			OR				(					
			Identified transition time in lean-rich direction, bank 2	>	1.2	sec	Absolute value of filling gradient	<=	12	%		
			OR				for time	=	1	sec		
			Identified delay time in rich-lean direction, bank 2	>	0.9	sec	)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			OR				(					
			Identified transition time in rich-lean direction, bank 2	>	1.2	sec	Condition half engine mode (HEM) active	=	TRUE	-		
			)				(					
			)				Relative air mass / 2	>	22.008	%		
							for time	=	0	sec		
							)					
							OR					
							Condition half engine mode (HEM) active	=	FALSE	-		
							(					
							Relative air mass	>	22.008	%		
							for time	=	0	sec		
							)					
							)					
							Ambient pressure	>	0	kPa		
							)					
							Bank-specific enabling conditions for continuous identification, bank 2	=	TRUE	-		
							(					
							Enabling conditions for lambda stability					
							(					
							(					
							Lambda closed loop control, Bank 2	=	TRUE	-		
							(					
							Lambda control disabled during after	=	FALSE	-		
							Lambda swtiched ON after fuel cutoff, bank 2	=	TRUE	-		
							(					
							Fuel cut off is active	=	FALSE	-		
							(					
								>	8	sec		
							enabling lambda control					
							OR					
							(					
							Absolute value of diffence in lambda of bank 2	<=	0.1001	-		
							Difference of counter time and plant time constant	>	0	sec		
							a-(b+c)					
							where a is Time running down after fuel					
							b is plant time constant for continuous air/fuel control, bank 2					
							c is plant parameter for dead time for lambda control, bank 2					
							)					
							)					
							)					
							LSU sensor upstream to catalyst ready for operation, bank 2	=	TRUE	-		
							(					
							lambda sensor 1 temperature, bank 2	>=	654.998	deg C		
							)					
							Lambda control disabled by a fault, bank 2	=	FALSE	-		
							(					
							Catalyst damaging misfire rate exceeded	=	FALSE	-		
							Injector power stage fault is active	=	FALSE	-		
							Camshaft fault in critical operating range present and MAF is main air charge sensor	=	FALSE	-		
							)					
							lambda control is active since warmup is finished	=	TRUE	-		
							Relative air charge	>	0	%		
							for time	>=	2	sec		
							Lamda control active due to GDI mode change	=	TRUE	-		
							(					
							GDI mode homogeneous	=	TRUE	-		
							for time	>=	0.8	sec		
							)					
							)					
							)					
							Rich catalyst purge is active, bank 2	=	TRUE	-		
							(					
							Lambda for component protection is active	=	FALSE	-		
							OR					
							Number of the lambda requests determining the lambda setpoint	!=	5	-		
							)					
							for time	=	2	sec		
							)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Plant time constant of continuous af control, base value, bank 2, linear quantization	<=	0.25	sec		
					(					
					Exhaust gas mass flow Cat 1, Bank 2	<=	55.55555556	g/sec		
					(					
					Difference between exhaust gas mass flow Cat 1, Bank 2 with its filtered value	>=	-55.55555556	g/sec		
					Difference between exhaust gas mass flow Cat 1, Bank 2 with its filtered value	<=	55.55555556	g/sec		
					)					
					for time	=	0.01	sec		
					)					
					Sensor LSU upstream cat ready for operation	=	TRUE	-		
					for time	=	10	sec		
					Enable LSU dynamic diagnosis w.r.t. scavenging	=	TRUE	-		
					(					
					Ratio of total air mass to mass in cylinder	<=	1.02002	-		
					Filtered air mass	>=	50	g		
					)					
					(					
					(					
					Transition time from step response measurement in rich-lean direction (sensor 1, bank 2)	<	0.2	sec		
					Transition time from step response measurement in lean-rich direction (sensor 1, bank 2)	<	0.2	sec		
					)					
					(					
					Transition time from step response measurement in rich-lean direction (sensor 1, bank 2)	<	0.1	sec		
					Transition time from step response measurement in lean-rich direction (sensor 1, bank 2)	<	0.1	sec		
					)					
					)					
					Injection valve cut-off on Bank 2	=	FALSE	-		
					)					
					Identification trigger: rate of change of modeled lambda in lean to rich direction, bank 2	>=	0.019989	-		
					Identification trigger: rate of change of modeled lambda in rich to lean direction, bank 2	>=	0.019989	-		
					(					
					Number of step response measurements in lean-rich direction for driving cylce (sensor 1, bank 2)	=	0	-		
					(					
					Time to evaluate loss function, bank 2	>=	30	sec		
					OR					
					Square of difference between band pass filtered reciprocal lambda and modelled reciprocal lambda values (sensor 1, bank 2)	>=	100	-		
					)					
					)					
					OR					
					Enabling conditions for step response measurement					
					(					
					(					
					(					
					(					
					Lean lambda is requested and the cat is filled with oxygen gas	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					Secondary O2 sensor voltage	<=	0.200195	V		
					(					
					Rich lambda is requested and the cat is filled with rich gas due to low sensor voltage, bank 2	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda bank2	=	0.91992	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR			
					Rich lamda is requested to empty the oxygen gas from the cat	= TRUE -		
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda	= 0.91992 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					(			
					Secondary O2 sensor voltage	>= 0.85083 V		
					Or			
					(			
					Secondary O2 sensor voltage	>= 0.749512 V		
					Secondary O2 sensor voltage	<= 0.09944 V/s		
					Secondary O2 sensor voltage	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 2	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda	<= (a) + (b)		
					(a) Primary lambda control set point	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 2	>= 15 g		
					)			
					)			
					for time	= A * 0.8 sec		
					where in			
					(A) LRS-plantparameter deadtime, bank 2			
					(			
					Reciprocal of actual lambda value, sensor 1, bank 2	> (A + (B*C)) -		
					where in			
					(A) Minimal or maximal value of reciprocal lambda after step, bank 2			
					(B) Fraction of step height to end step response measurement	= 0.3000031 -		
					(C) Step height in reciprocal lambda, bank 2			
					OR			
					Difference between time after step measurement and LRS-plantparameter deadtime, bank 2	> 2.5 sec		
					)			
					)			
					OR			
					(			
					(			
					Rich lambda is requested to empty the oxygen gas from the cat, bank 2	= TRUE -		
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda	= 0.91992 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					(			
					Secondary O2 sensor voltage	>= 0.85083 V		
					Or			
					(			
					Secondary O2 sensor voltage	>= 0.749512 V		
					Secondary O2 sensor voltage	<= 0.09944 V/s		
					Secondary O2 sensor voltage	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 2	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda	<= (a) + (b)		
					(a) Primary lambda control set point	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 2	>= 15 g		
					(			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Lean lambda is requested and the cat is filled with oxygen gas due to high sensor voltage, bank 2	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					((					
					Secondary O2 sensor voltage	<=	0.150146	V		
					for time	>=	0.1	sec		
					)					
					Or					
					(					
					Secondary O2 sensor voltage	<=	0.150146	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 2	>	0.1	g		
					))					
					(					
					Primary A/F sensor lambda	<=	(a) + (b)			
					(a) Primary lambda control set point	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated lean exhaust gas mass flow bank 2	>=	15	g		
					)					
					OR					
					Lean lambda is requested and the cat is filled with oxygen gas, bank 2	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					Secondary O2 sensor voltage	<=	0.200195	V		
					)					
					)					
					for time	=	A * 0.8	sec		
					where in					
					(A) LRS-plantparameter deadtime, bank 2					
					(					
					Reciprocal of actual lambda value, bank 2	<	(A - (B*C))	-		
					where in					
					(A) Minimal or maximal value of reciprocal lambda after step, bank 2					
					(B) Fraction of step height to end step response measurement	=	0.3000031	-		
					(C) Step height in reciprocal lambda, bank 2					
					OR					
					Difference between time after step measurement and LRS-plantparameter deadtime, bank 2	>	2.5	sec		
					)					
					)					
					)					
					Absolute difference between reciprocal of desired lamda limitation of sensor 1, bank 2 and reciprocal lambda setpoint in combustion chamber	>	0.05	-		
					for time	=	A * 0.8	sec		
					where in					
					(A) LRS-plantparameter deadtime, bank 2					
					)					
					(					
					(					
					Number of evaluated steps in lean-rich direction (sensor 1, bank 2)	<	4	counts		
					Number of evaluated steps in lean-rich direction (sensor 1, bank 2)	>	0	-		
					(					
					Delay time from step response measurement in lean-rich direction (sensor 1, bank 2)	<=	A - ((A - B)* (C / D))	sec		
					where in					
					(A) Delay time of best part unacceptable	=	0	sec		
					(B) Fault threshold of delay time (step response, lean to rich)	=	0.2	sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(C) Necessary number of measurements for fault-confirmation	=	4	counts		
					(D) Number of evaluated steps in lean-rich direction (sensor 1, bank 2)					
					Transition time from step response measurement in lean-rich direction (sensor 1, bank 2)	<=	A - ((A - B)* (C / D))	sec		
					where in					
					(A) Transition time of best part unacceptable	=	0	sec		
					(B) Fault threshold of transition time (step response, lean to rich)	=	0.2	sec		
					(C) Necessary number of measurements for fault-confirmation	=	4	counts		
					(D) Number of evaluated steps in lean-rich direction (sensor 1, bank 2)					
					)					
					OR					
					Number of evaluated steps in lean-rich direction (sensor 1, bank 2)	>=	4	counts		
					)					
					OR					
					(					
					Number of evaluated steps in rich-lean direction (sensor 1, bank 2)	<	4	counts		
					Number of evaluated steps in rich-lean direction (sensor 1, bank 2)	>	0	-		
					(					
					Delay time from step response measurement in rich-lean direction (sensor 1, bank 2)	<=	A - ((A - B)* (C / D))	sec		
					where in					
					(A) Delay time of best part unacceptable	=	0	sec		
					(B) Fault threshold of delay time (step response,rich to lean)	=	0.2	sec		
					(C) Necessary number of measurements for fault-confirmation	=	4	counts		
					(D) Number of evaluated steps in rich-lean direction (sensor 1, bank 2)					
					Transition time from step response measurement in rich-lean direction (sensor 1, bank 2)	<=	A - ((A - B)* (C / D))	sec		
					where in					
					(A) Transition time of best part unacceptable	=	0	sec		
					(B) Fault threshold of transition time (step response,rich to lean)	=	0.2	sec		
					(C) Necessary number of measurements for fault-confirmation	=	4	counts		
					(D) Number of evaluated steps in rich-lean direction (sensor 1, bank 2)					
					)					
					OR					
					Number of evaluated steps in rich-lean direction (sensor 1, bank 2)	>=	4	counts		
					)					
					)					
					EWMA filter strategy					
					Fast initialization mode (FIR)	=	**TRUE**			
					EWMA filter initial value for FIR	=	0	sec		
					EWMA filter constant	=	0.28	-		
					Maximum number of samples per	=	2	counts		
					Total number of samples for FIR	=	4	counts		
					Response to Step Change mode (RSC)	=	TRUE			
					Response to Step Change mode inactive	=	TRUE			
					absolute difference : ABS((a) - (b)	>	(c)			
					(a) measured tansition or delay time					
					(b) EWMA filtered normalized monitoring result					
					(c) Step change detection factor		0.14	sec		
					EWMA filter constant	=	0.28	-		
					Maximum number of samples per	=	2	counts		
					Total number of samples for RSC mode	=	4	counts		
					Stabilized mode					
					EWMA filter constant	=	0.28	-		
					Total number of samples for stablilized mode	=	1	counts		
					No pending or confirmed DTCs	=	see sheet inhibit table	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Basic enable conditions met	=	see sheet enable tables	-		
		Path 2: Step response/identifcation measurement of Oxygen sensor of bank 2 and pattern not detected with Step-response measurement within parallelization	**Step response measurement:**				Non bank-specific enabling conditions for continuous identification	=	TRUE	-		
			(				(					
			Arithmetical average value of delay time from step response measurement in lean-rich direction (sensor 1, bank 2)	>	0.2	sec	Vehicle speed	>=	3.107520199	mph		
			OR				Factor fuel purge adaptation factor	<=	40			
			Arithmetical average value of transition time from step response measurement in lean-rich direction, (sensor 1, bank 2)	>	0.2	sec	(					
			OR				Integral of purge mass flow after a longer purge stop	>=	1.02	g		
			Arithmetical average value of delay time from step response measurement in rich-lean direction, (sensor 1, bank 2)	>	0.2	sec	OR					
			OR				Purge mass flow for DTEV	<	0.027777778	g/sec		
			Arithmetical average value of transition time from step response measurement in rich-lean direction, (sensor 1, bank 2)	>	0.2	sec	)					
			)				(					
			OR				Condition gear-shift in process	=	FALSE	-		
			Identification measurement:				Condition instationary state during half engine mode switching	=	FALSE	-		
			(				)					
			Status of step response measurement (pattern is not detected bank 2)	=	0	-	End of start is reached	=	TRUE	-		
			(				for time	=	7	sec		
			Sum time of identification in lean-rich direction (sensor 1, bank 2)	>	1.5	sec	(					
			OR				Fault suspicion reported by continuous identification	=	TRUE	-		
			Sum time of identification in rich-lean direction (sensor 1, bank 2)	>	1.5	sec	(					
			)				Sum of identified delay time and transition time in lean to rich direction, bank 2	>	0.2	sec		
			)				OR					
							Sum of identified delay time and transition time in rich to lean direction, bank 2	>	0.2	sec		
							OR					
							Difference between sum of delay times and transition times in lean to rich and rich to lean directions respectively where in (A) Identified transition time in lean-rich direction (bank 2) (B)Identified delay time in lean-rich direction (bank 2) (C) Identified transition time in rich-lean direction (bank 2) (D) Identified delay time in rich-lean direction (bank 2)	>	0.2	sec		
							OR					
							Negative value of the sum of delay times and transition times in rich to lean and lean to rich directions respectively where in (A) Identified transition time in lean-rich direction (bank 1) (B)Identified delay time in lean-rich direction (bank 1) (C) Identified transition time in rich-lean direction (bank 1) (D) Identified delay time in rich-lean direction (bank 1)	>	0.2	sec		
							(					
							Absolute value of filling gradient	<=	12	%		
							for time	=	3	sec		
							)					
							)					
							OR					
							Fault suspicion reported by continuous identification	=	FALSE	-		
							(					
							Absolute value of filling gradient	<=	12	%		
							for time	=	1	sec		
							)					
							)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					Condition half engine mode (HEM) active	= TRUE -		
					(			
					Relative air mass / 2	> 22.008 %		
					for time	= 0 sec		
					)			
					OR			
					Condition half engine mode (HEM) active	= FALSE -		
					(			
					Relative air mass	> 22.008 %		
					for time	= 0 sec		
					)			
					)			
					Ambient pressure	> 0 kPa		
					)			
					Bank-specific enabling conditions for continuous identification, bank 2	= TRUE -		
					(			
					Enabling conditions for lambda stability			
					(			
					(			
					Lambda closed loop control, Bank 2	= TRUE -		
					(			
					Lambda control disabled during after	= FALSE -		
					Lambda swtiched ON after fuel cutoff, bank 2	= TRUE -		
					(			
					Fuel cut off is active	= FALSE -		
					(	> 8 sec		
					enabling lambda control			
					OR			
					(			
					Absolute value of diffence in lambda of bank 2	<= 0.1001 -		
					Difference of counter time and plant time constant	> 0 sec		
					a-(b+c)			
					where a is Time running down after fuel			
					b is plant time constant for continuous air/fuel control, bank 2			
					c is plant parameter for dead time for lambda control, bank 2			
					)			
					)			
					)			
					LSU sensor upstream to catalyst ready for operation, bank 2	= TRUE -		
					(			
					lambda sensor 1 temperature	>= 654.998 deg C		
					)			
					Lambda control disabled by a fault, bank 2	= FALSE -		
					(			
					Catalyst damaging misfire rate exceeded	= FALSE -		
					Injector power stage fault is active	= FALSE -		
					Camshaft fault in critical operating range present and MAF is main air charge sensor	= FALSE -		
					)			
					lambda control is active since warmup is finished	= TRUE -		
					Relative air charge	> 0 %		
					for time	>= 2 sec		
					Lamda control active due to GDI mode change	= TRUE -		
					(			
					GDI mode homogeneous	= TRUE -		
					for time	>= 0.8 sec		
					)			
					)			
					)			
					Rich catalyst purge is active, bank 2	= TRUE -		
					(			
					Lambda for component protection is active	= FALSE -		
					OR			
					Number of the lambda requests determining the lambda setpoint	!= 5 -		
					)			
					for time	= 2 sec		
					)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Plant time constant of continuous af control, base value, bank 2, linear quantization	<=	0.25	sec		
					(					
					Exhaust gas mass flow Cat 1, Bank 2	<=	55.55555556	g/sec		
					(					
					Difference between exhaust gas mass flow Cat 1, Bank 2 with its filtered value	>=	-55.55555556	g/sec		
					Difference between exhaust gas mass flow Cat 1, Bank 2 with its filtered value	<=	55.55555556	g/sec		
					)					
					for time	=	0.01	sec		
					)					
					Sensor LSU upstream cat ready for operation	=	TRUE	-		
					for time	=	10	sec		
					Enable LSU dynamic diagnosis w.r.t. scavenging	=	TRUE	-		
					(					
					Ratio of total air mass to mass in cylinder	<=	1.02002	-		
					Filtered air mass	>=	50	g		
					)					
					(					
					(					
					Transition time from step response measurement in rich-lean direction (sensor 1, bank 2)	<	0.2	sec		
					Transition time from step response measurement in lean-rich direction (sensor 1, bank 2)	<	0.2	sec		
					)					
					(					
					Transition time from step response measurement in rich-lean direction (sensor 1, bank 2)	<	0.1	sec		
					Transition time from step response measurement in lean-rich direction (sensor 1, bank 2)	<	0.1	sec		
					)					
					)					
					Injection valve cut-off on Bank 2	=	FALSE	-		
					)		3	sec		
					Identification trigger: rate of change of modeled lambda in lean to rich direction, bank 2	>=	0.019989	-		
					Identification trigger: rate of change of modeled lambda in rich to lean direction, bank 2	>=	0.019989	-		
					(					
					Number of step response measurements in lean-rich direction for driving cylce (sensor 1, bank 2)	=	0	-		
					(					
					Time to evaluate loss function, bank 2	>=	30	sec		
					OR					
					Square of difference between band pass filtered reciprocal lambda and modelled reciprocal lambda values (sensor 1, bank 2)	>=	100	-		
					)					
					)					
					OR					
					Enabling conditions for step response measurement					
					(					
					(					
					(					
					(					
					Lean lambda is requested and the cat is filled with oxygen gas, bank 2	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					Secondary O2 sensor voltage	<=	0.200195	V		
					(					
					Rich lambda is requested and the cat is filled with rich gas due to low sensor voltage, bank 2	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda bank2	=	0.91992	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR			
					Rich lambda is requested to empty the oxygen gas from the cat, bank 2	= TRUE -		
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda	= 0.91992 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					(			
					Secondary O2 sensor voltage	>= 0.85083 V		
					Or			
					(			
					Secondary O2 sensor voltage	>= 0.749512 V		
					Secondary O2 sensor voltage	<= 0.09944 V/s		
					Secondary O2 sensor voltage	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 2	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda	<= (a) + (b)		
					(a) Primary lambda control set point	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 2	>= 15 g		
					)			
					)			
					for time	= A * 0.8 sec		
					where in			
					(A) LRS-plantparameter deadtime, bank 2			
					and			
					(			
					Reciprocal of actual lambda value, sensor 1, bank 2	> (A + (B*C)) -		
					where in			
					(A) Minimal or maximal value of reciprocal lambda after step, bank 2			
					(B) Fraction of step height to end step response measurement	= 0.3000031 -		
					(C) Step height in reciprocal lambda, bank 2			
					OR			
					Difference between time after step measurement and LRS-plantparameter deadtime, bank 2	> 2.5 sec		
					)			
					)			
					OR			
					(			
					(			
					Rich lambda is requested to empty the oxygen gas from the cat, bank 2	= TRUE -		
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda	= 0.91992 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					(			
					Secondary O2 sensor voltage	>= 0.85083 V		
					Or			
					(			
					Secondary O2 sensor voltage	>= 0.749512 V		
					Secondary O2 sensor voltage	<= 0.09944 V/s		
					Secondary O2 sensor voltage	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 2	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda	<= (a) + (b)		
					(a) Primary lambda control set point	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 2	>= 15 g		
					(			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Lean lambda is requested and the cat is filled with oxygen gas due to high sensor voltage, bank 2	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					((					
					Secondary O2 sensor voltage	<=	0.150146	V		
					for time	>=	0.1	sec		
					)					
					Or					
					(					
					Secondary O2 sensor voltage	<=	0.150146	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 2	>	0.1	g		
					))					
					(					
					Primary A/F sensor lambda	<=	(a) + (b)			
					(a) Primary lambda control set point	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated lean exhaust gas mass flow bank 2	>=	15	g		
					OR					
					Lean lambda is requested and the cat is filled with oxygen gas, bank 2	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					Secondary O2 sensor voltage	<=	0.200195	V		
					)					
					)					
					for time	=	A * 0.8	sec		
					where in					
					(A) LRS-plantparameter deadtime, bank 2					
					(					
					Reciprocal of actual lambda value, bank 2	<	(A - (B*C))	-		
					where in					
					(A) Minimal or maximal value of reciprocal lambda after step, bank 2					
					(B) Fraction of step height to end step response measurement	=	0.3000031	-		
					(C) Step height in reciprocal lambda, bank 2					
					OR					
					Difference between time after step measurement and LRS-plantparameter deadtime, bank 2	>	2.5	sec		
					)					
					)					
					)					
					Absolute difference between reciprocal of desired lamda limitation of sensor 1, bank 2 and reciprocal lambda setpoint in combustion chamber	>	0.05	-		
					for time	=	A * 0.8	sec		
					where in					
					(A) LRS-plantparameter deadtime, bank 2					
					)					
					(					
					(					
					Number of evaluated steps in lean-rich direction (sensor 1, bank 2)	<	4	counts		
					Number of evaluated steps in lean-rich direction (sensor 1, bank 2)	>	0	-		
					(					
					Delay time from step response measurement in lean-rich direction (sensor 1, bank 2)	<=	A - ((A - B)* (C / D))	sec		
					where in					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(A) Delay time of best part unacceptable	=	0	sec		
					(B) Fault threshold of delay time (step response, lean to rich)	=	0.2	sec		
					(C) Necessary number of measurements for fault-confirmation	=	4	counts		
					(D) Number of evaluated steps in lean-rich direction (sensor 1, bank 2)					
					Transition time from step response measurement in lean-rich direction (sensor 1, bank 2)	<=	A - ((A - B)* (C / D))	sec		
					where in					
					(A) Transition time of best part unacceptable	=	0	sec		
					(B) Fault threshold of transition time (step response, lean to rich)	=	0.2	sec		
					(C) Necessary number of measurements for fault-confirmation	=	4	counts		
					(D) Number of evaluated steps in lean-rich direction (sensor 1, bank 2)					
					)					
					OR					
					Number of evaluated steps in lean-rich direction (sensor 1, bank 2)	>=	4	counts		
					)					
					OR					
					(					
					Number of evaluated steps in rich-lean direction (sensor 1, bank 2)	<	4	counts		
					Number of evaluated steps in rich-lean direction (sensor 1, bank 2)	>	0	-		
					(					
					Delay time from step response measurement in rich-lean direction (sensor 1, bank 2)	<=	A - ((A - B)* (C / D))	sec		
					where in					
					(A) Delay time of best part unacceptable	=	0	sec		
					(B) Fault threshold of delay time (step response,rich to lean)	=	0.2	sec		
					(C) Necessary number of measurements for fault-confirmation	=	4	counts		
					(D) Number of evaluated steps in rich-lean direction (sensor 1, bank 2)					
					Transition time from step response measurement in rich-lean direction (sensor 1, bank 2)	<=	A - ((A - B)* (C / D))	sec		
					where in					
					(A) Transition time of best part unacceptable	=	0	sec		
					(B) Fault threshold of transition time (step response,rich to lean)	=	0.2	sec		
					(C) Necessary number of measurements for fault-confirmation	=	4	counts		
					(D) Number of evaluated steps in rich-lean direction (sensor 1, bank 2)					
					)					
					OR					
					Number of evaluated steps in rich-lean direction (sensor 1, bank 2)	>=	4	counts		
					)					
					)					
					EWMA filter strategy					
					Fast initialization mode (FIR)	**=**	**TRUE**			
					EWMA filter initial value for FIR	=	0	sec		
					EWMA filter constant	=	0.28	-		
					Maximum number of samples per	=	2	counts		
					Total number of samples for FIR	=	4	counts		
					Response to Step Change mode (RSC)	=	TRUE			
					Response to Step Change mode inactive	=	TRUE			
					absolute difference : ABS((a) - (b)	>	(c)			
					(a) measured tansition or delay time					
					(b) EWMA filtered normalized monitoring result					
					(c) Step change detection factor		0.14	sec		
					EWMA filter constant	=	0.28	-		
					Maximum number of samples per	=	2	counts		
					Total number of samples for RSC mode	=	4	counts		
					Stabilized mode					
					EWMA filter constant	=	0.28	-		
					Total number of samples for stabilized mode	=	1	counts		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					No pending or confirmed DTCs	=	see sheet inhibit table	-		
					Basic enable conditions met	=	see sheet enable tables	-		
	P2196	Plausibility check of upstream exhaust gas sensor when the lambda offset is lesser than the calibrated threshold	Lambda offset of upstream exhaust gas sensor	< -0.059998 -	Debounce condition for fault confirmation by offset adaptation (sensor 1, bank 1)	=	TRUE	-	once per driving cycle	2 Trips
					(					
					Debouncing of offset fault by slow offset adaptation	=	TRUE	-		
					(					
					Slow offset adaptation	=	TRUE	-		
					(					
					Bit p-part controlability primary control enable	=	TRUE	-		
					(					
					(					
					Lambda regulator setpoint active	=	TRUE	-		
					(					
					Width of dead zone for lambda control deviation	>=	0.999969	-		
					OR					
					(					
					Lambda closed loop control (upstream catalyst), bank 1	=	TRUE	-		
					OR					
					(					
					Lambda setpoint for sensor after addition of trim control action is not eqaul to 0	=	TRUE	-		
					Difference between upper limit action value lambda control and temporary value before test for enleanment protection	>=	0	-		
					Difference between temporary value before test for enleanment protection and lower bound of dfr during enleanmant protection	>=	0	-		
					Lambda (measured and setpoint) is below minimal measurable lambda (bank 1)	=	FALSE	-		
					TEMIN-limitation active, bench 1	=	FALSE	-		
					)					
					)					
					)					
					Current lowpass value of p-part control upstream primary control enable	>	0	%		
					Lambda closed loop control (upstream catalyst), bank 1	=	TRUE	-		
					(					
					Lambda control disabled during or after	=	FALSE	-		
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					(					
						>	8	sec		
					enabling lambda control					
					OR					
					(					
					Absolute value of control difference in lambda, bank 1	<=	0.1001	-		
					Difference of counter time and plant time constant	>	0	sec		
					a-(b+c)					
					where a is Time running down after fuel					
					b is plant time constant for continuous air/fuel control					
					c is plant parameter for dead time for lambda control					
					)					
					)					
					)					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					lambda sensor 1 temperature, bank 1	>=	654.998	deg C		
					)					
					Lambda control disabled by a fault	=	FALSE	-		
					lambda control is active since warmup is finished	=	TRUE	-		
					Relative air charge	>	0	%		
					for time	>=	2	sec		
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					HEM condition to block lambda closed loop control upstream catalyst	=	FALSE	-		
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					(					
					Lambda control enabled for Cold operation sensor 2 bank 1	=	TRUE	-		
					OR					
					HEGO sensor 2 bank 1, signal valid	=	TRUE	-		
					(					
					Status of heating enable conditions for the sensor operating readiness	=	TRUE	-		
					(					
					Protective heating is finished	=	TRUE	-		
					for time	>=	15	sec		
					OR					
					Internal resistance OK for operating readiness	=	TRUE	-		
					(					
					Unfiltered internal resistance of HEGO sensor	<=	2000	Ohm		
					Protective heating is finished	=	TRUE	-		
					Counter for valid internal resistance measurements	>=	3	counts		
					)					
					)					
					Status of sensor signal enable conditions for the sensor operating readiness	=	TRUE	-		
					(					
					Internal resistance OK for operating readiness	=	TRUE	-		
					OR					
					(					
					(					
					Output voltage of HEGO Sensor	>=	0.551758	V		
					Output voltage of HEGO Sensor	<=	1.201172	V		
					)					
					OR					
					Output voltage of HEGO Sensor	<=	0.322266	V		
					)					
					OR					
					Sensor voltage stuck in countervoltage band	=	TRUE	-		
					(					
					(					
					(					
					Output voltage of HEGO Sensor	<	0.551758	V		
					Output voltage of HEGO Sensor	>	0.322266	V		
					)					
					(					
					Sensor open circuit fault existed in previous trip	=	TRUE	-		
					OR					
					Sensor open circuit fault currently not detected	=	TRUE	-		
					)					
					Electrical diagnostics enabled	=	TRUE	-		
					)					
					for time	>=	20	sec		
					)					
					)					
					for time	>=	0.2	sec		
					)					
					)					
					)					
					Bit p-part system balanced primary control enable	=	TRUE	-		
					(					
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Lambda setpoint for sensor is set equal to 1	=	TRUE	-		
					OR					
					Lambda setpoint for sensor is set equal to 1	=	FALSE	-		
					for time	>=	10	sec		
					)					
					Rich catalyst purge	=	FALSE	-		
					Mass flow of exhaust gas, sensor 2	>	25	g		
					)					
					P-part active from temperature and dynamic diagnosis	=	TRUE	-		
					(					
					Temperature of catalyst 1	>=	349.96	deg C		
					Temperature of catalyst 1	<	899.96	deg C		
					)					
					)					
					Bit I-part global primary control enable	=	TRUE	-		
					(					
					(					
					Current lowpass value of I-part load primary control enable	>	-1.5938	%		
					Current lowpass value of I-part load primary control enable	<=	1.5938	%		
					)					
					Diagnosis of canister purge system is active	=	FALSE	-		
					Ratio total charge to charge in cylinder	<=	1	-		
					Width of dead zone for lambda control deviation	=	0	-		
					Maximum value among the engine coolant temperature and model-based substitute value for engine temperature signal in case of error	>	-48.04	deg C		
					(					
					Bit I-part global load and engine speed control enable	=	TRUE	-		
					(					
					Engine speed with low resolution	<	2600	rpm		
					Engine speed with low resolution	>=	1000	rpm		
					(					
					Half engine mode active	=	TRUE	-		
					(					
					Relative air mass during half engine mode (see Look-Up table #P2096-2)	<	99.8	%		
					Relative air mass during half engine mode (see Look-Up table #P2096-3)	>=	20.3	%		
					)					
					OR					
					Half engine mode active	=	FALSE	-		
					(					
					Relative air mass (see Look-Up Table #P2096-4)	<	30 to 90	%		
					Relative air mass (see Look-Up Table #P2096-5)	>=	15 to 20.3	%		
					)					
					)					
					)					
					)					
					)					
					(					
					Bit i-part system primary control enable	=	TRUE	-		
					(					
					Current integrator value of P-part balanced primary control enable	>	150	g		
					(					
					(					
					Dew point end of sensor 2 Bank1 is reached	=	TRUE	-		
					End of start is reached	=	TRUE	-		
					Exhaust gas mass flow sensor 2 Bank 1	>	179.91	g		
					)					
					OR					
					(					
					(					
					Dew point end of sensor 2 reached	=	FALSE	-		
					OR					
					End of start is reached	=	FALSE	-		
					)					
					Exhaust gas mass flow sensor 2	>	199.82	g		
					)					
					)					
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Bit i-part system temperature primary control enable	=	TRUE	-		
					(					
					Temperature of catalyst 1	>	349.96	deg C		
					Temperature of catalyst 1	<	869.96	deg C		
					)					
					)					
					)					
					Cumulated time in which slow offset adaptation was active	>=	100	sec		
					)					
					Debounce condition for fault confirmation by fast offset adaptation (sensor 1, bank 1)	=	TRUE	-		
					General enabling condition of fast offset adaptation					
					(					
					Enabling condition of fast offset adaptation due to catalyst conditioning	=	TRUE	-		
					(					
					(					
					Bit signal valid, HEGO sensor 2 bank 1	=	TRUE	-		
					Flag lambda setpoint for sensor equal to 1	=	TRUE	-		
					Rich catalyst purge	=	FALSE	-		
					Bank-independent disabling conditions of fast offset adaptation	=	FALSE	-		
					(					
					Fuel cut-off	=	TRUE	-		
					Mass flow exhaust gas catalyst 1	>	300	g		
					)					
					OR					
					(					
					Fuel cut-off	=	FALSE	-		
					Mass flow exhaust gas catalyst 1	>	180	g		
					)					
					)					
					(					
					(					
					Parallelization done at least once from LSU plausibility diagnosis point of view (sensor 1, bank 1)	=	TRUE	-		
					(					
					(					
					Target sensor voltage for rich during active parallelisation reached once, sensor 1, bank 2	=	TRUE	-		
					Oil gas mass flow by active lambda shifting minus the maximal possible influence of LSU offset part, segment 1, bank 1	>=	1.6	g		
					for time	>=	1	sec		
					)					
					OR					
					(					
					Lean target sensor voltage during active parallelisation reached once, sensor 1, bank 2	=	TRUE	-		
					Oxygen mass flow in catalyst 1, deduct from maximum present LSU Offset in a fault free system	>=	1.3	g		
					for time	>=	1	sec		
					)					
					)					
					OR					
					Dynamic diagnosis error of upstream exhaust gas sensor is not set	=	TRUE	-		
					)					
					OR					
					(					
					(					
					lambda control is set when lambda controller reaches lower limit FRMIN	=	TRUE	-		
					Lambda actual value sensor 1 bank 1	<	1	-		
					Output voltage of HEGO sensor 2 bank 1	<	0.4	-		
					)					
					OR					
					(					
					lambda control is set when lambda controller reaches lower limit FRMAX	=	TRUE	-		
					Lambda actual value sensor 1 bank 1	>	1			
					Output voltage of HEGO sensor 2 bank 1	>	0.6			
					)					
					for time	>=	2	sec		
					Condition for Lambda closed loop control upstream catalyst; bank 1	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					)					
					for time	>=	1	sec		
					)					
					(					
					(					
					Temperature of catalyst 1	>	499.96	deg C		
					Temperature of catalyst 1	<	899.96	deg C		
					)					
					for time	=	0	sec		
					)					
					(					
					(					
					Mass flow exhaust gas catalyst 1	>	3.888888889	g/sec		
					Mass flow exhaust gas catalyst 1	<	69.44444444	g/sec		
					)					
					OR					
					(					
					(					
					Mass flow exhaust gas catalyst 1	>	2.083333333	g/sec		
					Mass flow exhaust gas catalyst 1	<=	3.888888889	g/sec		
					)					
					for time	>=	4	sec		
					)					
					)					
					Condition for upstream cat LSU ready for operation f(lamsons_w)	=	TRUE	-		
					(					
					Sensor type sensor 1 bank 1	>	0	-		
					Lambda signal quality sensor 1 bank 1	<=	12	-		
					)					
					Hydrogen-correction-voltage, HEGO sensor 2 bank 1 with high resolution	<=	0.08057	V		
					(					
					CAT damage during past interval	=	FALSE	-		
					(					
					Ratio total charge to charge in cylinder	<=	1.02002	-		
					Width of dead zone for lambda control deviation	=	0	-		
					)					
					)					
					Mass flow of exhaust gas catalyst 1	>=	200	g		
					Difference betweeen Lambda offset (sensor 1, bank 1) and Lambda offset (delayed by one calculation raster)	<=	0.0079956	-		
					(					
					Counter for no step in offset or increasing offset in a row	>=	2	counts		
					OR					
					Counter for exhaust masses to debounce fault with fast offset adaptation	>=	4	counts		
					)					
					)					
					)					
					)					
					)					
					No pending or confirmed DTCs	=	see sheet inhibit table	-		
					Basic enable conditions met	=	see sheet enable tables	-		
	P2195	Plausibility check of upstream exhaust gas sensor when the lambda offset is greater than the calibrated threshold	Lambda offset of upstream exhaust gas sensor	> 0.059998 -	Debounce condition for fault confirmation by offset adaptation (sensor 1, bank 1)	=	TRUE	-	once per driving cycle	2 Trips
					(					
					Debouncing of offset fault by slow offset adaptation	=	TRUE	-		
					(					
					Slow offset adaptation	=	TRUE	-		
					(					
					Bit p-part controlability primary control enable	=	TRUE	-		
					(					
					(					
					Lambda regulator setpoint active	=	TRUE	-		
					(					
					Width of dead zone for lambda control deviation	>=	0.999969	-		
					OR					
					(					
					Lambda closed loop control (upstream catalyst), bank 1	=	TRUE	-		
					OR					
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Lambda setpoint for sensor after addition of trim control action is not eqaul to 0	=	TRUE	-		
					Difference between upper limit action value lambda control and temporary value before test for enleanment protection	>=	0	-		
					Difference between temporary value before test for enleanment protection and lower bound of dfr during enleanmant protection	>=	0	-		
					Lambda (measured and setpoint) is below minimal measurable lambda (bank 1)	=	FALSE	-		
					TEMIN-limitation active, bench 1	=	FALSE	-		
					)					
					)					
					)					
					Current lowpass value of p-part control upstream primary control enable	>	0	%		
					Lambda closed loop control (upstream catalyst), bank 1	=	TRUE	-		
					(					
					Lambda control disabled during or after	=	FALSE	-		
					Lambda swtiched ON after fuel cutoff	=	TRUE	-		
					(					
					Fuel cut off is active	=	FALSE	-		
					(					
						>	8	sec		
					enabling lambda control					
					OR					
					(					
					Absolute value of control difference in lambda, bank 1	<=	0.1001	-		
					Difference of counter time and plant time constant	>	0	sec		
					a-(b+c)					
					where a is Time running down after fuel					
					b is plant time constant for continuous air/fuel control					
					c is plant parameter for dead time for lambda control					
					)					
					)					
					)					
					LSU sensor upstream to catalyst ready for operation	=	TRUE	-		
					(					
					lambda sensor 1 temperature, bank 1	>=	654.998	deg C		
					)					
					Lambda control disabled by a fault	=	FALSE	-		
					lambda control is active since warmup is finished	=	TRUE	-		
					Relative air charge	>	0	%		
					for time	>=	2	sec		
					)					
					HEM condition to block lambda closed loop control upstream catalyst	=	FALSE	-		
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					(					
					Lambda control enabled for Cold operation sensor 2 bank 1	=	TRUE	-		
					OR					
					HEGO sensor 2 bank 1, signal valid	=	TRUE	-		
					(					
					Status of heating enable conditions for the sensor operating readiness	=	TRUE	-		
					(					
					Protective heating is finished	=	TRUE	-		
					for time	>=	15	sec		
					OR					
					Internal resistance OK for operating readiness	=	TRUE	-		
					(					
					Unfiltered internal resistance of HEGO sensor	<=	2000	Ohm		
					Protective heating is finished	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Counter for valid internal resistance measurements	>=	3	counts		
					)					
					)					
					Status of sensor signal enable conditions for the sensor operating readiness	=	TRUE	-		
					(					
					Internal resistance OK for operating readiness	=	TRUE	-		
					OR					
					(					
					(					
					Output voltage of HEGO Sensor	>=	0.551758	V		
					Output voltage of HEGO Sensor	<=	1.201172	V		
					)					
					OR					
					Output voltage of HEGO Sensor	<=	0.322266	V		
					)					
					OR					
					Sensor voltage stuck in countervoltage band	=	TRUE	-		
					(					
					(					
					(					
					Output voltage of HEGO Sensor	<	0.551758	V		
					Output voltage of HEGO Sensor	>	0.322266	V		
					)					
					(					
					Sensor open circuit fault existed in previous trip	=	TRUE	-		
					OR					
					Sensor open circuit fault currently not detected	=	TRUE	-		
					)					
					Electrical diagnostics enabled	=	TRUE	-		
					)					
					for time	>=	20	sec		
					)					
					)					
					for time	>=	0.2	sec		
					)					
					)					
					)					
					Bit p-part system balanced primary control enable	=	TRUE	-		
					(					
					(					
					Lambda setpoint for sensor is set equal to 1	=	TRUE	-		
					OR					
					Lambda setpoint for sensor is set equal to 1	=	FALSE	-		
					for time	>=	10	sec		
					)					
					Rich catalyst purge	=	FALSE	-		
					Mass flow of exhaust gas, sensor 2	>	25	g		
					)					
					P-part active from temperature and dynamic diagnosis	=	TRUE	-		
					(					
					Temperature of catalyst 1	>=	349.96	deg C		
					Temperature of catalyst 1	<	899.96	deg C		
					)					
					)					
					Bit I-part global primary control enable	=	TRUE	-		
					(					
					(					
					Current lowpass value of I-part load primary control enable	>	-1.5938	%		
					Current lowpass value of I-part load primary control enable	<=	1.5938	%		
					)					
					Diagnosis of canister purge system is active	=	FALSE	-		
					Ratio total charge to charge in cylinder	<=	1	-		
					Width of dead zone for lambda control deviation	=	0	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Maximum value among the engine coolant temperature and model-based substitute value for engine temperature signal in case of error	>	-48.04	deg C		
					(					
					Bit I-part global load and engine speed control enable	=	TRUE	-		
					(					
					Engine speed with low resolution	<	2600	rpm		
					Engine speed with low resolution	>=	1000	rpm		
					(					
					Half engine mode active	=	TRUE	-		
					(					
					Relative air mass during half engine mode (see Look-Up table #P2096-2)	<	99.8	%		
					Relative air mass during half engine mode (see Look-Up table #P2096-3)	>=	20.3	%		
					)					
					OR					
					Half engine mode active	=	FALSE	-		
					(					
					Relative air mass (see Look-Up Table #P2096-4)	<	30 to 90	%		
					Relative air mass (see Look-Up Table #P2096-5)	>=	15 to 20.3	%		
					)					
					)					
					)					
					)					
					)					
					(					
					Bit i-part system primary control enable	=	TRUE	-		
					(					
					Current integrator value of P-part balanced primary control enable	>	150	g		
					(					
					(					
					Dew point end of sensor 2 Bank1 is reached	=	TRUE	-		
					End of start is reached	=	TRUE	-		
					Exhaust gas mass flow sensor 2 Bank 1	>	179.91	g		
					)					
					OR					
					(					
					(					
					Dew point end of sensor 2 reached	=	FALSE	-		
					OR					
					End of start is reached	=	FALSE	-		
					)					
					Exhaust gas mass flow sensor 2	>	199.82	g		
					)					
					)					
					)					
					Bit i-part system temperature primary control enable	=	TRUE	-		
					(					
					Temperature of catalyst 1	>	349.96	deg C		
					Temperature of catalyst 1	<	869.96	deg C		
					)					
					)					
					)					
					Cumulated time in which slow offset adaptation was active	>=	100	sec		
					)					
					Debounce condition for fault confirmation by fast offset adaptation (sensor 1, bank 1)	=	TRUE	-		
					General enabling condition of fast offset adaptation					
					(					
					Enabling condition of fast offset adaptation due to catalyst conditioning	=	TRUE	-		
					(					
					(					
					Bit signal valid, HEGO sensor 2 bank 1	=	TRUE	-		
					Flag lambda setpoint for sensor equal to 1	=	TRUE	-		
					Rich catalyst purge	=	FALSE	-		
					Bank-independent disabling conditions of fast offset adaptation	=	FALSE	-		
					(					
					Fuel cut-off	=	TRUE	-		
					Mass flow exhaust gas catalyst 1	>	300	g		
					)					
					OR					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					Fuel cut-off	=	FALSE	-		
					Mass flow exhaust gas catalyst 1	>	180	g		
					)					
					)					
					(					
					(					
					Parallelization done at least once from LSU plausibility diagnosis point of view (sensor 1, bank 1)	=	TRUE	-		
					(					
					(					
					Target sensor voltage for rich during active parallelisation reached once, sensor 1, bank 2	=	TRUE	-		
					Oil gas mass flow by active lambda shifting minus the maximal possible influence of LSU offset part, segment 1, bank 1	>=	1.6	g		
					for time	>=	1	sec		
					)					
					OR					
					(					
					Lean target sensor voltage during active parallelisation reached once, sensor 1, bank 2	=	TRUE	-		
					Oxygen mass flow in catalyst 1, deduct from maximum present LSU Offset in a fault free system	>=	1.3	g		
					for time	>=	1	sec		
					)					
					)					
					OR					
					Dynamic diagnosis error of upstream exhaust gas sensor is not set	=	TRUE	-		
					)					
					OR					
					(					
					(					
					lambda control is set when lambda controller reaches lower limit FRMIN	=	TRUE	-		
					Lambda actual value sensor 1 bank 1	<	1	-		
					Output voltage of HEGO sensor 2 bank 1	<	0.4	-		
					)					
					OR					
					(					
					lambda control is set when lambda controller reaches lower limit FRMAX	=	TRUE	-		
					Lambda actual value sensor 1 bank 1	>	1			
					Output voltage of HEGO sensor 2 bank 1	>	0.6			
					)					
					for time	>=	2	sec		
					Condition for Lambda closed loop control upstream catalyst; bank 1	=	TRUE	-		
					)					
					for time	>=	1	sec		
					)					
					(					
					(					
					Temperature of catalyst 1	>	499.96	deg C		
					Temperature of catalyst 1	<	899.96	deg C		
					)					
					for time	=	0	sec		
					)					
					(					
					(					
					Mass flow exhaust gas catalyst 1	>	3.888888889	g/sec		
					Mass flow exhaust gas catalyst 1	<	69.44444444	g/sec		
					)					
					OR					
					(					
					(					
					Mass flow exhaust gas catalyst 1	>	2.083333333	g/sec		
					Mass flow exhaust gas catalyst 1	<=	3.888888889	g/sec		
					)					
					for time	>=	4	sec		
					)					
					)					
					Condition for upstream cat LSU ready for operation f(lamsons_w)	=	TRUE	-		
					(					
					Sensor type sensor 1 bank 1	>	0	-		
					Lambda signal quality sensor 1 bank 1	<=	12	-		
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Hydrogen-correction-voltage, HEGO sensor 2 bank 1 with high resolution	<= 0.08057 V		
					(			
					CAT damage during past interval	= FALSE -		
					(			
					Ratio total charge to charge in cylinder	<= 1.02002 -		
					Width of dead zone for lambda control deviation	= 0 -		
					)			
					)			
					Mass flow of exhaust gas catalyst 1	>= 200 g		
					Difference betweeen Lambda offset (sensor 1, bank 1) and Lambda offset (delayed by one calculation raster)	<= 0.0079956 -		
					(			
					Counter for no step in offset or increasing offset in a row	>= 2 counts		
					OR			
					Counter for exhaust masses to debounce fault with fast offset adaptation	>= 4 counts		
					)			
					)			
					)			
					)			
					)			
					No pending or confirmed DTCs	= see sheet inhibit table -		
					Basic enable conditions met	= see sheet enable tables -		
	P2198	Plausibility check of upstream exhaust gas sensor when the lambda offset is lesser than the calibrated threshold	Lambda offset of upstream exhaust gas sensor, bank 2	< -0.059998 -	Debounce condition for fault confirmation by offset adaptation (sensor 1, bank 2)	= TRUE -	once per driving cycle	2 Trips
					(			
					Debouncing of offset fault by slow offset adaptation, bank 2	= TRUE -		
					(			
					Slow offset adaptation, bank 2	= TRUE -		
					(			
					Bit p-part controlability primary control enable 2	= TRUE -		
					(			
					(			
					Lambda regulator setpoint active, bank 2	= TRUE -		
					(			
					Width of dead zone for lambda control deviation	>= 0.999969 -		
					OR			
					(			
					Lambda closed loop control (upstream catalyst), bank 2	= TRUE -		
					OR			
					(			
					Lambda setpoint for sensor after addition of trim control action, bank 2 is not eqaul to 0	= TRUE -		
					Difference between upper limit action value lambda control and temporary value before test for enleanment protection, bank 2	>= 0 -		
					Difference between temporary value before test for enleanment protection, bank 2 and lower bound of dfr during enleanmant protection	>= 0 -		
					Lambda (measured and setpoint) is below minimal measurable lambda (bank 2)	= FALSE -		
					TEMIN-limitation active, bench 2	= FALSE -		
					)			
					)			
					)			
					Current lowpass value of p-part control upstream primary control enable 2	> 0 %		
					Lambda closed loop control (upstream catalyst), bank 2	= TRUE -		
					(			
					Lambda control disabled during or after	= FALSE -		
					Lambda swtiched ON after fuel cutoff, bank 2	= TRUE -		
					(			
					Fuel cut off is active, bank 2	= FALSE -		
					(			
					enabling lambda control	> 8 sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					OR					
					(					
					Absolute value of control difference in lambda, bank 2	<=	0.1001	-		
					Difference of counter time and plant time constant	>	0	sec		
					a-(b+c)					
					where a is Time running down after fuel					
					b is plant time constant for continuous air/fuel control, bank 2					
					c is plant parameter for dead time for lambda control, bank 2					
					)					
					)					
					)					
					LSU sensor upstream to catalyst ready for operation, bank 2	=	TRUE	-		
					(					
					lambda sensor 1 temperature, bank 2	>=	654.998	deg C		
					)					
					Lambda control disabled by a fault, bank 2	=	FALSE	-		
					lambda control is active since warmup is finished	=	TRUE	-		
					Relative air charge	>	0	%		
					for time	>=	2	sec		
					)					
					HEM condition to block lambda closed loop control upstream catalyst, bank 2	=	FALSE	-		
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					(					
					Lambda control enabled for Cold operation sensor 2 bank 2	=	TRUE	-		
					OR					
					HEGO sensor 2 bank 2, signal valid	=	TRUE	-		
					(					
					Status of heating enable conditions for the sensor operating readiness	=	TRUE	-		
					(					
					Protective heating is finished, bank 2	=	TRUE	-		
					for time	>=	15	sec		
					OR					
					Internal resistance OK for operating readiness, bank 2	=	TRUE	-		
					(					
					Unfiltered internal resistance of HEGO sensor, bank 2	<=	2000	Ohm		
					Protective heating is finished, bank 2	=	TRUE	-		
					Counter for valid internal resistance measurements, bank 2	>=	3	counts		
					)					
					)					
					Status of sensor signal enable conditions for the sensor operating readiness, bank 2	=	TRUE	-		
					(					
					Internal resistance OK for operating readiness	=	TRUE	-		
					OR					
					(					
					(					
					Output voltage of HEGO Sensor, bank 2	>=	0.551758	V		
					Output voltae of HEGO Sensor, bank 2	<=	1.201172	V		
					)					
					OR					
					Output voltae of HEGO Sensor, bank 2	<=	0.322266	V		
					)					
					OR					
					Sensor voltage stuck in countervoltage band	=	TRUE	-		
					(					
					(					
					(					
					Output voltage of HEGO Sensor, bank 2	<	0.551758	V		
					Output voltage of HEGO Sensor, bank 2	>	0.322266	V		
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					Sensor open circuit fault existed in previous trip	=	TRUE	-		
					OR					
					Sensor open circuit fault currently not detected	=	TRUE	-		
					)					
					Electrical diagnostics enabled, bank 2	=	TRUE	-		
					)					
					for time	>=	20	sec		
					)					
					)					
					for time	>=	0.2	sec		
					)					
					)					
					)					
					Bit p-part system balanced primary control enable 2	=	TRUE	-		
					(					
					(					
					Lambda setpoint for sensor is set equal to 1, bank 2	=	TRUE	-		
					OR					
					Lambda setpoint for sensor is set equal to 1, bank 2	=	FALSE	-		
					for time	>=	10	sec		
					)					
					Rich catalyst purge, bank 2	=	FALSE	-		
					Mass flow of exhaust gas, sensor 1, bank 2	>	25	g		
					)					
					P-part active from temperature and dynamic diagnosis, bank 2	=	TRUE	-		
					(					
					Temperature of catalyst 1, bank 2	>=	349.96	deg C		
					Temperature of catalyst 1, bank 2	<	899.96	deg C		
					)					
					)					
					Bit I-part global primary control enable	=	TRUE	-		
					(					
					(					
					Current lowpass value of I-part load primary control enable	>	-1.5938	%		
					Current lowpass value of I-part load primary control enable	<=	1.5938	%		
					)					
					Diagnosis of canister purge system is active	=	FALSE	-		
					Ratio total charge to charge in cylinder	<=	1	-		
					Width of dead zone for lambda control deviation	=	0	-		
					Maximum value among the engine coolant temperature and model-based substitute value for engine temperature signal in case of error	>	-48.04	deg C		
					(					
					Bit I-part global load and engine speed control enable	=	TRUE	-		
					(					
					Engine speed with low resolution	<	2600	rpm		
					Engine speed with low resolution	>=	1000	rpm		
					(					
					Half engine mode active	=	TRUE	-		
					(					
					Relative air mass during half engine mode (see Look-Up table #P2096-2)	<	99.8	%		
					Relative air mass during half engine mode (see Look-Up table #P2096-3)	>=	20.3	%		
					)					
					OR					
					Half engine mode active	=	FALSE	-		
					(					
					Relative air mass (see Look-Up Table #P2096-4)	<	30 to 90	%		
					Relative air mass (see Look-Up Table #P2096-5)	>=	15 to 20.3	%		
					)					
					)					
					)					
					)					
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					Bit i-part system primary control enable, bank 2	=	TRUE	-		
					(					
					Current integrator value of P-part balanced primary control enable, bank 2	>	150	g		
					(					
					(					
					Dew point end of sensor 1 Bank 2 is reached	=	TRUE	-		
					End of start is reached	=	TRUE	-		
					Exhaust gas mass flow sensor 1 Bank 2	>	179.91	g		
					)					
					OR					
					(					
					(					
					Dew point end of sensor 2 reached, bank 2	=	FALSE	-		
					OR					
					End of start is reached	=	FALSE	-		
					)					
					Exhaust gas mass flow sensor 1 Bank 2	>	199.82	g		
					)					
					)					
					)					
					Bit i-part system temperature primary control enable, bank 2	=	TRUE	-		
					(					
					Temperature of catalyst 1, bank 2	>	349.96	deg C		
					Temperature of catalyst 1, bank 2	<	869.96	deg C		
					)					
					)					
					)					
					Cumulated time in which slow offset adaptation was active, bank 2	>=	100	sec		
					)					
					Debounce condition for fault confirmation by fast offset adaptation (sensor 1, bank 2)	=	TRUE	-		
					General enabling condition of fast offset adaptation, bank 2					
					(					
					Enabling condition of fast offset adaptation due to catalyst conditioning, bank 2	=	TRUE	-		
					(					
					(					
					Bit signal valid, HEGO sensor 2 bank 2	=	TRUE	-		
					Flag lambda setpoint for sensor equal to 1, bank 2	=	TRUE	-		
					Rich catalyst purge, bank 2	=	FALSE	-		
					Bank-independent disabling conditions of fast offset adaptation	=	FALSE	-		
					(					
					Fuel cut-off, bank	=	TRUE	-		
					Mass flow exhaust gas catalyst 1, bank 2	>	300	g		
					)					
					OR					
					(					
					Fuel cut-off	=	FALSE	-		
					Mass flow exhaust gas catalyst 1, bank 2	>	180	g		
					)					
					)					
					(					
					(					
					Parallelization done at least once from LSU plausibility diagnosis point of view (sensor 1, bank 2)	=	TRUE	-		
					(					
					(					
					Target sensor voltage for rich during active parallelisation reached once, sensor 1, bank 2	=	TRUE	-		
					Oil gas mass flow by active lambda shifting minus the maximal possible influence of LSU offset part, segment 1, bank 2	>=	1.6	g		
					for time	>=	1	sec		
					)					
					OR					
					(					
					Lean target sensor voltage during active parallelisation reached once, sensor 1, bank 2	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Oxygen mass flow in catalyst 1, deduct from maximum present LSU Offset in a fault free system, bank 2	>=	1.3	g		
					for time	>=	1	sec		
					)					
					)					
					OR					
					Dynamic diagnosis error of upstream exhaust gas sensor is not set	=	TRUE	-		
					)					
					OR					
					(					
					(					
					lambda control is set when lambda controller reaches lower limit FRMIN, bank 2	=	TRUE	-		
					Lambda actual value sensor 1 bank 2	<	1	-		
					Output voltage of HEGO sensor 2 bank 2	<	0.4	-		
					)					
					OR					
					(					
					lambda control is set when lambda controller reaches lower limit FRMAX, bank 2	=	TRUE	-		
					Lambda actual value sensor 1 bank 2	>	1			
					Output voltage of HEGO sensor 2 bank 2	>	0.6			
					)					
					for time	>=	2	sec		
					Condition for Lambda closed loop control upstream catalyst; bank 2	=	TRUE	-		
					)					
					for time	>=	1	sec		
					)					
					(					
					(					
					Temperature of catalyst 1, bank 2	>	499.96	deg C		
					Temperature of catalyst 1, bank 2	<	899.96	deg C		
					)					
					for time	=	0	sec		
					)					
					(					
					(					
					Mass flow exhaust gas catalyst 1, bank 2	>	3.888888889	g/sec		
					Mass flow exhaust gas catalyst 1, bank 2	<	69.44444444	g/sec		
					)					
					OR					
					(					
					(					
					Mass flow exhaust gas catalyst 1, bank 2	>	2.083333333	g/sec		
					Mass flow exhaust gas catalyst 1, bank 2	<=	3.888888889	g/sec		
					)					
					for time	>=	4	sec		
					)					
					)					
					Condition for upstream cat LSU ready for operation f(lamsons_w), bank 2	=	TRUE	-		
					(					
					Sensor type sensor 1 bank 2	>	0	-		
					Lambda signal quality sensor 1 bank 2	<=	12	-		
					)					
					Hydrogen-correction-voltage, HEGO sensor 2 bank 2 with high resolution	<=	0.08057	V		
					(					
					CAT damage during past interval	=	FALSE	-		
					(					
					Ratio total charge to charge in cylinder	<=	1.02002	-		
					Width of dead zone for lambda control deviation	=	0	-		
					)					
					)					
					Mass flow of exhaust gas catalyst 1, bank 2	>=	200	g		
					Difference betweeen Lambda offset (sensor 1, bank 2) and Lambda offset (delayed by one calculation raster)	<=	0.0079956	-		
					(					
					Counter for no step in offset or increasing offset in a row, bank 2	>=	2	counts		
					OR					
					Counter for exhaust masses to debounce fault with fast offset adaptation, bank 2	>=	4	counts		
					)					
					)					
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							)					
							)					
							No pending or confirmed DTCs	=	see sheet inhibit table	-		
							Basic enable conditions met	=	see sheet enable tables	-		
	P2197	Plausibility check of upstream exhaust gas sensor when the lambda offset is greater than the calibrated threshold	Lambda offset of upstream exhaust gas sensor, bank 2	>	0.059998	-	Debounce condition for fault confirmation by offset adaptation (sensor 1, bank 2)	=	TRUE	-	once per driving cycle	2 Trips
							(					
							Debouncing of offset fault by slow offset adaptation, bank 2	=	TRUE	-		
							(					
							Slow offset adaptation, bank 2	=	TRUE	-		
							(					
							Bit p-part controlability primary control enable 2	=	TRUE	-		
							(					
							(					
							Lambda regulator setpoint active, bank 2	=	TRUE	-		
							(					
							Width of dead zone for lambda control deviation	>=	0.999969	-		
							OR					
							(					
							Lambda closed loop control (upstream catalyst), bank 2	=	TRUE	-		
							OR					
							(					
							Lambda setpoint for sensor after addition of trim control action, bank 2 is not eqaul to 0	=	TRUE	-		
							Difference between upper limit action value lambda control and temporary value before test for enleanment protection, bank 2	>=	0	-		
							Difference between temporary value before test for enleanment protection, bank 2 and lower bound of dfr during enleanmant protection	>=	0	-		
							Lambda (measured and setpoint) is below minimal measurable lambda (bank 2)	=	FALSE	-		
							TEMIN-limitation active, bench 2	=	FALSE	-		
							)					
							)					
							)					
							Current lowpass value of p-part control upstream primary control enable 2	>	0	%		
							Lambda closed loop control (upstream catalyst), bank 2	=	TRUE	-		
							(					
							Lambda control disabled during or after	=	FALSE	-		
							Lambda swtiched ON after fuel cutoff, bank 2	=	TRUE	-		
							(					
							Fuel cut off is active, bank 2	=	FALSE	-		
							(					
								>	8	sec		
							enabling lambda control					
							OR					
							(					
							Absolute value of control difference in lambda, bank 2	<=	0.1001	-		
							Difference of counter time and plant time constant	>	0	sec		
							a-(b+c)					
							where a is Time running down after fuel					
							b is plant time constant for continuous air/fuel control, bank 2					
							c is plant parameter for dead time for lambda control, bank 2					
							)					
							)					
							)					
							LSU sensor upstream to catalyst ready for operation, bank 2	=	TRUE	-		
							(					
							lambda sensor 1 temperature, bank 2	>=	654.998	deg C		
							)					
							Lambda control disabled by a fault, bank 2	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					lambda control is active since warmup is finished	=	TRUE	-		
					Relative air charge	>	0	%		
					for time	>=	2	sec		
					)					
					HEM condition to block lambda closed loop control upstream catalyst, bank 2	=	FALSE	-		
					Lamda control active due to GDI mode change	=	TRUE	-		
					(					
					GDI mode homogeneous	=	TRUE	-		
					for time	>=	0.8	sec		
					)					
					)					
					(					
					Lambda control enabled for Cold operation sensor 2 bank 2	=	TRUE	-		
					OR					
					HEGO sensor 2 bank 2, signal valid	=	TRUE	-		
					(					
					Status of heating enable conditions for the sensor operating readiness	=	TRUE	-		
					(					
					Protective heating is finished, bank 2	=	TRUE	-		
					for time	>=	15	sec		
					OR					
					Internal resistance OK for operating readiness, bank 2	=	TRUE	-		
					(					
					Unfiltered internal resistance of HEGO sensor, bank 2	<=	2000	Ohm		
					Protective heating is finished, bank 2	=	TRUE	-		
					Counter for valid internal resistance measurements, bank 2	>=	3	counts		
					)					
					)					
					Status of sensor signal enable conditions for the sensor operating readiness, bank 2	=	TRUE	-		
					(					
					Internal resistance OK for operating readiness	=	TRUE	-		
					OR					
					(					
					(					
					Output voltage of HEGO Sensor, bank 2	>=	0.551758	V		
					Output voltae of HEGO Sensor, bank 2	<=	1.201172	V		
					)					
					OR					
					Output voltae of HEGO Sensor, bank 2	<=	0.322266	V		
					)					
					OR					
					Sensor voltage stuck in countervoltage band	=	TRUE	-		
					(					
					(					
					(					
					Output voltage of HEGO Sensor, bank 2	<	0.551758	V		
					Output voltage of HEGO Sensor, bank 2	>	0.322266	V		
					)					
					(					
					Sensor open circuit fault existed in previous trip	=	TRUE	-		
					OR					
					Sensor open circuit fault currently not detected	=	TRUE	-		
					)					
					Electrical diagnostics enabled, bank 2	=	TRUE	-		
					)					
					for time	>=	20	sec		
					)					
					)					
					for time	>=	0.2	sec		
					)					
					)					
					)					
					Bit p-part system balanced primary control enable 2	=	TRUE	-		
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					Lambda setpoint for sensor is set equal to 1, bank 2	=	TRUE	-		
					OR					
					Lambda setpoint for sensor is set equal to 1, bank 2	=	FALSE	-		
					for time	>=	10	sec		
					)					
					Rich catalyst purge, bank 2	=	FALSE	-		
					Mass flow of exhaust gas, sensor 1, bank 2	>	25	g		
					)					
					P-part active from temperature and dynamic diagnosis, bank 2	=	TRUE	-		
					(					
					Temperature of catalyst 1, bank 2	>=	349.96	deg C		
					Temperature of catalyst 1, bank 2	<	899.96	deg C		
					)					
					)					
					Bit I-part global primary control enable	=	TRUE	-		
					(					
					(					
					Current lowpass value of I-part load primary control enable	>	-1.5938	%		
					Current lowpass value of I-part load primary control enable	<=	1.5938	%		
					)					
					Diagnosis of canister purge system is active	=	FALSE	-		
					Ratio total charge to charge in cylinder	<=	1	-		
					Width of dead zone for lambda control deviation	=	0	-		
					Maximum value among the engine coolant temperature and model-based substitute value for engine temperature signal in case of error	>	-48.04	deg C		
					(					
					Bit I-part global load and engine speed control enable	=	TRUE	-		
					(					
					Engine speed with low resolution	<	2600	rpm		
					Engine speed with low resolution	>=	1000	rpm		
					(					
					Half engine mode active	=	TRUE	-		
					(					
					Relative air mass during half engine mode (see Look-Up table #P2096-2)	<	99.8	%		
					Relative air mass during half engine mode (see Look-Up table #P2096-3)	>=	20.3	%		
					)					
					OR					
					Half engine mode active	=	FALSE	-		
					(					
					Relative air mass (see Look-Up Table #P2096-4)	<	30 to 90	%		
					Relative air mass (see Look-Up Table #P2096-5)	>=	15 to 20.3	%		
					)					
					)					
					)					
					)					
					)					
					(					
					Bit i-part system primary control enable, bank 2	=	TRUE	-		
					(					
					Current integrator value of P-part balanced primary control enable, bank 2	>	150	g		
					(					
					(					
					Dew point end of sensor 1 Bank 2 is reached	=	TRUE	-		
					End of start is reached	=	TRUE	-		
					Exhaust gas mass flow sensor 1 Bank 2	>	179.91	g		
					)					
					OR					
					(					
					(					
					Dew point end of sensor 2 reached, bank 2	=	FALSE	-		
					OR					
					End of start is reached	=	FALSE	-		
					)					
					Exhaust gas mass flow sensor 1 Bank 2	>	199.82	g		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					)			
					)			
					)			
					Bit i-part system temperature primary control enable, bank 2	= TRUE -		
					(			
					Temperature of catalyst 1, bank 2	> 349.96 deg C		
					Temperature of catalyst 1, bank 2	< 869.96 deg C		
					)			
					)			
					)			
					Cumulated time in which slow offset adaptation was active, bank 2	>= 100 sec		
					)			
					Debounce condition for fault confirmation by fast offset adaptation (sensor 1, bank 2)	= TRUE -		
					General enabling condition of fast offset adaptation, bank 2			
					(			
					Enabling condition of fast offset adaptation due to catalyst conditioning, bank 2	= TRUE -		
					(			
					(			
					Bit signal valid, HEGO sensor 2 bank 2	= TRUE -		
					Flag lambda setpoint for sensor equal to 1, bank 2	= TRUE -		
					Rich catalyst purge, bank 2	= FALSE -		
					Bank-independent disabling conditions of fast offset adaptation	= FALSE -		
					(			
					Fuel cut-off, bank	= TRUE -		
					Mass flow exhaust gas catalyst 1, bank 2	> 300 g		
					)			
					OR			
					(			
					Fuel cut-off	= FALSE -		
					Mass flow exhaust gas catalyst 1, bank 2	> 180 g		
					)			
					)			
					(			
					(			
					Parallelization done at least once from LSU plausibility diagnosis point of view (sensor 1, bank 2)	= TRUE -		
					(			
					(			
					Target sensor voltage for rich during active parallelisation reached once, sensor 1, bank 2	= TRUE -		
					Oil gas mass flow by active lambda shifting minus the maximal possible influence of LSU offset part, segment 1, bank 2	>= 1.6 g		
					for time	>= 1 sec		
					)			
					OR			
					(			
					Lean target sensor voltage during active parallelisation reached once, sensor 1, bank 2	= TRUE -		
					Oxygen mass flow in catalyst 1, deduct from maximum present LSU Offset in a fault free system, bank 2	>= 1.3 g		
					for time	>= 1 sec		
					)			
					)			
					OR			
					Dynamic diagnosis error of upstream exhaust gas sensor is not set	= TRUE -		
					)			
					OR			
					(			
					(			
					lambda control is set when lambda controller reaches lower limit FRMIN, bank 2	= TRUE -		
					Lambda actual value sensor 1 bank 2	< 1 -		
					Output voltage of HEGO sensor 2 bank 2	< 0.4 -		
					)			
					OR			
					(			
					lambda control is set when lambda controller reaches lower limit FRMAX, bank 2	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Lambda actual value sensor 1 bank 2	> 1		
					Output voltage of HEGO sensor 2 bank 2	> 0.6		
					)			
					for time	>= 2 sec		
					Condition for Lambda closed loop control upstream catalyst; bank 2	= TRUE -		
					)			
					for time	>= 1 sec		
					)			
					(			
					(			
					Temperature of catalyst 1, bank 2	> 499.96 deg C		
					Temperature of catalyst 1, bank 2	< 899.96 deg C		
					)			
					for time	= 0 sec		
					)			
					(			
					(			
					Mass flow exhaust gas catalyst 1, bank 2	> 3.888888889 g/sec		
					Mass flow exhaust gas catalyst 1, bank 2	< 69.44444444 g/sec		
					)			
					OR			
					(			
					(			
					Mass flow exhaust gas catalyst 1, bank 2	> 2.083333333 g/sec		
					Mass flow exhaust gas catalyst 1, bank 2	<= 3.888888889 g/sec		
					)			
					for time	>= 4 sec		
					)			
					)			
					Condition for upstream cat LSU ready for operation f(lamsons_w), bank 2	= TRUE -		
					(			
					Sensor type sensor 1 bank 2	> 0 -		
					Lambda signal quality sensor 1 bank 2	<= 12 -		
					)			
					Hydrogen-correction-voltage, HEGO sensor 2 bank 2 with high resolution	<= 0.08057 V		
					(			
					CAT damage during past interval	= FALSE -		
					(			
					Ratio total charge to charge in cylinder	<= 1.02002 -		
					Width of dead zone for lambda control deviation	= 0 -		
					)			
					)			
					Mass flow of exhaust gas catalyst 1, bank 2	>= 200 g		
					Difference betweeen Lambda offset (sensor 1, bank 2) and Lambda offset (delayed by one calculation raster)	<= 0.0079956 -		
					(			
					Counter for no step in offset or increasing offset in a row, bank 2	>= 2 counts		
					OR			
					Counter for exhaust masses to debounce fault with fast offset adaptation, bank 2	>= 4 counts		
					)			
					)			
					)			
					)			
					)			
					No pending or confirmed DTCs	= see sheet inhibit table -		
					Basic enable conditions met	= see sheet enable tables -		
	P2297	Air fuel ratio signal check for oxygen sensor 1 bank 1	Lambda equivalent value based on electrically corrected pump current sensor 1 bank 1	> 12 -	UEGO Release condition for O2 signal is fulfilled under following condition for sensor1 bank1 :	= TRUE -	10 sec continuous	2 Trips
					(			
					Temperature of ceramic Sensor 1,Bank 1	> 654.998 deg C		
					(			
					Calculation of reverse charge sensor 1 bank 1	= TRUE -		
					Condition for pump current calculation in sync started	= TRUE -		
					Reference pump current for pump current correction status	= TRUE -		
					Valid status of correction	= TRUE -		
					for time	= 0.5 sec		
					)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Validity of Reverse Pump Current Mode Sensor 1 Bank 1	= FALSE -		
					(			
					Condition for evaluation temperature valid sensor 1 bank 1	= TRUE -		
					for time	= 1 sec		
					)			
					Condition of UN0 for sensor 1 and bank 1 regulated	= TRUE -		
					)			
					Injection valves are activated	= TRUE -		
					End of start is reached and combustion engine runs on its own power	= TRUE -		
					Required lambda referring to lambda sensor fitting location	< 1.19995 -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P2298	Air fuel ratio signal check for oxygen sensor 1 bank 2	Lambda equivalent value based on electrically corrected pump current sensor 1 bank 2	> 12 -	UEGO Release condition for O2 signal is fulfilled under following condition for sensor1 bank2 :	= TRUE -	10 sec continuous	2 Trips
					(			
					Temperature of ceramic Sensor 1,Bank 2	> 654.998 deg C		
					(			
					Calculation of reverse charge sensor 1 bank 2	= TRUE -		
					Condition for pump current calculation in sync started	= TRUE -		
					Reference pump current for pump current correction status	= TRUE -		
					Valid status of correction	= TRUE -		
					for time	= 0.5 sec		
					)			
					Validity of Reverse Pump Current Mode Sensor 1 Bank 2	= FALSE -		
					(			
					Condition for evaluation temperature valid sensor 1 bank 2	= TRUE -		
					for time	= 1 sec		
					)			
					Condition of UN0 for sensor 1 and bank 2 regulated	= TRUE -		
					)			
					Injection valves are activated	= TRUE -		
					End of start is reached and combustion engine runs on its own power	= TRUE -		
					Required lambda referring to lambda sensor fitting location	< 1.19995 -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
Downstream Exhaust Gas Sensor	P013A	Compares measured transition response time of Seconday O2 sensor 2 bank 1 with the calibrated threshold when the sensor voltage changes Rich to Lean	arithmetic filtered delay response time of Secondary O2 sensor 2, bank 1, Rich to Lean: tiArth	> 0.6 sec	primary A/F commanded lambda	<= 1.09009 -	2	2 Trip
			tiArth = old tiArth + ((((a) - (b)) - old tiArth) * 1/ sample order)		primary A/F commanded lambda	>= 0.8501 -		
			(a) Raw transition response time of secondary O2 S2B1 Rich to Lean		engine runs	= TRUE -		
			(b) Exhaust mass flow dependent correction for transition response time of secondary O2 S2B1 Rich to Lean (see Look-Up-Table #P013A-2)	0.05 to 0.1 sec	Vehicle speed	>= 4.350528278 mph		
					engine speed	<= 3520 rpm		
					engine speed	>= 1000 rpm		
					engine load @ full engine mode (see Look-Up-Table #P0420-4)	>= 12 to 19.992 %		
					(engine load of full engine mode / 2) @ half engine mode (see Look-Up-Table #P0420-4)	>= 12 to 19.992 %		
					for time	>= 3 sec		
					Ratio total charge to charge in cylinder	< 1.00024 -		
					for time	>= 2 sec		
					Integrated air mass flow	> 60 g		
					measured ambient temperatuer	>= -39.8 deg C		
					measured ambient pressure	>= 50 kPa		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					measured engine coolant temperature	>=	52.06	deg C		
					no transmission gear change	=	TRUE	-		
					for time	>=	2	sec		
					)					
					(					
					integrated exhaust gas mass flow after the following operation points are in the monitoring window Bank 2	>	60	g		
					(					
					Change of exhaust gas mass flow Bank 2: (a) - (b)	<=	6.944444444	g/sec		
					Change of exhaust gas mass flow Bank 2: (a) - (b)	>=	-6.944444444	g/sec		
					(a) exhaust gas mass flow Bank 2					
					(b) filtered exhaust gas mass flow Bank 2					
					PT1 time constant		1.20029304	sec		
					Low window exhaust gas mass flow Bank 2 (see Look-Up-Table #P0420-2)	<=	22.222222222222 2 to 27.777777777777 8	g/sec		
					Low window exhaust gas mass flow Bank 2	>=	3.888888889	g/sec		
					Low window exhaust gas mass flow bank 1	>=	(a) - (b)			
					(a) minimum exhaust gas mass flow bank 1		3.888888889	g/sec		
					(b) offset exhaust gas mass flow bank 1 at tip-out		0.833333333	g/sec		
					for time	>=	3	sec		
					High window exhaust gas mass flow bank 1 (see Look-Up-Table #P0420-1)	<=	22.222222222222 2 to 27.777777777777 8	g/sec		
					High window exhaust gas mass flow bank 1	>=	3.888888889	g/sec		
					)					
					(					
					Modeled catalyst temperature gradient bank 1: (a) - (b)	<=	40.0078	deg C		
					Modeled catalyst temperature gradient bank 1: (a) - (b)	>=	-40.0078	deg C		
					(a) Modeled catalyst temperature bank 1					
					(b) filtered modeled catalyst temperature bank 1	=	4.9989321	sec		
					PT1 time constant					
					Low window modeled catalyst temperature	<=	650.006	deg C		
					Low window Modeled catalyst temperature bank 1	>=	520.022	deg C		
					High window modeled catalyst temperature bank 1	<=	780.014	deg C		
					High window Modeled catalyst temperature bank 1	>=	600.014	deg C		
					Modeled catalyst temperature bank 1 after the first engine start and driving	>	420.06	deg C		
					for time	>=	12	sec		
					))					
					((					
					Integrated purge mass flow after a longer purge stop	>=	1.51	g		
					HC concentration factor in chacoal canister	<=	40	factor		
					relative fuel portion of canister purge to injected fuel mass : (a) / (b)		0.200012	-		
					(a) fuel mass supplied by canister purge control					
					(b) fuel mass supplied by injection					
					OR					
					open loop canister purge control	=	TRUE	-		
					OR					
					canister purge control mass flow into the manifold	<=	5.555555556	g/sec		
					((					
					integrated exhaust gas mass flow bank 1 since engine start (see Look-Up-Table #P0420-3)	>	1600 to 2850	g		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					integrated exhaust gas mass flow bank 1 after the following sensors's readiness	> 40 g		
					(			
					Secondary O2 sensor readiness bank 1			
					Primary A/F sensor readiness bank 1			
					)			
						>= 350.0 deg C		
					temperature deviation of Primary A/F sensor heater control bank 1: (a) - (b)	< 64.9922 deg C		
					(a) primary A/F sensor temperature set point for heater control	800.006 deg C		
					(b) measured primary A/F sensor temperature for heater control			
					)			
					statemachine = sm			
					statemachine (sm =0) : inactive	=		
					a commanded lambda active	= FALSE -		
					primary A/F commanded lambda	= 1 -		
					if the following conditions are met, sm moves to sm = 2			
					Secondary O2 sensor voltage bank1	>= 0.749512 V		
					if the following conditions are met, sm moves to sm = 1			
					Secondary O2 sensor voltage bank1	< 0.749512 V		
					Secondary O2 sensor voltage bank1	>= 0.450439 V		
					statemachine (sm=1) - rich mixture in catalyst	= TRUE -		
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda bank1	= 0.91992 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 2			
					((			
					Secondary O2 sensor voltage gradient over 0.05s	>= 0.069 V/s		
					Secondary O2 sensor voltage bank1	>= 0.749512 V		
					)			
					OR			
					Secondary O2 sensor voltage bank1	>= 0.749512 V		
					)			
					Integrated exhaust mass flow bank 1	>= 0.12 g		
					if the following conditions are met, sm moves to sm = 3			
					(			
					Secondary O2 sensor voltage bank 1	>= 0.85083 V		
					OR			
					(			
					Secondary O2 sensor voltage bank 1	>= 0.749512 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 1	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda bank 1	<= (a) + (b)		
					(a) Primary lambda control set point bank 1	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 1	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 1	>= 15 g		
					)			
					And			
					(			
					Secondary O2 sensor voltage bank 1	> (a) + (b)		
					(a) minimum secondary O2 voltage			
					(b) Offset voltage of Secondary O2 sensor	= 0.030518 V		
					)			
					statemachine (sm=2) - Lean mixture in catalyst			
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda	= 1.08008 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					if the following conditions are met, sm moves to sm = 4					
					((					
					Secondary O2 sensor voltage	<=	0.150146	V		
					for time	>=	0.1	sec		
					)					
					OR					
					(					
					Secondary O2 sensor voltage	<=	0.150146	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 1	>	0.1	g		
					))					
					(					
					Primary A/F sensor lambda	<=	(a) + (b)			
					(a) Primary lambda control set point	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated lean exhaust gas mass flow bank 1	>=	15	g		
					)					
					statemachine (sm=3) - Lean mixture in catalyst	**=**	**TRUE**	-		
					a commanded lambda active bank 1	=	TRUE	-		
					primary A/F commanded lambda bank 1	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 4					
					(					
					Secondary O2 sensor voltage bank 1	<=	0.150146	V		
					for time	>=	0.1	sec		
					OR					
					(					
					Secondary O2 sensor voltage bank 1	<=	0.150146	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 1	>	0.1	g		
					))					
					(					
					Primary A/F sensor lambda bank 1	<=	(a) + (b)			
					(a) Primary lambda control set point	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda bank 1	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated lean exhaust gas mass flow bank 1	>=	15	g		
					)					
					(					
					Secondary O2 sensor voltage difference: (a) - (b)	<	0.014648	V		
					(a) old Secondary O2 sensor voltage bank 1					
					(b) Secondary O2 sensor voltage bank 1					
					Secondary O2 sensor voltage bank 1	<=	0.202637	V		
					for time	>=	2.5	sec		
					)					
					statemachine (sm=4) - Rich mixture in catalyst	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	0.91992	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 3					
					(					
					Secondary O2 sensor voltage bank 1	>=	0.85083	V		
					OR					
					(					
					Secondary O2 sensor voltage bank 1	>=	0.749512	V		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 1	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda bank 1	<= (a) + (b)		
					(a) Primary lambda control set point bank 1	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 1	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 1	>= 15 g		
					)			
					And			
					(			
					No pending or confirmed DTCs	= see sheet inhibit table		
					Basic enable conditions met	= see sheet enable tables -		
Downstream Exhaust Gas Sensor	P013B	Compares measured transition response time of Seconday O2 sensor 2 bank 1 with the calibrated threshold when the sensor voltage changes Lean to Rich	EWMA filtered delay response time (a) - (b) of Secondary O2 sensor 2, bank 1, Lean to Rich	> 0.6 sec	primary A/F commanded lambda	<= 1.09009 -	2 counts	1 Trip
			(a) Raw transition response time of secondary O2 S2B1 Lean to Rich		primary A/F commanded lambda	>= 0.8501 -		EWMA
			(b) Exhaust mass flow dependent correction for transition response time of secondary O2 S2B1 Lean to Rich (see Look-Up-Table #P013A-1)	0.06 to 0.07 sec	engine runs	= TRUE -		
					Vehicle speed	>= 4.350528278 mph		
					engine speed	<= 3520 rpm		
					engine speed	>= 1000 rpm		
					engine load @ full engine mode (see Look-Up-Table #P0420-4)	>= 12 to 19.992 %		
					(engine load of full engine mode / 2) @ half engine mode (see Look-Up-Table #P0420-4)	>= 12 to 19.992 %		
					for time	>= 3 sec		
					Ratio total charge to charge in cylinder	< 1.00024 -		
					for time	>= 2 sec		
					Integrated air mass flow	> 60 g		
					measured ambient temperatuer	>= -39.8 deg C		
					measured ambient pressure	>= 50 kPa		
					measured engine coolant temperature	>= 52.06 deg C		
					no transmission gear change	= TRUE -		
					for time	>= 2 sec		
					)			
					(			
					integrated exhaust gas mass flow after the following operation points are in the monitoring window bank 1	> 60 g		
					(			
					Change of exhaust gas mass flow bank 1: (a) - (b)	<= 6.944444444 g/sec		
					Change of exhaust gas mass flow bank 1: (a) - (b)	>= -6.944444444 g/sec		
					(a) exhaust gas mass flow bank 1			
					(b) filtered exhaust gas mass flow bank 1			
					PT1 time constant	1.20029304 sec		
					Low window exhaust gas mass flow bank 1 (see Look-Up-Table #P0420-2)	<= 22.222222222222 2 to 27.777777777777 8 g/sec		
					Low window exhaust gas mass flow bank 1	>= 3.888888889 g/sec		
					Low window exhaust gas mass flow bank 1	>= (a) - (b)		
					(a) minimum exhaust gas mass flow bank 1	3.888888889 g/sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(b) offset exhaust gas mass flow bank 1 at tip-out		0.833333333	g/sec		
					for time	>=	3	sec		
					High window exhaust gas mass flow bank 1 (see Look-Up-Table #P0420-1)	<=	22.2222222222222 to 27.7777777777778	g/sec		
					High window exhaust gas mass flow bank 1	>=	3.888888889	g/sec		
					)					
					(					
					Modeled catalyst temperature gradient bank 1: (a) - (b)	<=	40.0078	deg C		
					Modeled catalyst temperature gradient bank 1: (a) - (b) (a) Modeled catalyst temperature bank 1 (b) filtered modeled catalyst temperature bank 1	>=	-40.0078	deg C		
					PT1 time constant	=	4.9989321	sec		
					Low window modeled catalyst temperature	<=	650.006	deg C		
					Low window Modeled catalyst temperature bank 1	>=	520.022	deg C		
					High window modeled catalyst temperature bank 1	<=	780.014	deg C		
					High window Modeled catalyst temperature bank 1	>=	600.014	deg C		
					Modeled catalyst temperature bank 1 after the first engine start and driving	>	420.06	deg C		
					for time	>=	12	sec		
					))					
					((					
					Integrated purge mass flow after a longer purge stop	>=	1.51	g		
					HC concentration factor in chacoal canister	<=	40	factor		
					relative fuel portion of canister purge to injected fuel mass : (a) / (b) (a) fuel mass supplied by canister purge control (b) fuel mass supplied by injection		0.200012	-		
					OR					
					open loop canister purge control	=	TRUE	-		
					OR					
					canister purge control mass flow into the manifold	<=	5.555555556	g/sec		
					((					
					integrated exhaust gas mass flow bank 1 since engine start (see Look-Up-Table #P0420-3)	>	1600 to 2850	g		
					integrated exhaust gas mass flow bank 1 after the following sensors's readiness	>	40	g		
					(					
					Secondary O2 sensor readiness bank 1					
					Primary A/F sensor readiness bank 1					
					)					
						>=	350.0	deg C		
					temperature deviation of Primary A/F sensor heater control bank 1: (a) - (b)	<	64.9922	deg C		
					(a) primary A/F sensor temperature set point for heater control		800.006	deg C		
					(b) measured primary A/F sensor temperature for heater control					
					)					
					statemachine = sm					
					statemachine (sm =0) : inactive	=				
					a commanded lambda active	=	FALSE	-		
					primary A/F commanded lambda	=	1	-		
					if the following conditions are met, sm moves to sm = 2					
					Secondary O2 sensor voltage bank1	>=	0.749512	V		
					if the following conditions are met, sm moves to sm = 1					
					Secondary O2 sensor voltage bank1	<	0.749512	V		
					Secondary O2 sensor voltage bank1	>=	0.450439	V		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					statemachine (sm=1) - rich mixture in catalyst	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda bank1	=	0.91992	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 2					
					((					
					Secondary O2 sensor voltage gradient over 0.05s	>=	0.069	V/s		
					Secondary O2 sensor voltage bank1	>=	0.749512	V		
					)					
					OR					
					Secondary O2 sensor voltage bank1	>=	0.749512	V		
					)					
					Integrated exhaust mass flow bank 1	>=	0.12	g		
					if the following conditions are met, sm moves to sm = 3					
					(					
					Secondary O2 sensor voltage bank 1	>=	0.85083	V		
					OR					
					(					
					Secondary O2 sensor voltage bank 1	>=	0.749512	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 1	>	0.15	g		
					))					
					(					
					Primary A/F sensor lambda bank 1	<=	(a) + (b)			
					(a) Primary lambda control set point bank 1	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda bank 1	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated rich exhaust gas mass flow bank 1	>=	15	g		
					)					
					And					
					(					
					Secondary O2 sensor voltage bank 1	>	(a) + (b)			
					(a) minimum secondary O2 voltage					
					(b) Offset voltage of Secondary O2 sensor	=	0.030518	V		
					)					
					statemachine (sm=2) - Lean mixture in catalyst					
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 4					
					((					
					Secondary O2 sensor voltage	<=	0.150146	V		
					for time	>=	0.1	sec		
					)					
					OR					
					(					
					Secondary O2 sensor voltage	<=	0.150146	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 1	>	0.1	g		
					))					
					(					
					Primary A/F sensor lambda	<=	(a) + (b)			
					(a) Primary lambda control set point	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated lean exhaust gas mass flow bank 1	>=	15	g		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					)			
					statemachine (sm=3) - Lean mixture in catalyst	**= TRUE -**		
					a commanded lambda active bank 1	= TRUE -		
					primary A/F commanded lambda bank 1	= 1.08008 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 4			
					(			
					Secondary O2 sensor voltage bank 1	<= 0.150146 V		
					for time	>= 0.1 sec		
					OR			
					(			
					Secondary O2 sensor voltage bank 1	<= 0.150146 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 1	> 0.1 g		
					))			
					(			
					Primary A/F sensor lambda bank 1	<= (a) + (b)		
					(a) Primary lambda control set point	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 1	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated lean exhaust gas mass flow bank 1	>= 15 g		
					)			
					statemachine (sm=4) - Rich mixture in catalyst	= TRUE -		
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda	= 0.91992 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 3			
					(			
					Secondary O2 sensor voltage bank 1	>= 0.85083 V		
					OR			
					(			
					Secondary O2 sensor voltage bank 1	>= 0.749512 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 1	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda bank 1	<= (a) + (b)		
					(a) Primary lambda control set point bank 1	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 1	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 1	>= 15 g		
					)			
					And			
					(			
					Secondary O2 sensor voltage difference: (a) - (b)	> 0.014648 V		
					(a) old Secondary O2 sensor voltage bank 1			
					(b) Secondary O2 sensor voltage bank 1			
					Secondary O2 sensor voltage bank 1	>= 0.650635 V		
					)			
					EWMA filter strategy			
					Fast initialization mode (FIR)	**= TRUE**		
					EWMA filter initial value for FIR	= 0.3 sec		
					EWMA filter constant	= 0.3398 -		
					Maximum number of samples per	= 2 counts		
					Total number of samples for FIR	= 4 counts		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Response to Step Change mode (RSC)	= TRUE		
					Response to Step Change mode inactive	= TRUE		
					absolute difference : ABS((a) - (b) (a) measured delayed response (b) EWMA filtered normalized monitoring result (c) Step change detection factor	> (b) * (c) 0.35 sec		
					EWMA filter constant	= 0.3398 -		
					Maximum number of samples per	= 2 counts		
					Total number of samples for RSC mode	= 4 counts		
					Stablilized mode			
					EWMA filter constant	= 0.3398 -		
					Total number of samples for stablilized mode	= 1 counts		
					No pending or confirmed DTCs	= see sheet inhibit table		
					Basic enable conditions met	= see sheet enable tables -		
Downstream Exhaust Gas Sensor	P013C	Compares measured transition response time of Seconday O2 sensor 2 bank 2 with the calibrated threshold when the sensor voltage changes Rich to Lean	arithmetic filtered delay response time of Secondary O2 sensor 2, bank 2, Rich to Lean: tiArth	> 0.6 sec	primary A/F commanded lambda	<= 1.09009 -	2	2 Trip
			tiArth = old tiArth + ((((a) - (b)) - old tiArth) * 1/ sample order)		primary A/F commanded lambda	>= 0.8501 -		
			(a) Raw transition response time of secondary O2 S2B2 Rich to Lean		engine runs	= TRUE -		
			(b) Exhaust mass flow dependent correction for transition response time of secondary O2 S2B2 Rich to Lean (see Look-Up-Table #P013A-2)	0.05 to 0.1 sec	Vehicle speed	>= 4.350528278 mph		
					engine speed	<= 3520 rpm		
					engine speed	>= 1000 rpm		
					engine load @ full engine mode (see Look-Up-Table #P0420-4)	>= 12 to 19.992 %		
					(engine load of full engine mode / 2) @ half engine mode (see Look-Up-Table #P0420-4)	>= 12 to 19.992 %		
					for time	>= 3 sec		
					Ratio total charge to charge in cylinder	< 1.00024 -		
					for time	>= 2 sec		
					Integrated air mass flow	> 60 g		
					measured ambient temperatuer	>= -39.8 deg C		
					measured ambient pressure	>= 50 kPa		
					measured engine coolant temperature	>= 52.06 deg C		
					no transmission gear change	= TRUE -		
					for time)	>= 2 sec		
					(integrated exhaust gas mass flow after the following operation points are in the monitoring window Bank 2 (	> 60 g		
					Change of exhaust gas mass flow Bank 2: (a) - (b)	<= 6.944444444 g/sec		
					Change of exhaust gas mass flow Bank 2: (a) - (b) (a) exhaust gas mass flow Bank 2 (b) filtered exhaust gas mass flow Bank 2	>= -6.944444444 g/sec		
					PT1 time constant	1.20029304 sec		
					Low window exhaust gas mass flow Bank 2 (see Look-Up-Table #P0420-2)	<= 22.222222222222 2 to 27.777777777777 8 g/sec		
					Low window exhaust gas mass flow Bank 2	>= 3.888888889 g/sec		
					Low window exhaust gas mass flow bank 2 (a) minimum exhaust gas mass flow bank 2	>= (a) - (b) 3.888888889 g/sec		
					(b) offset exhaust gas mass flow bank 2 at tip-out	0.833333333 g/sec		
					for time	>= 3 sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					High window exhaust gas mass flow bank 2 (see Look-Up-Table #P0420-1)	<=	22.2222222222222 to 27.7777777777778	g/sec		
					High window exhaust gas mass flow bank 2	>=	3.888888889	g/sec		
					)					
					(					
					Modeled catalyst temperature gradient bank 2: (a) - (b)	<=	40.0078	deg C		
					Modeled catalyst temperature gradient bank 2: (a) - (b)	>=	-40.0078	deg C		
					(a) Modeled catalyst temperature bank 2					
					(b) filtered modeled catalyst temperature bank 2 PT1 time constant	=	4.9989321	sec		
					Low window modeled catalyst temperature	<=	650.006	deg C		
					Low window Modeled catalyst temperature bank 2	>=	520.022	deg C		
					High window modeled catalyst temperature bank 2	<=	780.014	deg C		
					High window Modeled catalyst temperature bank 2	>=	600.014	deg C		
					Modeled catalyst temperature bank 2 after the first engine start and driving	>	420.06	deg C		
					for time	>=	12	sec		
					))					
					((					
					Integrated purge mass flow after a longer purge stop	>=	1.51	g		
					HC concentration factor in chacoal canister	<=	40	factor		
					relative fuel portion of canister purge to injected fuel mass : (a) / (b)		0.200012	-		
					(a) fuel mass supplied by canister purge control					
					(b) fuel mass supplied by injection					
					OR					
					open loop canister purge control	=	TRUE	-		
					OR					
					canister purge control mass flow into the manifold	<=	5.555555556	g/sec		
					((					
					integrated exhaust gas mass flow bank 2 since engine start (see Look-Up-Table #P0420-3)	>	1600 to 2850	g		
					integrated exhaust gas mass flow bank 2 after the following sensors's readiness	>	40	g		
					(					
					Secondary O2 sensor readiness bank 2					
					Primary A/F sensor readiness bank 2					
					)					
						>=	350.0	deg C		
					temperature deviation of Primary A/F sensor heater control bank 2: (a) - (b)	<	64.9922	deg C		
					(a) primary A/F sensor temperature set point for heater control		800.006	deg C		
					(b) measured primary A/F sensor temperature for heater control					
					)					
					statemachine = sm					
					statemachine (sm =0) : inactive	=				
					a commanded lambda active	=	FALSE	-		
					primary A/F commanded lambda	=	1	-		
					if the following conditions are met, sm moves to sm = 2					
					Secondary O2 sensor voltage bank1	>=	0.749512	V		
					if the following conditions are met, sm moves to sm = 1					
					Secondary O2 sensor voltage bank1	<	0.749512	V		
					Secondary O2 sensor voltage bank1	>=	0.450439	V		
					statemachine (sm=1) - rich mixture in catalyst	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda bank1	=	0.91992	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 2			
					((			
					Secondary O2 sensor voltage gradient over 0.05s	>= 0.069 V/s		
					Secondary O2 sensor voltage bank1	>= 0.749512 V		
					)			
					OR			
					Secondary O2 sensor voltage bank1	>= 0.749512 V		
					)			
					Integrated exhaust mass flow bank 2	>= 0.12 g		
					if the following conditions are met, sm moves to sm = 3			
					(			
					Secondary O2 sensor voltage bank 2	>= 0.85083 V		
					OR			
					(			
					Secondary O2 sensor voltage bank 2	>= 0.749512 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 2	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda bank 2	<= (a) + (b)		
					(a) Primary lambda control set point bank 2	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 2	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 2	>= 15 g		
					)			
					And			
					(			
					Secondary O2 sensor voltage bank 2	> (a) + (b)		
					(a) minimum secondary O2 voltage			
					(b) Offset voltage of Secondary O2 sensor	= 0.030518 V		
					)			
					statemachine (sm=2) - Lean mixture in catalyst			
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda	= 1.08008 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 4			
					((			
					Secondary O2 sensor voltage	<= 0.150146 V		
					for time	>= 0.1 sec		
					)			
					OR			
					(			
					Secondary O2 sensor voltage	<= 0.150146 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 2	> 0.1 g		
					))			
					(			
					Primary A/F sensor lambda	<= (a) + (b)		
					(a) Primary lambda control set point	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated lean exhaust gas mass flow bank 2	>= 15 g		
					)			
					statemachine (sm=3) - Lean mixture in catalyst	**= TRUE -**		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					a commanded lambda active bank 2	= TRUE -		
					primary A/F commanded lambda bank 2	= 1.08008 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 4			
					(			
					Secondary O2 sensor voltage bank 2	<= 0.150146 V		
					for time	>= 0.1 sec		
					OR			
					(			
					Secondary O2 sensor voltage bank 2	<= 0.150146 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 2	> 0.1 g		
					))			
					(			
					Primary A/F sensor lambda bank 2	<= (a) + (b)		
					(a) Primary lambda control set point	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 2	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated lean exhaust gas mass flow bank 2	>= 15 g		
					)			
					(			
					Secondary O2 sensor voltage difference: (a) - (b)	< 0.014648 V		
					(a) old Secondary O2 sensor voltage bank 2			
					(b) Secondary O2 sensor voltage bank 2			
					Secondary O2 sensor voltage bank 2	<= 0.202637 V		
					for time	>= 2.5 sec		
					)			
					statemachine (sm=4) - Rich mixture in catalyst	= TRUE -		
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda	= 0.91992 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 3			
					(			
					Secondary O2 sensor voltage bank 2	>= 0.85083 V		
					OR			
					(			
					Secondary O2 sensor voltage bank 2	>= 0.749512 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 2	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda bank 2	<= (a) + (b)		
					(a) Primary lambda control set point bank 2	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 2	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 2	>= 15 g		
					)			
					(			
					No pending or confirmed DTCs	= see sheet inhibit table		
					Basic enable conditions met	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required		MIL Illum.
Downstream Exhaust Gas Sensor	P013D	Compares measured transition response time of Seconday O2 sensor 2 bank 2 with the calibrated threshold when the sensor voltage changes Lean to Rich	EWMA filtered delay response time (a) - (b) of Secondary O2 sensor 2, bank 2, Lean to Rich	>	0.6	sec	primary A/F commanded lambda	<=	1.09009	-	2	counts	1 Trip
			(a) Raw transition response time of secondary O2 S2B2 Lean to Rich				primary A/F commanded lambda	>=	0.8501	-			EWMA
			(b) Exhaust mass flow dependent correction for transition response time of secondary O2 S2B2 Lean to Rich (see Look-Up-Table #P013A-1)		0.06 to 0.07	sec	engine runs	=	TRUE	-			
							Vehicle speed	>=	4.350528278	mph			
							engine speed	<=	3520	rpm			
							engine speed	>=	1000	rpm			
							engine load @ full engine mode (see Look-Up-Table #P0420-4)	>=	12 to 19.992	%			
							(engine load of full engine mode / 2) @ half engine mode (see Look-Up-Table #P0420-4)	>=	12 to 19.992	%			
							for time	>=	3	sec			
							Ratio total charge to charge in cylinder	<	1.00024	-			
							for time	>=	2	sec			
							Integrated air mass flow	>	60	g			
							measured ambient temperatuer	>=	-39.8	deg C			
							measured ambient pressure	>=	50	kPa			
							measured engine coolant temperature	>=	52.06	deg C			
							no transmission gear change	=	TRUE	-			
							for time	>=	2	sec			
							)						
							(						
							integrated exhaust gas mass flow after the following operation points are in the monitoring window bank 2	>	60	g			
							(						
							Change of exhaust gas mass flow bank 2: (a) - (b)	<=	6.944444444	g/sec			
							Change of exhaust gas mass flow bank 2: (a) - (b)	>=	-6.944444444	g/sec			
							(a) exhaust gas mass flow bank 2						
							(b) filtered exhaust gas mass flow bank 2						
							PT1 time constant		1.20029304	sec			
							Low window exhaust gas mass flow bank 2 (see Look-Up-Table #P0420-2)	<=	22.222222222222 2 to 27.777777777777 8	g/sec			
							Low window exhaust gas mass flow bank 2	>=	3.888888889	g/sec			
							Low window exhaust gas mass flow bank 2	>=	(a) - (b)				
							(a) minimum exhaust gas mass flow bank 2		3.888888889	g/sec			
							(b) offset exhaust gas mass flow bank 2 at tip-out		0.833333333	g/sec			
							for time	>=	3	sec			
							High window exhaust gas mass flow bank 2 (see Look-Up-Table #P0420-1)	<=	22.222222222222 2 to 27.777777777777 8	g/sec			
							High window exhaust gas mass flow bank 2	>=	3.888888889	g/sec			
							)						
							(						
							Modeled catalyst temperature gradient bank 2: (a) - (b)	<=	40.0078	deg C			
							Modeled catalyst temperature gradient bank 2: (a) - (b)	>=	-40.0078	deg C			
							(a) Modeled catalyst temperature bank 2						
							(b) filtered modeled catalyst temperature bank 2	=	4.9989321	sec			
							PT1 time constant						
							Low window modeled catalyst temperature	<=	650.006	deg C			
							Low window Modeled catalyst temperature bank 2	>=	520.022	deg C			
							High window modeled catalyst temperature bank 2	<=	780.014	deg C			
							High window Modeled catalyst temperature bank 2	>=	600.014	deg C			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Modeled catalyst temperature bank 2 after the first engine start and driving	>	420.06	deg C		
					for time	>=	12	sec		
					))					
					((					
					Integrated purge mass flow after a longer purge stop	>=	1.51	g		
					HC concentration factor in chacoal canister	<=	40	factor		
					relative fuel portion of canister purge to injected fuel mass : (a) / (b) (a) fuel mass supplied by canister purge control (b) fuel mass supplied by injection		0.200012	-		
					OR					
					open loop canister purge control	=	TRUE	-		
					OR					
					canister purge control mass flow into the manifold	<=	5.555555556	g/sec		
					((					
					integrated exhaust gas mass flow bank 2 since engine start (see Look-Up-Table #P0420-3)	>	1600 to 2850	g		
					integrated exhaust gas mass flow bank 2 after the following sensors's readiness	>	40	g		
					(					
					Secondary O2 sensor readiness bank 2					
					Primary A/F sensor readiness bank 2					
					)					
						>=	350.0	deg C		
					temperature deviation of Primary A/F sensor heater control bank 2: (a) - (b)	<	64.9922	deg C		
					(a) primary A/F sensor temperature set point for heater control		800.006	deg C		
					(b) measured primary A/F sensor temperature for heater control					
					)					
					statemachine = sm					
					statemachine (sm =0) : inactive	=				
					a commanded lambda active	=	FALSE	-		
					primary A/F commanded lambda	=	1	-		
					if the following conditions are met, sm moves to sm = 2					
					Secondary O2 sensor voltage bank1	>=	0.749512	V		
					if the following conditions are met, sm moves to sm = 1					
					Secondary O2 sensor voltage bank1	<	0.749512	V		
					Secondary O2 sensor voltage bank1	>=	0.450439	V		
					statemachine (sm=1) - rich mixture in catalyst	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda bank1	=	0.91992	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 2					
					((					
					Secondary O2 sensor voltage gradient over 0.05s	>=	0.069	V/s		
					Secondary O2 sensor voltage bank1	>=	0.749512	V		
					)					
					OR					
					Secondary O2 sensor voltage bank1	>=	0.749512	V		
					)					
					Integrated exhaust mass flow bank 2	>=	0.12	g		
					if the following conditions are met, sm moves to sm = 3					
					(					
					Secondary O2 sensor voltage bank 2	>=	0.85083	V		
					OR					
					(					
					Secondary O2 sensor voltage bank 2	>=	0.749512	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 2	>	0.15	g		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					))			
					(			
					Primary A/F sensor lambda bank 2	<= (a) + (b)		
					(a) Primary lambda control set point bank 2	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 2	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 2	>= 15 g		
					)			
					(			
					Secondary O2 sensor voltage bank 2	> (a) + (b)		
					(a) minimum secondary O2 voltage			
					(b) Offset voltage of Secondary O2 sensor	= 0.030518 V		
					)			
					statemachine (sm=2) - Lean mixture in catalyst			
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda	= 1.08008 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 4			
					((			
					Secondary O2 sensor voltage	<= 0.150146 V		
					for time	>= 0.1 sec		
					)			
					OR			
					(			
					Secondary O2 sensor voltage	<= 0.150146 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 2	> 0.1 g		
					))			
					(			
					Primary A/F sensor lambda	<= (a) + (b)		
					(a) Primary lambda control set point	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated lean exhaust gas mass flow bank 2	>= 15 g		
					)			
					statemachine (sm=3) - Lean mixture in catalyst	**= TRUE** -		
					a commanded lambda active bank 2	= TRUE -		
					primary A/F commanded lambda bank 2	= 1.08008 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 4			
					(			
					Secondary O2 sensor voltage bank 2	<= 0.150146 V		
					for time	>= 0.1 sec		
					OR			
					(			
					Secondary O2 sensor voltage bank 2	<= 0.150146 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 2	> 0.1 g		
					))			
					(			
					Primary A/F sensor lambda bank 2	<= (a) + (b)		
					(a) Primary lambda control set point	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 2	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for time	>= 0.2 sec		
					Integrated lean exhaust gas mass flow bank 2	>= 15 g		
					)			
					statemachine (sm=4) - Rich mixture in catalyst	= TRUE -		
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda	= 0.91992 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 3			
					(			
					Secondary O2 sensor voltage bank 2	>= 0.85083 V		
					OR			
					(			
					Secondary O2 sensor voltage bank 2	>= 0.749512 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 2	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda bank 2	<= (a) + (b)		
					(a) Primary lambda control set point bank 2	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 2	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 2	>= 15 g		
					)			
					(			
					Secondary O2 sensor voltage difference: (a) - (b)	> 0.014648 V		
					(a) old Secondary O2 sensor voltage bank 2			
					(b) Secondary O2 sensor voltage bank 2			
					Secondary O2 sensor voltage bank 2	>= 0.650635 V		
					)			
					EWMA filter strategy			
					Fast initialization mode (FIR)	**= TRUE**		
					EWMA filter initial value for FIR	= 0.3 sec		
					EWMA filter constant	= 0.3398 -		
					Maximum number of samples per	= 2 counts		
					Total number of samples for FIR	= 4 counts		
					Response to Step Change mode (RSC)	= TRUE		
					Response to Step Change mode inactive	= TRUE		
					absolute difference : ABS((a) - (b)	> (b) * (c)		
					(a) measured delayed response			
					(b) EWMA filtered normalized monitoring result			
					(c) Step change detection factor	0.35 s		
					EWMA filter constant	= 0.3398 -		
					Maximum number of samples per	= 2 counts		
					Total number of samples for RSC mode	= 4 counts		
					Stabilized mode			
					EWMA filter constant	= 0.3398 -		
					Total number of samples for stablilized mode	= 1 counts		
					No pending or confirmed DTCs	= see sheet inhibit table		
					Basic enable conditions met	= see sheet enable tables -		
Downstream Exhaust Gas Sensor	P013E	Compares measured delayed response time of Seconday O2 sensor 2 bank 1 with the calibrated threshold when the sensor voltage changes Rich to Lean	Ewma filtered delay response time of Secondary O2 sensor 2, bank 1, Rich to Lean	> 0.75 sec	primary A/F commanded lambda	<= 1.09009 -	2 Once per driving cycle	1 Trip
			(a) Raw delay response time of secondary O2 S2B1 Rich to Lean		primary A/F commanded lambda	>= 0.8501 -		EWMA
			(b) Exhaust mass flow dependent correction for delay response time of secondary O2 sensor Rich to Lean	0 sec	engine runs	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Vehicle speed	>=	4.350528278	mph		
					engine speed	<=	3520	rpm		
					engine speed	>=	1000	rpm		
					engine load @ full engine mode (see Look-Up-Table #P0420-4)	>=	12 to 19.992	%		
					(engine load of full engine mode / 2) @ half engine mode (see Look-Up-Table #P0420-4)	>=	12 to 19.992	%		
					for time	>=	3	sec		
					Ratio total charge to charge in cylinder	<	1.00024	-		
					for time	>=	2	sec		
					Integrated air mass flow	>	60	g		
					measured ambient temperatuer	>=	-39.8	deg C		
					measured ambient pressure	>=	50	kPa		
					measured engine coolant temperature	>=	52.06	deg C		
					no transmission gear change	=	TRUE	-		
					for time	>=	2	sec		
					)					
					(					
					integrated exhaust gas mass flow after the following operation points are in the monitoring window bank 1	>	60	g		
					(					
					Change of exhaust gas mass flow bank 1: (a) - (b)	<=	6.944444444	g/sec		
					Change of exhaust gas mass flow bank 1: (a) - (b)	>=	-6.944444444	g/sec		
					(a) exhaust gas mass flow bank 1					
					(b) filtered exhaust gas mass flow bank 1					
					PT1 time constant		1.20029304	sec		
					Low window exhaust gas mass flow bank 1 (see Look-Up-Table #P0420-2)	<=	22.2222222222222 to 27.7777777777778	g/sec		
					Low window exhaust gas mass flow bank 1	>=	3.888888889	g/sec		
					Low window exhaust gas mass flow bank 1	>=	(a) - (b)			
					(a) minimum exhaust gas mass flow bank 1		3.888888889	g/sec		
					(b) offset exhaust gas mass flow bank 1 at tip-out		0.833333333	g/sec		
					for time	>=	3	sec		
					High window exhaust gas mass flow bank 1 (see Look-Up-Table #P0420-1)	<=	22.2222222222222 to 27.7777777777778	g/sec		
					High window exhaust gas mass flow bank 1	>=	3.888888889	g/sec		
					)					
					(					
					Modeled catalyst temperature gradient bank 1: (a) - (b)	<=	40.0078	deg C		
					Modeled catalyst temperature gradient bank 1: (a) - (b)	>=	-40.0078	deg C		
					(a) Modeled catalyst temperature bank 1					
					(b) filtered modeled catalyst temperature bank 1	=	4.9989321	sec		
					PT1 time constant					
					Low window modeled catalyst temperature	<=	650.006	deg C		
					Low window Modeled catalyst temperature bank 1	>=	520.022	deg C		
					High window modeled catalyst temperature bank 1	<=	780.014	deg C		
					High window Modeled catalyst temperature bank 1	>=	600.014	deg C		
					Modeled catalyst temperature bank 1 after the first engine start and driving	>	420.06	deg C		
					for time	>=	12	sec		
					))					
					((					
					Integrated purge mass flow after a longer purge stop	>=	1.51	g		
					HC concentration factor in chacoal canister	<=	40	factor		
					relative fuel portion of canister purge to injected fuel mass : (a) / (b)		0.200012	-		
					(a) fuel mass supplied by canister purge control					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(b) fuel mass supplied by injection					
					OR					
					open loop canister purge control	=	TRUE	-		
					OR					
					canister purge control mass flow into the manifold	<=	5.555555556	g/sec		
					((					
					integrated exhaust gas mass flow bank 1 since engine start (see Look-Up-Table #P0420-3)	>	1600 to 2850	g		
					integrated exhaust gas mass flow bank 1 after the following sensors's readiness	>	40	g		
					(					
					Secondary O2 sensor readiness bank 1					
					Primary A/F sensor readiness bank 1					
					)					
						>=	350.0	deg C		
					temperature deviation of Primary A/F sensor heater control bank 1: (a) - (b)	<	64.9922	deg C		
					(a) primary A/F sensor temperature set point for heater control		800.006	deg C		
					(b) measured primary A/F sensor temperature for heater control					
					)					
					statemachine = sm					
					statemachine (sm =0) : inactive	=				
					a commanded lambda active	=	FALSE	-		
					primary A/F commanded lambda	=	1	-		
					if the following conditions are met, sm moves to sm = 2					
					Secondary O2 sensor voltage Bank 1	>=	0.749512	V		
					if the following conditions are met, sm moves to sm = 1					
					Secondary O2 sensor voltage Bank 1	<	0.749512	V		
					Secondary O2 sensor voltage Bank 1	>=	0.450439	V		
					statemachine (sm=1) - rich mixture in catalyst	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda Bank 1	=	0.91992	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 2					
					((					
					Secondary O2 sensor voltage gradient over 0.05s	>=	0.069	V/s		
					Secondary O2 sensor voltage Bank 1	>=	0.749512	V		
					)					
					OR					
					Secondary O2 sensor voltage Bank 1	>=	0.749512	V		
					)					
					Integrated exhaust mass flow bank 1	>=	0.12	g		
					if the following conditions are met, sm moves to sm = 3					
					(					
					Secondary O2 sensor voltage bank 1	>=	0.85083	V		
					OR					
					(					
					Secondary O2 sensor voltage bank 1	>=	0.749512	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 1	>	0.15	g		
					))					
					(					
					Primary A/F sensor lambda bank 1	<=	(a) + (b)			
					(a) Primary lambda control set point bank 1	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda bank 1	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated rich exhaust gas mass flow bank 1	>=	15	g		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				)			
				And			
				(			
				Secondary O2 sensor voltage bank 1	> (a) + (b)		
				(a) minimum secondary O2 voltage			
				(b) Offset voltage of Secondary O2 sensor	= 0.030518 V		
				)			
				statemachine (sm=2) - Lean mixture in catalyst			
				a commanded lambda active	= TRUE -		
				primary A/F commanded lambda	= 1.08008 -		
				for time	>= 3 sec		
				for time	>= 0.2 sec		
				if the following conditions are met, sm moves to sm = 4			
				((			
				Secondary O2 sensor voltage	<= 0.150146 V		
				for time	>= 0.1 sec		
				)			
				OR			
				(			
				Secondary O2 sensor voltage	<= 0.150146 V		
				Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
				Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
				Integrated Oxygen mass flow bank 1	> 0.1 g		
				))			
				(			
				Primary A/F sensor lambda	<= (a) + (b)		
				(a) Primary lambda control set point	(a)		
				(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
				Primary A/F sensor lambda	>= (a) - (b)		
				(a) Primary lambda control set point			
				(b) maximum lambda deviation of rich mixture	0.05005 -		
				for time	>= 0.2 sec		
				Integrated lean exhaust gas mass flow bank 1	>= 15 g		
				)			
				statemachine (sm=3) - Lean mixture in catalyst	**= TRUE** -		
				a commanded lambda active bank 1	= TRUE -		
				primary A/F commanded lambda bank 1	= 1.08008 -		
				for time	>= 3 sec		
				for time	>= 0.2 sec		
				if the following conditions are met, sm moves to sm = 4			
				(			
				Secondary O2 sensor voltage bank 1	<= 0.150146 V		
				for time	>= 0.1 sec		
				OR			
				(			
				Secondary O2 sensor voltage bank 1	<= 0.150146 V		
				Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
				Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
				Integrated Oxygen mass flow bank 1	> 0.1 g		
				))			
				(			
				Primary A/F sensor lambda bank 1	<= (a) + (b)		
				(a) Primary lambda control set point	(a)		
				(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
				Primary A/F sensor lambda bank 1	>= (a) - (b)		
				(a) Primary lambda control set point			
				(b) maximum lambda deviation of rich mixture	0.05005 -		
				for time	>= 0.2 sec		
				Integrated lean exhaust gas mass flow bank 1	>= 15 g		
				)			
				(			
				Primary A/F commanded lambda bank 1	<= (a) + (b)		
				(a) Primary A/F commanded lambda bank 1			
				(b) offset to the commanded lambda bank 1	0.06006		
				Secondary O2 sensor voltage bank 1	> (a) + (b)		
				(a) minimum secondary O2 voltage Bank 1			
				(b) Offset voltage of Secondary O2 sensor	= 0.030518 V		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					)			
					statemachine (sm=4) -	= TRUE -		
					Rich mixture in catalyst			
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda	= 0.91992 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 3			
					(			
					Secondary O2 sensor voltage bank 1	>= 0.85083 V		
					OR			
					(			
					Secondary O2 sensor voltage bank 1	>= 0.749512 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 1	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda bank 1	<= (a) + (b)		
					(a) Primary lambda control set point bank 1	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 1	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 1	>= 15 g		
					)			
					EWMA filter strategy			
					Fast initialization mode (FIR)	**= TRUE** -		
					EWMA filter initial value for FIR mode	= 0.4 sec		
					EWMA filter constant	= 0.3594 -		
					Maximum number of samples per trip	= 2 counts		
					Total number of samples for FIR mode	= 4 counts		
					Response to Step Change mode (RSC)	**=** TRUE -		
					Response to Step Change mode inactive	= TRUE -		
					absolute difference : ABS((a) - (b))	> (b) * (c)		
					(a) measured delayed response time			
					(b) EWMA filtered normalized monitoring result			
					(c) Step change detection factor	0.4 sec		
					EWMA filter constant	= 0.3594 -		
					Maximum number of samples per trip	= 2 counts		
					Total number of samples for RSC mode	= 4 counts		
					EWMA filter constant	= 0.3594 -		
					Total number of samples for stabilized mode	= 1 counts		
					No pending or confirmed DTCs	= see sheet inhibit table		
					Basic enable conditions met	= see sheet enable tables -		
	P013F	Compares measured delay response time of Seconday O2 sensor 2 bank 1 with the calibrated threshold when the sensor voltage changes Lean to Rich	Ewma filtered delay response time of Secondary O2 sensor 2, bank 1, Lean to Rich	> 0.65 sec	primary A/F commanded lambda	<= 1.09009 -	2 counts	1 Trip
			(a) Raw delay response time of secondary O2 S2B1 Lean to Rich		primary A/F commanded lambda	>= 0.8501 -		EWMA
			(b) Exhaust mass flow dependent correction for delay response time of secondary O2 sensor Lean to Rich	0 sec	engine runs	= TRUE -		
					Vehicle speed	>= 4.350528278 mph		
					engine speed	<= 3520 rpm		
					engine speed	>= 1000 rpm		
					engine load @ full engine mode (see Look-Up-Table #P0420-4)	>= 12 to 19.992 %		
					(engine load of full engine mode / 2) @ half engine mode (see Look-Up-Table #P0420-4)	>= 12 to 19.992 %		
					for time	>= 3 sec		
					Ratio total charge to charge in cylinder	< 1.00024 -		
					for time	>= 2 sec		
					Integrated air mass flow	> 60 g		
					measured ambient temperatuer	>= -39.8 deg C		
					measured ambient pressure	>= 50 kPa		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					measured engine coolant temperature	>=	52.06	deg C		
					no transmission gear change	=	TRUE	-		
					for time	>=	2	sec		
					)					
					(					
					integrated exhaust gas mass flow after the following operation points are in the monitoring window bank 1	>	60	g		
					(					
					Change of exhaust gas mass flow bank 1: (a) - (b)	<=	6.944444444	g/sec		
					Change of exhaust gas mass flow bank 1: (a) - (b)	>=	-6.944444444	g/sec		
					(a) exhaust gas mass flow bank 1					
					(b) filtered exhaust gas mass flow bank 1					
					PT1 time constant		1.20029304	sec		
					Low window exhaust gas mass flow bank 1 (see Look-Up-Table #P0420-2)	<=	22.2222222222222 to 27.7777777777778	g/sec		
					Low window exhaust gas mass flow bank 1	>=	3.888888889	g/sec		
					Low window exhaust gas mass flow bank 1	>=	(a) - (b)			
					(a) minimum exhaust gas mass flow bank 1		3.888888889	g/sec		
					(b) offset exhaust gas mass flow bank 1 at tip-out		0.833333333	g/sec		
					for time	>=	3	sec		
					High window exhaust gas mass flow bank 1 (see Look-Up-Table #P0420-1)	<=	22.2222222222222 to 27.7777777777778	g/sec		
					High window exhaust gas mass flow bank 1	>=	3.888888889	g/sec		
					)					
					(					
					Modeled catalyst temperature gradient bank 1: (a) - (b)	<=	40.0078	deg C		
					Modeled catalyst temperature gradient bank 1: (a) - (b)	>=	-40.0078	deg C		
					(a) Modeled catalyst temperature bank 1					
					(b) filtered modeled catalyst temperature bank 1	=	4.9989321	sec		
					PT1 time constant					
					Low window modeled catalyst temperature bank 1	<=	650.006	deg C		
					Low window Modeled catalyst temperature bank 1	>=	520.022	deg C		
					High window modeled catalyst temperature bank 1	<=	780.014	deg C		
					High window Modeled catalyst temperature bank 1	>=	600.014	deg C		
					Modeled catalyst temperature bank 1 after the first engine start and driving	>	420.06	deg C		
					for time	>=	12	sec		
					))					
					((					
					Integrated purge mass flow after a longer purge stop	>=	1.51	g		
					HC concentration factor in chacoal canister	<=	40	factor		
					relative fuel portion of canister purge to injected fuel mass : (a) / (b)		0.200012	-		
					(a) fuel mass supplied by canister purge control					
					(b) fuel mass supplied by injection					
					OR					
					open loop canister purge control	=	TRUE	-		
					OR					
					canister purge control mass flow into the manifold	<=	5.555555556	g/sec		
					((					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					integrated exhaust gas mass flow bank 1 since engine start (see Look-Up-Table #P0420-3)	> 1600 to 2850 g		
					integrated exhaust gas mass flow bank 1 after the following sensors's readiness	> 40 g		
					(			
					Secondary O2 sensor readiness bank 1			
					Primary A/F sensor readiness bank 1			
					)			
						>= 350.0 deg C		
					temperature deviation of Primary A/F sensor heater control bank 1: (a) - (b)	< 64.9922 deg C		
					(a) primary A/F sensor temperature set point for heater control	800.006 deg C		
					(b) measured primary A/F sensor temperature for heater control			
					)			
					statemachine = sm			
					statemachine (sm =0) : inactive	=		
					a commanded lambda active	= FALSE -		
					primary A/F commanded lambda	= 1 -		
					if the following conditions are met, sm moves to sm = 2			
					Secondary O2 sensor voltage Bank 1	>= 0.749512 V		
					if the following conditions are met, sm moves to sm = 1			
					Secondary O2 sensor voltage Bank 1	< 0.749512 V		
					Secondary O2 sensor voltage Bank 1	>= 0.450439 V		
					statemachine (sm=1) - rich mixture in catalyst	= TRUE -		
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda Bank 1	= 0.91992 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 2			
					((			
					Secondary O2 sensor voltage gradient over 0.05s	>= 0.069 V/s		
					Secondary O2 sensor voltage Bank 1	>= 0.749512 V		
					)			
					OR			
					Secondary O2 sensor voltage Bank 1	>= 0.749512 V		
					)			
					Integrated exhaust mass flow bank 1	>= 0.12 g		
					if the following conditions are met, sm moves to sm = 3			
					(			
					Secondary O2 sensor voltage bank 1	>= 0.85083 V		
					OR			
					(			
					Secondary O2 sensor voltage bank 1	>= 0.749512 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 1	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda bank 1	<= (a) + (b)		
					(a) Primary lambda control set point bank 1	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 1	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 1	>= 15 g		
					)			
					(			
					Secondary O2 sensor voltage bank 1	> (a) + (b)		
					(a) minimum secondary O2 voltage			
					(b) Offset voltage of Secondary O2 sensor	= 0.030518 V		
					)			
					statemachine (sm=2) - Lean mixture in catalyst			
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda	= 1.08008 -		
					for time	>= 3 sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 4					
					((					
					Secondary O2 sensor voltage	<=	0.150146	V		
					for time	>=	0.1	sec		
					)					
					OR					
					(					
					Secondary O2 sensor voltage	<=	0.150146	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 1	>	0.1	g		
					))					
					(					
					Primary A/F sensor lambda	<=	(a) + (b)			
					(a) Primary lambda control set point	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated lean exhaust gas mass flow bank 1	>=	15	g		
					)					
					statemachine (sm=3) - Lean mixture in catalyst	**=**	**TRUE**	-		
					a commanded lambda active bank 1	=	TRUE	-		
					primary A/F commanded lambda bank 1	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 4					
					(					
					Secondary O2 sensor voltage bank 1	<=	0.150146	V		
					for time	>=	0.1	sec		
					OR					
					(					
					Secondary O2 sensor voltage bank 1	<=	0.150146	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 1	>	0.1	g		
					))					
					(					
					Primary A/F sensor lambda bank 1	<=	(a) + (b)			
					(a) Primary lambda control set point	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda bank 1	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated lean exhaust gas mass flow bank 1	>=	15	g		
					)					
					statemachine (sm=4) - Rich mixture in catalyst	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	0.91992	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 3					
					(					
					Secondary O2 sensor voltage bank 1	>=	0.85083	V		
					OR					
					(					
					Secondary O2 sensor voltage bank 1	>=	0.749512	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 1	>	0.15	g		
					))					
					(					
					Primary A/F sensor lambda bank 1	<=	(a) + (b)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(a) Primary lambda control set point bank 1	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 1 (a) Primary lambda control set point	>= (a) - (b)		
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 1) (	>= 15 g		
					Primary A/F commanded lambda bank 1 (a) Primary A/F commanded lambda bank 1	<= (a) + (b)		
					(b) offset to the commanded lambda bank 1	0.1001		
					Secondary O2 sensor voltage bank 1 (a) minimum secondary O2 voltage Bank 1	> (a) + (b)		
					(b) Offset voltage of Secondary O2 sensor)	= 0.030518 V		
					EWMA filter strategy			
					Fast initialization mode (FIR)	= **TRUE**		
					EWMA filter initial value for FIR	= 0.3 s		
					EWMA filter constant	= 0.3008 Unitless		
					Maximum number of samples per	= 2 counts		
					Total number of samples for FIR	= 4 counts		
					Response to Step Change mode (RSC)	= TRUE		
					Response to Step Change mode inactive	= TRUE		
					absolute difference : ABS((a) - (b) (a) measured delayed response (b) EWMA filtered normalized monitoring result	> (b) * (c)		
					(c) Step change detection factor	0.35 s		
					EWMA filter constant	= 0.3008 Unitless		
					Maximum number of samples per	= 2 counts		
					Total number of samples for RSC mode	= 4 counts		
					Stabilized mode			
					EWMA filter constant	= 0.3008 Unitless		
					Total number of samples for stablilized mode	= 1 counts		
					No pending or confirmed DTCs	= see sheet inhibit table		
					Basic enable conditions met	= see sheet enable tables -		
Downstream Exhaust Gas Sensor	P014A	Compares measured delay response time of Seconday O2 sensor 2 bank 2 with the calibrated threshold when the sensor voltage changes Rich to Lean	Ewma filtered delay response time of Secondary O2 sensor 2, bank 2, Rich to Lean	> 0.75 sec	primary A/F commanded lambda Bank 2	<= 1.09009 -	2 Once per driving cycle	1 Trip
			(a) Raw delay response time of secondary O2 S2B2 Rich to Lean		primary A/F commanded lambda Bank 2	>= 0.8501 -		EWMA
			(b) Exhaust mass flow dependent correction for delay response time of secondary O2 sensor Rich to Lean	= 0 sec	engine runs	= TRUE -		
					Vehicle speed	>= 4.350528278 mph		
					engine speed	<= 3520 rpm		
					engine speed	>= 1000 rpm		
					engine load @ full engine mode (see Look-Up-Table #P0420-4)	>= 12 to 19.992 %		
					(engine load of full engine mode / 2) @ half engine mode (see Look-Up-Table #P0420-4)	>= 12 to 19.992 %		
					for time	>= 3 sec		
					Ratio total charge to charge in cylinder	< 1.00024 -		
					for time	>= 2 sec		
					Integrated air mass flow	> 60 g		
					measured ambient temperatuer	>= -39.8 deg C		
					measured ambient pressure	>= 50 kPa		
					measured engine coolant temperature	>= 52.06 deg C		
					no transmission gear change	= TRUE -		
					for time) (	>= 2 sec		
					integrated exhaust gas mass flow after the following operation points are in the monitoring window bank 2	> 60 g		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					Change of exhaust gas mass flow bank 2: (a) - (b)	<= 6.944444444 g/sec		
					Change of exhaust gas mass flow bank 2: (a) - (b)	>= -6.944444444 g/sec		
					(a) exhaust gas mass flow bank 2			
					(b) filtered exhaust gas mass flow bank 2			
					PT1 time constant	1.20029304 sec		
					Low window exhaust gas mass flow bank 2 (see Look-Up-Table #P0420-2)	<= 22.2222222222222 to 27.7777777777778 g/sec		
					Low window exhaust gas mass flow bank 2	>= 3.888888889 g/sec		
					Low window exhaust gas mass flow bank 2	>= (a) - (b)		
					(a) minimum exhaust gas mass flow bank 2	3.888888889 g/sec		
					(b) offset exhaust gas mass flow bank 2 at tip-out	0.833333333 g/sec		
					for time	>= 3 sec		
					High window exhaust gas mass flow bank 2 (see Look-Up-Table #P0420-1)	<= 22.2222222222222 to 27.7777777777778 g/sec		
					High window exhaust gas mass flow bank 2	>= 3.888888889 g/sec		
					)			
					(			
					Modeled catalyst temperature gradient bank 2: (a) - (b)	<= 40.0078 deg C		
					Modeled catalyst temperature gradient bank 2: (a) - (b)	>= -40.0078 deg C		
					(a) Modeled catalyst temperature bank 2			
					(b) filtered modeled catalyst temperature bank 2	= 4.9989321 sec		
					PT1 time constant			
					Low window modeled catalyst temperature	<= 650.006 deg C		
					Low window Modeled catalyst temperature bank 2	>= 520.022 deg C		
					High window modeled catalyst temperature bank 2	<= 780.014 deg C		
					High window Modeled catalyst temperature bank 2	>= 600.014 deg C		
					Modeled catalyst temperature bank 2 after the first engine start and driving	> 420.06 deg C		
					for time	>= 12 sec		
					))			
					((			
					Integrated purge mass flow after a longer purge stop	>= 1.51 g		
					HC concentration factor in chacoal canister	<= 40 factor		
					relative fuel portion of canister purge to injected fuel mass : (a) / (b)	0.200012 -		
					(a) fuel mass supplied by canister purge control			
					(b) fuel mass supplied by injection			
					OR			
					open loop canister purge control	= TRUE -		
					OR			
					canister purge control mass flow into the manifold	<= 5.555555556 g/sec		
					((			
					integrated exhaust gas mass flow bank 2 since engine start (see Look-Up-Table #P0420-3)	> 1600 to 2850 g		
					integrated exhaust gas mass flow bank 2 after the following sensors's readiness	> 40 g		
					(			
					Secondary O2 sensor readiness bank 2			
					Primary A/F sensor readiness bank 2			
					)			
						>= 350.0 deg C		
					temperature deviation of Primary A/F sensor heater control bank 2: (a) - (b)	< 64.9922 deg C		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(a) primary A/F sensor temperature set point for heater control	800.006 deg C		
					(b) measured primary A/F sensor temperature for heater control			
					)			
					statemachine = sm			
					statemachine (sm =0) : inactive	=		
					a commanded lambda active	= FALSE -		
					primary A/F commanded lambda	= 1 -		
					if the following conditions are met, sm moves to sm = 2			
					Secondary O2 sensor voltage Bank 2	>= 0.749512 V		
					if the following conditions are met, sm moves to sm = 1			
					Secondary O2 sensor voltage Bank 2	< 0.749512 V		
					Secondary O2 sensor voltage Bank 2	>= 0.450439 V		
					statemachine (sm=1) - rich mixture in catalyst	= TRUE -		
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda Bank 2	= 0.91992 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 2			
					((			
					Secondary O2 sensor voltage gradient over 0.05s	>= 0.069 V/s		
					Secondary O2 sensor voltage Bank 2	>= 0.749512 V		
					)			
					OR			
					Secondary O2 sensor voltage Bank 2	>= 0.749512 V		
					)			
					Integrated exhaust mass flow bank 2	>= 0.12 g		
					if the following conditions are met, sm moves to sm = 3			
					(			
					Secondary O2 sensor voltage bank 2	>= 0.85083 V		
					OR			
					(			
					Secondary O2 sensor voltage bank 2	>= 0.749512 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 2	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda bank 2	<= (a) + (b)		
					(a) Primary lambda control set point bank 2	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 2	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 2	>= 15 g		
					)			
					And			
					(			
					Secondary O2 sensor voltage bank 2	> (a) + (b)		
					(a) minimum secondary O2 voltage			
					(b) Offset voltage of Secondary O2 sensor	= 0.030518 V		
					)			
					statemachine (sm=2) - Lean mixture in catalyst			
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda	= 1.08008 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 4			
					((			
					Secondary O2 sensor voltage	<= 0.150146 V		
					for time	>= 0.1 sec		
					)			
					OR			
					(			
					Secondary O2 sensor voltage	<= 0.150146 V		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 2	>	0.1	g		
					))					
					(					
					Primary A/F sensor lambda	<=	(a) + (b)			
					(a) Primary lambda control set point	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated lean exhaust gas mass flow bank 2	>=	15	g		
					)					
					statemachine (sm=3) - Lean mixture in catalyst	**=**	**TRUE**	-		
					a commanded lambda active bank 2	=	TRUE	-		
					primary A/F commanded lambda bank 2	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 4					
					(					
					Secondary O2 sensor voltage bank 2	<=	0.150146	V		
					for time	>=	0.1	sec		
					OR					
					(					
					Secondary O2 sensor voltage bank 2	<=	0.150146	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 2	>	0.1	g		
					))					
					(					
					Primary A/F sensor lambda bank 2	<=	(a) + (b)			
					(a) Primary lambda control set point	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda bank 2	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated lean exhaust gas mass flow bank 2	>=	15	g		
					)					
					(					
					Primary A/F commanded lambda bank 2	<=	(a) + (b)			
					(a) Primary A/F commanded lambda bank 2					
					(b) offset to the commanded lambda bank 2		0.06006			
					Secondary O2 sensor voltage bank 2	>	(a) + (b)			
					(a) minimum secondary O2 voltage Bank 2					
					(b) Offset voltage of Secondary O2 sensor	=	0.030518	V		
					)					
					statemachine (sm=4) - Rich mixture in catalyst	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	0.91992	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 3					
					(					
					Secondary O2 sensor voltage bank 2	>=	0.85083	V		
					OR					
					(					
					Secondary O2 sensor voltage bank 2	>=	0.749512	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 2	>	0.15	g		
					))					
					(					
					Primary A/F sensor lambda bank 2	<=	(a) + (b)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(a) Primary lambda control set point bank 2	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 2 (a) Primary lambda control set point (b) maximum lambda deviation of rich mixture	>= (a) - (b) 0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 2)	>= 15 g		
					EWMA filter strategy			
					Fast initialization mode (FIR)	**= TRUE** -		
					EWMA filter initial value for FIR mode	= 0.4 sec		
					EWMA filter constant	= 0.3594 -		
					Maximum number of samples per trip	= 2 counts		
					Total number of samples for FIR mode	= 4 counts		
					Response to Step Change mode (RSC)	**=** TRUE -		
					Response to Step Change mode inactive	= TRUE -		
					absolute difference : ABS((a) - (b)) (a) measured delayed response time (b) EWMA filtered normalized monitoring result	> (b) * (c)		
					(c) Step change detection factor	0.4 sec		
					EWMA filter constant	= 0.3594 -		
					Maximum number of samples per trip	= 2 counts		
					Total number of samples for RSC mode	= 4 counts		
					EWMA filter constant	= 0.3594 -		
					Total number of samples for stabilized mode	= 1 counts		
					No pending or confirmed DTCs	= see sheet inhibit table		
					Basic enable conditions met	= see sheet enable tables -		
	P014B	Compares measured delay response time of Seconday O2 sensor 2 bank 2 with the calibrated threshold when the sensor voltage changes Lean to Rich	Ewma filtered delay response time of Secondary O2 sensor 2, bank 2, Lean to Rich	> 0.65 sec	primary A/F commanded lambda Bank 2	<= 1.09009 -	2 counts	1 Trip
			(a) Raw delay response time of secondary O2 S2B2 Lean to Rich		primary A/F commanded lambda Bank 2	>= 0.8501 -		EWMA
			(b) Exhaust mass flow dependent correction for delay response time of secondary O2 sensor Lean to Rich	0 sec	engine runs	= TRUE -		
					Vehicle speed	>= 4.350528278 mph		
					engine speed	<= 3520 rpm		
					engine speed	>= 1000 rpm		
					engine load @ full engine mode (see Look-Up-Table #P0420-4)	>= 12 to 19.992 %		
					(engine load of full engine mode / 2) @ half engine mode (see Look-Up-Table #P0420-4)	>= 12 to 19.992 %		
					for time	>= 3 sec		
					Ratio total charge to charge in cylinder	< 1.00024 -		
					for time	>= 2 sec		
					Integrated air mass flow	> 60 g		
					measured ambient temperatuer	>= -39.8 deg C		
					measured ambient pressure	>= 50 kPa		
					measured engine coolant temperature	>= 52.06 deg C		
					no transmission gear change	= TRUE -		
					for time)	>= 2 sec		
					(integrated exhaust gas mass flow after the following operation points are in the monitoring window bank 2 (	> 60 g		
					Change of exhaust gas mass flow bank 2: (a) - (b)	<= 6.944444444 g/sec		
					Change of exhaust gas mass flow bank 2: (a) - (b) (a) exhaust gas mass flow bank 2 (b) filtered exhaust gas mass flow bank 2	>= -6.944444444 g/sec		
					PT1 time constant	1.20029304 sec		
					Low window exhaust gas mass flow bank 2 (see Look-Up-Table #P0420-2)	<= 22.222222222222 2 to 27.777777777777 8 g/sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Low window exhaust gas mass flow bank 2	>= 3.888888889 g/sec		
					Low window exhaust gas mass flow bank 2 (a) minimum exhaust gas mass flow bank 2	>= (a) - (b) 3.888888889 g/sec		
					(b) offset exhaust gas mass flow bank 2 at tip-out	0.833333333 g/sec		
					for time	>= 3 sec		
					High window exhaust gas mass flow bank 2 (see Look-Up-Table #P0420-1)	<= 22.2222222222222 to 27.7777777777778 g/sec		
					High window exhaust gas mass flow bank 2	>= 3.888888889 g/sec		
					) (			
					Modeled catalyst temperature gradient bank 2: (a) - (b)	<= 40.0078 deg C		
					Modeled catalyst temperature gradient bank 2: (a) - (b) (a) Modeled catalyst temperature bank 2	>= -40.0078 deg C		
					(b) filtered modeled catalyst temperature bank 2 PT1 time constant	= 4.9989321 sec		
					Low window modeled catalyst temperature bank 2	<= 650.006 deg C		
					Low window Modeled catalyst temperature bank 2	>= 520.022 deg C		
					High window modeled catalyst temperature bank 2	<= 780.014 deg C		
					High window Modeled catalyst temperature bank 2	>= 600.014 deg C		
					Modeled catalyst temperature bank 2 after the first engine start and driving	> 420.06 deg C		
					for time))	>= 12 sec		
					((Integrated purge mass flow after a longer purge stop	>= 1.51 g		
					HC concentration factor in chacoal canister	<= 40 factor		
					relative fuel portion of canister purge to injected fuel mass : (a) / (b) (a) fuel mass supplied by canister purge control (b) fuel mass supplied by injection	0.200012 -		
					OR			
					open loop canister purge control OR	= TRUE -		
					canister purge control mass flow into the manifold	<= 5.555555556 g/sec		
					((integrated exhaust gas mass flow bank 2 since engine start (see Look-Up-Table #P0420-3)	> 1600 to 2850 g		
					integrated exhaust gas mass flow bank 2 after the following sensors's readiness (Secondary O2 sensor readiness bank 2 Primary A/F sensor readiness bank 2)	> 40 g		
						>= 350.0 deg C		
					temperature deviation of Primary A/F sensor heater control bank 2: (a) - (b)	< 64.9922 deg C		
					(a) primary A/F sensor temperature set point for heater control (b) measured primary A/F sensor temperature for heater control)	800.006 deg C		
					statemachine = sm **statemachine (sm =0) : inactive**	=		
					a commanded lambda active	= FALSE -		
					primary A/F commanded lambda **if the following conditions are met, sm moves to sm = 2**	= 1 -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Secondary O2 sensor voltage Bank 2	>=	0.749512	V		
					if the following conditions are met, sm moves to sm = 1					
					Secondary O2 sensor voltage Bank 2	<	0.749512	V		
					Secondary O2 sensor voltage Bank 2	>=	0.450439	V		
					statemachine (sm=1) - rich mixture in catalyst	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda Bank 2	=	0.91992	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 2					
					((					
					Secondary O2 sensor voltage gradient over 0.05s	>=	0.069	V/s		
					Secondary O2 sensor voltage Bank 2	>=	0.749512	V		
					)					
					OR					
					Secondary O2 sensor voltage Bank 2	>=	0.749512	V		
					)					
					Integrated exhaust mass flow bank 2	>=	0.12	g		
					if the following conditions are met, sm moves to sm = 3					
					(					
					Secondary O2 sensor voltage bank 2	>=	0.85083	V		
					OR					
					(					
					Secondary O2 sensor voltage bank 2	>=	0.749512	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 2	>	0.15	g		
					))					
					(					
					Primary A/F sensor lambda bank 2	<=	(a) + (b)			
					(a) Primary lambda control set point bank 2	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda bank 2	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated rich exhaust gas mass flow bank 2	>=	15	g		
					)					
					And					
					(					
					Secondary O2 sensor voltage bank 2	>	(a) + (b)			
					(a) minimum secondary O2 voltage					
					(b) Offset voltage of Secondary O2 sensor	=	0.030518	V		
					)					
					statemachine (sm=2) - Lean mixture in catalyst					
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 4					
					((					
					Secondary O2 sensor voltage	<=	0.150146	V		
					for time	>=	0.1	sec		
					)					
					OR					
					(					
					Secondary O2 sensor voltage	<=	0.150146	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 2	>	0.1	g		
					))					
					(					
					Primary A/F sensor lambda	<=	(a) + (b)			
					(a) Primary lambda control set point	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda	>=	(a) - (b)			
					(a) Primary lambda control set point					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated lean exhaust gas mass flow bank 2	>= 15 g		
					)			
					statemachine (sm=3) - Lean mixture in catalyst	**= TRUE -**		
					a commanded lambda active bank 2	= TRUE -		
					primary A/F commanded lambda bank 2	= 1.08008 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 4			
					(			
					Secondary O2 sensor voltage bank 2	<= 0.150146 V		
					for time	>= 0.1 sec		
					OR			
					(			
					Secondary O2 sensor voltage bank 2	<= 0.150146 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 2	> 0.1 g		
					))			
					(			
					Primary A/F sensor lambda bank 2	<= (a) + (b)		
					(a) Primary lambda control set point	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 2	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated lean exhaust gas mass flow bank 2	>= 15 g		
					)			
					statemachine (sm=4) - Rich mixture in catalyst	= TRUE -		
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda	= 0.91992 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 3			
					(			
					Secondary O2 sensor voltage bank 2	>= 0.85083 V		
					OR			
					(			
					Secondary O2 sensor voltage bank 2	>= 0.749512 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 2	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda bank 2	<= (a) + (b)		
					(a) Primary lambda control set point bank 2	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 2	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 2	>= 15 g		
					)			
					(			
					Primary A/F commanded lambda bank 2	<= (a) + (b)		
					(a) Primary A/F commanded lambda bank 2			
					(b) offset to the commanded lambda bank 2	0.1001		
					Secondary O2 sensor voltage bank 2	> (a) + (b)		
					(a) minimum secondary O2 voltage Bank 2			
					(b) Offset voltage of Secondary O2 sensor	= 0.030518 V		
					)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					Secondary O2 sensor voltage bank 2	> (a) + (b)		
					(a) minimum secondary O2 voltage Bank 2			
					(b) Offset voltage of Secondary O2 sensor	= 0.030518 V		
					)			
					EWMA filter strategy			
					Fast initialization mode (FIR)	= **TRUE**		
					EWMA filter initial value for FIR	= 0.3 s		
					EWMA filter constant	= 0.3008 Unitless		
					Maximum number of samples per	= 2 counts		
					Total number of samples for FIR	= 4 counts		
					Response to Step Change mode (RSC)	= TRUE		
					Response to Step Change mode inactive	= TRUE		
					absolute difference : ABS((a) - (b)	> (b) * (c)		
					(a) measured delayed response			
					(b) EWMA filtered normalized monitoring result			
					(c) Step change detection factor	0.35 s		
					EWMA filter constant	= 0.3008 Unitless		
					Maximum number of samples per	= 2 counts		
					Total number of samples for RSC mode	= 4 counts		
					Stabilized mode			
					EWMA filter constant	= 0.3008 Unitless		
					Total number of samples for stablilized mode	= 1 counts		
					No pending or confirmed DTCs	= see sheet inhibit table		
					Basic enable conditions met	= see sheet enable tables -		
Downstream Exhaust Gas Sensor	P2270	Compare maximum secondary O2 sensor voltage bank 1 with a calibrated threshold during intrusive commanded rich lambda	Maximum Secondary O2 sensor voltage bank 1 during lambda shifting to rich	< 0.749512 V			once per driving cycle	2 Trips
					primary A/F commanded lambda	<= 1.09009 -		
					primary A/F commanded lambda	>= 0.8501 -		
					engine runs	= TRUE -		
					(			
					Deceleration Fuel Cut-Off (DFCO)	= FALSE -		
					for time	>= 10 sec		
					Vehicle speed	>= 4.350528278 mph		
					engine speed	<= 3520 rpm		
					engine speed	>= 1000 rpm		
					engine load @ full engine mode (see Look-Up-Table #P0420-4)	>= 12 to 19.992 %		
					(engine load of full engine mode / 2) @ half engine mode (see Look-Up-Table #P0420-4)	>= 12 to 19.992 %		
					for time	>= 3 sec		
					Ratio total charge to charge in cylinder	< 1.00024 -		
					for time	>= 2 sec		
					Integrated air mass flow	> 60 g		
					measured ambient temperatuer	>= -39.8 deg C		
					measured ambient pressure	>= 50 kPa		
					measured engine coolant temperature	>= 52.06 deg C		
					no transmission gear change	= TRUE -		
					for time	>= 2 sec		
					)			
					(			
					integrated exhaust gas mass flow after the following operation points are in the monitoring window bank 1	> 60 g		
					(			
					Change of exhaust gas mass flow bank 1: (a) - (b)	<= 6.944444444 g/sec		
					Change of exhaust gas mass flow bank 1: (a) - (b)	>= -6.944444444 g/sec		
					(a) exhaust gas mass flow bank 1			
					(b) filtered exhaust gas mass flow bank 1			
					PT1 time constant	1.20029304 sec		
					Low window exhaust gas mass flow bank 1 (see Look-Up-Table #P0420-2)	<= 22.222222222222 2 to 27.777777777777 8 g/sec		
					Low window exhaust gas mass flow bank 1	>= 3.888888889 g/sec		
					Low window exhaust gas mass flow bank 1	>= (a) - (b)		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(a) minimum exhaust gas mass flow bank 1		3.888888889	g/sec		
					(b) offset exhaust gas mass flow bank 1 at tip-out		0.833333333	g/sec		
					for time	>=	3	sec		
					High window exhaust gas mass flow bank 1 (see Look-Up-Table #P0420-1)	<=	22.2222222222222 to 27.7777777777778	g/sec		
					High window exhaust gas mass flow bank 1	>=	3.888888889	g/sec		
					)					
					(					
					Modeled catalyst temperature gradient bank 1: (a) - (b)	<=	40.0078	deg C		
					Modeled catalyst temperature gradient bank 1: (a) - (b)	>=	-40.0078	deg C		
					(a) Modeled catalyst temperature bank 1 (b) filtered modeled catalyst temperature bank 1 PT1 time constant	=	4.9989321	sec		
					Low window modeled catalyst temperature bank 1	<=	650.006	deg C		
					Low window Modeled catalyst temperature bank 1	>=	520.022	deg C		
					High window modeled catalyst temperature bank 1	<=	780.014	deg C		
					High window Modeled catalyst temperature bank 1	>=	600.014	deg C		
					Modeled catalyst temperature bank 1 after the first engine start and driving	>	420.06	deg C		
					for time	>=	12	sec		
					))					
					((					
					Integrated purge mass flow after a longer purge stop	>=	1.51	g		
					HC concentration factor in chacoal canister	<=	40	factor		
					relative fuel portion of canister purge to injected fuel mass : (a) / (b) (a) fuel mass supplied by canister purge control (b) fuel mass supplied by injection		0.200012	-		
					OR					
					open loop canister purge control	=	TRUE	-		
					OR					
					canister purge control mass flow into the manifold	<=	5.555555556	g/sec		
					((					
					integrated exhaust gas mass flow bank 1 since engine start (see Look-Up-Table #P0420-3)	>	1600 to 2850	g		
					integrated exhaust gas mass flow bank 1 after the following sensors's readiness	>	40	g		
					(Secondary O2 sensor readiness bank 1 Primary A/F sensor readiness bank 1)					
						>=	350.0	deg C		
					temperature deviation of Primary A/F sensor heater control bank 1: (a) - (b)	<	64.9922	deg C		
					(a) primary A/F sensor temperature set point for heater control		800.006	deg C		
					(b) measured primary A/F sensor temperature for heater control)					
					statemachine = sm					
					statemachine (sm =0) : inactive	=				
					a commanded lambda active	=	FALSE	-		
					primary A/F commanded lambda	=	1	-		
					if the following conditions are met, sm moves to sm = 2					
					Secondary O2 sensor voltage bank1	>=	0.749512	V		
					if the following conditions are met, sm moves to sm = 1					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Secondary O2 sensor voltage bank1	< 0.749512 V		
					Secondary O2 sensor voltage bank1	>= 0.450439 V		
					statemachine (sm=1) - rich mixture in catalyst	= TRUE -		
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda bank1	= 0.91992 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					Integrated Rich Gas Storage Capacity	>= 1.6 g		
					for time	>= 1 sec		
					Primary A/F commanded lambda bank 1	<= 0.75 -		
					Integreted Exhaust mass flow	>= 100 g		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 2			
					((			
					Secondary O2 sensor voltage gradient over 0.05s	>= 0.069 V/s		
					Secondary O2 sensor voltage bank1	>= 0.749512 V		
					)			
					OR			
					Secondary O2 sensor voltage bank1	>= 0.749512 V		
					)			
					Integrated exhaust mass flow bank 1	>= 0.12 g		
					if the following conditions are met, sm moves to sm = 3			
					(			
					Secondary O2 sensor voltage bank 1	>= 0.85083 V		
					OR			
					(			
					Secondary O2 sensor voltage bank 1	>= 0.749512 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 1	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda bank 1	<= (a) + (b)		
					(a) Primary lambda control set point bank 1	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 1	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 1	>= 15 g		
					)			
					(			
					Secondary O2 sensor voltage bank 1	> (a) + (b)		
					(a) minimum secondary O2 voltage			
					(b) Offset voltage of Secondary O2 sensor	= 0.030518 V		
					)			
					statemachine (sm=2) - Lean mixture in catalyst			
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda	= 1.08008 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 4			
					((			
					Secondary O2 sensor voltage bank 1	<= 0.150146 V		
					for time	>= 0.1 sec		
					)			
					OR			
					(			
					Secondary O2 sensor voltage	<= 0.150146 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 1	> 0.1 g		
					))			
					(			
					Primary A/F sensor lambda	<= (a) + (b)		
					(a) Primary lambda control set point	(a)		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated lean exhaust gas mass flow bank 1	>=	15	g		
					)					
					statemachine (sm=3) - Lean mixture in catalyst	**=**	**TRUE**	-		
					a commanded lambda active bank 1	=	TRUE	-		
					primary A/F commanded lambda bank 1	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 4					
					(					
					Secondary O2 sensor voltage bank 1	<=	0.150146	V		
					for time	>=	0.1	sec		
					OR					
					(					
					Secondary O2 sensor voltage bank 1	<=	0.150146	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 1	>	0.1	g		
					))					
					(					
					Primary A/F sensor lambda bank 1	<=	(a) + (b)			
					(a) Primary lambda control set point	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda bank 1	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated lean exhaust gas mass flow bank 1	>=	15	g		
					)					
					statemachine (sm=4) - Rich mixture in catalyst	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	0.91992	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					Integrated Rich Gas Storage Capacity	>=	1.6	g		
					for time	>=	1	sec		
					Primary A/F commanded lambda bank 1	<=	0.75	-		
					Integreted Exhaust mass flow	>=	100	g		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 3					
					(					
					Secondary O2 sensor voltage bank 1	>=	0.85083	V		
					OR					
					(					
					Secondary O2 sensor voltage bank 1	>=	0.749512	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 1	>	0.15	g		
					))					
					(					
					Primary A/F sensor lambda bank 1	<=	(a) + (b)			
					(a) Primary lambda control set point bank 1	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda bank 1	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated rich exhaust gas mass flow bank 1	>=	15	g		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					)			
					No pending or confirmed DTCs	= see sheet inhibit table -		
					Basic enable conditions met	= see sheet enable tables		
	P2271	Compare maximum secondary O2 sensor voltage bank 1 with a calibrated threshold during intrusive commanded rich lambda	Minimum secondary O2 sensor voltage bank 1 during lambda shifting to lean	> 0.150146 V	primary A/F commanded lambda	<= 1.09009 -	once per driving cycle	2 Trips
					primary A/F commanded lambda	>= 0.8501 -		
					engine runs	= TRUE -		
					(			
					Deceleration Fuel Cut-Off (DFCO)	= FALSE -		
					for time	>= 10 sec		
					Vehicle speed	>= 4.350528278 mph		
					engine speed	<= 3520 rpm		
					engine speed	>= 1000 rpm		
					engine load @ full engine mode (see Look-Up-Table #P0420-4)	>= 12 to 19.992 %		
					(engine load of full engine mode / 2) @ half engine mode (see Look-Up-Table #P0420-4)	>= 12 to 19.992 %		
					for time	>= 3 sec		
					Ratio total charge to charge in cylinder	< 1.00024 -		
					for time	>= 2 sec		
					Integrated air mass flow	> 60 g		
					measured ambient temperatuer	>= -39.8 deg C		
					measured ambient pressure	>= 50 kPa		
					measured engine coolant temperature	>= 52.06 deg C		
					no transmission gear change	= TRUE -		
					for time	>= 2 sec		
					)			
					(			
					integrated exhaust gas mass flow after the following operation points are in the monitoring window bank 1	> 60 g		
					(			
					Change of exhaust gas mass flow bank 1: (a) - (b)	<= 6.944444444 g/sec		
					Change of exhaust gas mass flow bank 1: (a) - (b)	>= -6.944444444 g/sec		
					(a) exhaust gas mass flow bank 1			
					(b) filtered exhaust gas mass flow bank 1			
					PT1 time constant	1.20029304 sec		
					Low window exhaust gas mass flow bank 1 (see Look-Up-Table #P0420-2)	<= 22.222222222222 2 to 27.777777777777 8 g/sec		
					Low window exhaust gas mass flow bank 1	>= 3.888888889 g/sec		
					Low window exhaust gas mass flow bank 1	>= (a) - (b)		
					(a) minimum exhaust gas mass flow bank 1	3.888888889 g/sec		
					(b) offset exhaust gas mass flow bank 1 at tip-out	0.833333333 g/sec		
					for time	>= 3 sec		
					High window exhaust gas mass flow bank 1 (see Look-Up-Table #P0420-1)	<= 22.222222222222 2 to 27.777777777777 8 g/sec		
					High window exhaust gas mass flow bank 1	>= 3.888888889 g/sec		
					)			
					(			
					Modeled catalyst temperature gradient bank 1: (a) - (b)	<= 40.0078 deg C		
					Modeled catalyst temperature gradient bank 1: (a) - (b)	>= -40.0078 deg C		
					(a) Modeled catalyst temperature bank 1			
					(b) filtered modeled catalyst temperature bank 1	= 4.9989321 sec		
					PT1 time constant			
					Low window modeled catalyst temperature bank 1	<= 650.006 deg C		
					Low window Modeled catalyst temperature bank 1	>= 520.022 deg C		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					High window modeled catalyst temperature bank 1	<=	780.014	deg C		
					High window Modeled catalyst temperature bank 1	>=	600.014	deg C		
					Modeled catalyst temperature bank 1 after the first engine start and driving	>	420.06	deg C		
					for time	>=	12	sec		
					))					
					((					
					Integrated purge mass flow after a longer purge stop	>=	1.51	g		
					HC concentration factor in chacoal canister	<=	40	factor		
					relative fuel portion of canister purge to injected fuel mass : (a) / (b) (a) fuel mass supplied by canister purge control (b) fuel mass supplied by injection		0.200012	-		
					OR					
					open loop canister purge control	=	TRUE	-		
					OR					
					canister purge control mass flow into the manifold	<=	5.555555556	g/sec		
					((					
					integrated exhaust gas mass flow bank 1 since engine start (see Look-Up-Table #P0420-3)	>	1600 to 2850	g		
					integrated exhaust gas mass flow bank 1 after the following sensors's readiness	>	40	g		
					(					
					Secondary O2 sensor readiness bank 1					
					Primary A/F sensor readiness bank 1					
					)					
						>=	350.0	deg C		
					temperature deviation of Primary A/F sensor heater control bank 1: (a) - (b)	<	64.9922	deg C		
					(a) primary A/F sensor temperature set point for heater control		800.006	deg C		
					(b) measured primary A/F sensor temperature for heater control					
					)					
					statemachine = sm					
					statemachine (sm =0) : inactive	=				
					a commanded lambda active	=	FALSE	-		
					primary A/F commanded lambda	=	1	-		
					if the following conditions are met, sm moves to sm = 2					
					Secondary O2 sensor voltage bank1	>=	0.749512	V		
					if the following conditions are met, sm moves to sm = 1					
					Secondary O2 sensor voltage bank1	<	0.749512	V		
					Secondary O2 sensor voltage bank1	>=	0.450439	V		
					statemachine (sm=1) - rich mixture in catalyst	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda bank1	=	0.91992	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 2					
					((					
					Secondary O2 sensor voltage gradient over 0.05s	>=	0.069	V/s		
					Secondary O2 sensor voltage bank1	>=	0.749512	V		
					)					
					OR					
					Secondary O2 sensor voltage bank1	>=	0.749512	V		
					)					
					Integrated exhaust mass flow bank 1	>=	0.12	g		
					if the following conditions are met, sm moves to sm = 3					
					(					
					Secondary O2 sensor voltage bank 1	>=	0.85083	V		
					OR					
					(					
					Secondary O2 sensor voltage bank 1	>=	0.749512	V		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 1	>	0.15	g		
					))					
					(					
					Primary A/F sensor lambda bank 1	<=	(a) + (b)			
					(a) Primary lambda control set point bank 1	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda bank 1	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated rich exhaust gas mass flow bank 1	>=	15	g		
					)					
					(					
					Secondary O2 sensor voltage bank 1	>	(a) + (b)			
					(a) minimum secondary O2 voltage					
					(b) Offset voltage of Secondary O2 sensor	=	0.030518	V		
					)					
					statemachine (sm=2) - Lean mixture in catalyst					
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					(					
					Integrated Oxygen Storage Capacity	>=	1.3	g		
					for time	>=	1	sec		
					Primary A/F commanded lambda bank 1	>=	1.1499	-		
					Integreted Exhaust mass flow	>=	100	g		
					for time	>=	0.2	sec		
					)					
					if the following conditions are met, sm moves to sm = 4					
					((					
					Secondary O2 sensor voltage bank 1	<=	0.150146	V		
					for time	>=	0.1	sec		
					)					
					OR					
					(					
					Secondary O2 sensor voltage	<=	0.150146	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 1	>	0.1	g		
					))					
					(					
					Primary A/F sensor lambda	<=	(a) + (b)			
					(a) Primary lambda control set point	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated lean exhaust gas mass flow bank 1	>=	15	g		
					)					
					statemachine (sm=3) - Lean mixture in catalyst	**=**	**TRUE**	-		
					a commanded lambda active bank 1	=	TRUE	-		
					primary A/F commanded lambda bank 1	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					Integrated Oxygen Storage Capacity	>=	1.3	g		
					for time	>=	1	sec		
					Primary A/F commanded lambda bank 1	>=	1.1499	-		
					Integreted Exhaust mass flow	>=	100	g		
					for time	>=	0.2	sec		
					)					
					if the following conditions are met, sm moves to sm = 4					
					(					
					Secondary O2 sensor voltage bank 1	<=	0.150146	V		
					for time	>=	0.1	sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR			
					(			
					Secondary O2 sensor voltage bank 1	<= 0.150146 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 1	> 0.1 g		
					))			
					(			
					Primary A/F sensor lambda bank 1	<= (a) + (b)		
					(a) Primary lambda control set point	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 1	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated lean exhaust gas mass flow bank 1	>= 15 g		
					)			
					statemachine (sm=4) - Rich mixture in catalyst	= TRUE -		
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda	= 0.91992 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 3			
					(			
					Secondary O2 sensor voltage bank 1	>= 0.85083 V		
					OR			
					(			
					Secondary O2 sensor voltage bank 1	>= 0.749512 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 1	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda bank 1	<= (a) + (b)		
					(a) Primary lambda control set point bank 1	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 1	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 1	>= 15 g		
					)			
					No pending or confirmed DTCs	= see sheet inhibit table -		
					Basic enable conditions met	= see sheet enable tables		
	P2272	Compare maximum secondary O2 sensor voltage bank 2 with a calibrated threshold during intrusive commanded rich lambda	Maximum Secondary O2 sensor voltage bank 2 during lambda shifting to rich	< 0.749512 V			once per driving cycle	2 Trips
					primary A/F commanded lambda	<= 1.09009 -		
					primary A/F commanded lambda	>= 0.8501 -		
					engine runs	= TRUE -		
					(			
					Deceleration Fuel Cut-Off (DFCO)	= FALSE -		
					for time	>= 10 sec		
					Vehicle speed	>= 4.350528278 mph		
					engine speed	<= 3520 rpm		
					engine speed	>= 1000 rpm		
					engine load @ full engine mode (see Look-Up-Table #P0420-4)	>= 12 to 19.992 %		
					(engine load of full engine mode / 2) @ half engine mode (see Look-Up-Table #P0420-4)	>= 12 to 19.992 %		
					for time	>= 3 sec		
					Ratio total charge to charge in cylinder	< 1.00024 -		
					for time	>= 2 sec		
					Integrated air mass flow	> 60 g		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					measured ambient temperatuer	>=	-39.8	deg C		
					measured ambient pressure	>=	50	kPa		
					measured engine coolant temperature	>=	52.06	deg C		
					no transmission gear change	=	TRUE	-		
					for time	>=	2	sec		
					)					
					(					
					integrated exhaust gas mass flow after the following operation points are in the monitoring window bank 1	>	60	g		
					(					
					Change of exhaust gas mass flow bank 1: (a) - (b)	<=	6.944444444	g/sec		
					Change of exhaust gas mass flow bank 1: (a) - (b)	>=	-6.944444444	g/sec		
					(a) exhaust gas mass flow bank 1					
					(b) filtered exhaust gas mass flow bank 1					
					PT1 time constant		1.20029304	sec		
					Low window exhaust gas mass flow bank 1 (see Look-Up-Table #P0420-2)	<=	22.2222222222222 to 27.7777777777778	g/sec		
					Low window exhaust gas mass flow bank 1	>=	3.888888889	g/sec		
					Low window exhaust gas mass flow bank 1	>=	(a) - (b)			
					(a) minimum exhaust gas mass flow bank 1		3.888888889	g/sec		
					(b) offset exhaust gas mass flow bank 1 at tip-out		0.833333333	g/sec		
					for time	>=	3	sec		
					High window exhaust gas mass flow bank 1 (see Look-Up-Table #P0420-1)	<=	22.2222222222222 to 27.7777777777778	g/sec		
					High window exhaust gas mass flow bank 1	>=	3.888888889	g/sec		
					)					
					(					
					Modeled catalyst temperature gradient bank 1: (a) - (b)	<=	40.0078	deg C		
					Modeled catalyst temperature gradient bank 1: (a) - (b)	>=	-40.0078	deg C		
					(a) Modeled catalyst temperature bank 1					
					(b) filtered modeled catalyst temperature bank 1	=	4.9989321	sec		
					PT1 time constant					
					Low window modeled catalyst temperature bank 1	<=	650.006	deg C		
					Low window Modeled catalyst temperature bank 1	>=	520.022	deg C		
					High window modeled catalyst temperature bank 1	<=	780.014	deg C		
					High window Modeled catalyst temperature bank 1	>=	600.014	deg C		
					Modeled catalyst temperature bank 1 after the first engine start and driving	>	420.06	deg C		
					for time	>=	12	sec		
					))					
					((					
					Integrated purge mass flow after a longer purge stop	>=	1.51	g		
					HC concentration factor in chacoal canister	<=	40	factor		
					relative fuel portion of canister purge to injected fuel mass : (a) / (b)		0.200012	-		
					(a) fuel mass supplied by canister purge control					
					(b) fuel mass supplied by injection					
					OR					
					open loop canister purge control	=	TRUE	-		
					OR					
					canister purge control mass flow into the manifold	<=	5.555555556	g/sec		
					((					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					integrated exhaust gas mass flow bank 1 since engine start (see Look-Up-Table #P0420-3)	> 1600 to 2850 g		
					integrated exhaust gas mass flow bank 1 after the following sensors's readiness	> 40 g		
					(			
					Secondary O2 sensor readiness bank 1			
					Primary A/F sensor readiness bank 1			
					)			
						>= 350.0 deg C		
					temperature deviation of Primary A/F sensor heater control bank 1: (a) - (b)	< 64.9922 deg C		
					(a) primary A/F sensor temperature set point for heater control	800.006 deg C		
					(b) measured primary A/F sensor temperature for heater control			
					)			
					statemachine = sm			
					statemachine (sm =0) : inactive	=		
					a commanded lambda active	= FALSE -		
					primary A/F commanded lambda	= 1 -		
					if the following conditions are met, sm moves to sm = 2			
					Secondary O2 sensor voltage bank1	>= 0.749512 V		
					if the following conditions are met, sm moves to sm = 1			
					Secondary O2 sensor voltage bank1	< 0.749512 V		
					Secondary O2 sensor voltage bank1	>= 0.450439 V		
					statemachine (sm=1) - rich mixture in catalyst	= TRUE -		
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda bank1	= 0.91992 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					Integrated Rich Gas Storage Capacity	>= 1.6 g		
					for time	>= 1 sec		
					Primary A/F commanded lambda bank 1	<= 0.75 -		
					Integreted Exhaust mass flow	>= 100 g		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 2			
					((			
					Secondary O2 sensor voltage gradient over 0.05s	>= 0.069 V/s		
					Secondary O2 sensor voltage bank1	>= 0.749512 V		
					)			
					OR			
					Secondary O2 sensor voltage bank1	>= 0.749512 V		
					)			
					Integrated exhaust mass flow bank 1	>= 0.12 g		
					if the following conditions are met, sm moves to sm = 3			
					(			
					Secondary O2 sensor voltage bank 1	>= 0.85083 V		
					OR			
					(			
					Secondary O2 sensor voltage bank 1	>= 0.749512 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 1	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda bank 1	<= (a) + (b)		
					(a) Primary lambda control set point bank 1	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 1	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 1	>= 15 g		
					)			
					(			
					Secondary O2 sensor voltage bank 1	> (a) + (b)		
					(a) minimum secondary O2 voltage			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(b) Offset voltage of Secondary O2 sensor	=	0.030518	V		
					)					
					statemachine (sm=2) - Lean mixture in catalyst					
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 4					
					((					
					Secondary O2 sensor voltage bank 1	<=	0.150146	V		
					for time	>=	0.1	sec		
					)					
					OR					
					(					
					Secondary O2 sensor voltage	<=	0.150146	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 1	>	0.1	g		
					))					
					(					
					Primary A/F sensor lambda	<=	(a) + (b)			
					(a) Primary lambda control set point	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated lean exhaust gas mass flow bank 1	>=	15	g		
					)					
					statemachine (sm=3) - Lean mixture in catalyst	**=**	**TRUE**	-		
					a commanded lambda active bank 1	=	TRUE	-		
					primary A/F commanded lambda bank 1	=	1.08008	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					if the following conditions are met, sm moves to sm = 4					
					(					
					Secondary O2 sensor voltage bank 1	<=	0.150146	V		
					for time	>=	0.1	sec		
					OR					
					(					
					Secondary O2 sensor voltage bank 1	<=	0.150146	V		
					Secondary O2 sensor voltage gradient over 0.05s	<=	0.09944	V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>=	-0.09944	V/s		
					Integrated Oxygen mass flow bank 1	>	0.1	g		
					))					
					(					
					Primary A/F sensor lambda bank 1	<=	(a) + (b)			
					(a) Primary lambda control set point	(a)				
					(b) maximum lambda deviation of lean mixture	(b)	0.05005	-		
					Primary A/F sensor lambda bank 1	>=	(a) - (b)			
					(a) Primary lambda control set point					
					(b) maximum lambda deviation of rich mixture		0.05005	-		
					for time	>=	0.2	sec		
					Integrated lean exhaust gas mass flow bank 1	>=	15	g		
					)					
					statemachine (sm=4) - Rich mixture in catalyst	=	TRUE	-		
					a commanded lambda active	=	TRUE	-		
					primary A/F commanded lambda	=	0.91992	-		
					for time	>=	3	sec		
					for time	>=	0.2	sec		
					Integrated Rich Gas Storage Capacity	>=	1.6	g		
					for time	>=	1	sec		
					Primary A/F commanded lambda bank 1	<=	0.75	-		
					Integreted Exhaust mass flow	>=	100	g		
					for time	>=	0.2	sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					if the following conditions are met, sm moves to sm = 3			
					(			
					Secondary O2 sensor voltage bank 1	>= 0.85083 V		
					OR			
					(			
					Secondary O2 sensor voltage bank 1	>= 0.749512 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 1	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda bank 1	<= (a) + (b)		
					(a) Primary lambda control set point bank 1	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 1	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 1	>= 15 g		
					)			
					No pending or confirmed DTCs	= see sheet inhibit table -		
					Basic enable conditions met	= see sheet enable tables		
	P2273	Compare maximum secondary O2 sensor voltage bank 2 with a calibrated threshold during intrusive commanded rich lambda	Minimum secondary O2 sensor voltage bank 2 during lambda shifting to lean	> 0.150146 V	primary A/F commanded lambda	<= 1.09009 -	once per driving cycle	2 Trips
					primary A/F commanded lambda	>= 0.8501 -		
					engine runs	= TRUE -		
					(			
					Deceleration Fuel Cut-Off (DFCO)	= FALSE -		
					for time	>= 10 sec		
					Vehicle speed	>= 4.350528278 mph		
					engine speed	<= 3520 rpm		
					engine speed	>= 1000 rpm		
					engine load @ full engine mode (see Look-Up-Table #P0420-4)	>= 12 to 19.992 %		
					(engine load of full engine mode / 2) @ half engine mode (see Look-Up-Table #P0420-4)	>= 12 to 19.992 %		
					for time	>= 3 sec		
					Ratio total charge to charge in cylinder	< 1.00024 -		
					for time	>= 2 sec		
					Integrated air mass flow	> 60 g		
					measured ambient temperatuer	>= -39.8 deg C		
					measured ambient pressure	>= 50 kPa		
					measured engine coolant temperature	>= 52.06 deg C		
					no transmission gear change	= TRUE -		
					for time	>= 2 sec		
					)			
					(			
					integrated exhaust gas mass flow after the following operation points are in the monitoring window bank 2	> 60 g		
					(			
					Change of exhaust gas mass flow bank 2: (a) - (b)	<= 6.944444444 g/sec		
					Change of exhaust gas mass flow bank 2: (a) - (b)	>= -6.944444444 g/sec		
					(a) exhaust gas mass flow bank 2			
					(b) filtered exhaust gas mass flow bank 2			
					PT1 time constant	1.20029304 sec		
					Low window exhaust gas mass flow bank 2 (see Look-Up-Table #P0420-2)	<= 22.2222222222222 to 27.7777777777778 g/sec		
					Low window exhaust gas mass flow bank 2	>= 3.888888889 g/sec		
					Low window exhaust gas mass flow bank 2	>= (a) - (b)		
					(a) minimum exhaust gas mass flow bank 2	3.888888889 g/sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(b) offset exhaust gas mass flow bank 2 at tip-out		0.833333333	g/sec		
					for time	>=	3	sec		
					High window exhaust gas mass flow bank 2 (see Look-Up-Table #P0420-1)	<=	22.2222222222222 to 27.7777777777778	g/sec		
					High window exhaust gas mass flow bank 2	>=	3.888888889	g/sec		
					)					
					(					
					Modeled catalyst temperature gradient bank 2: (a) - (b)	<=	40.0078	deg C		
					Modeled catalyst temperature gradient bank 2: (a) - (b) (a) Modeled catalyst temperature bank 2	>=	-40.0078	deg C		
					(b) filtered modeled catalyst temperature bank 2 PT1 time constant	=	4.9989321	sec		
					Low window modeled catalyst temperature bank 2	<=	650.006	deg C		
					Low window Modeled catalyst temperature bank 2	>=	520.022	deg C		
					High window modeled catalyst temperature bank 2	<=	780.014	deg C		
					High window Modeled catalyst temperature bank 2	>=	600.014	deg C		
					Modeled catalyst temperature bank 2 after the first engine start and driving	>	420.06	deg C		
					for time	>=	12	sec		
					))					
					((					
					Integrated purge mass flow after a longer purge stop	>=	1.51	g		
					HC concentration factor in chacoal canister	<=	40	factor		
					relative fuel portion of canister purge to injected fuel mass : (a) / (b) (a) fuel mass supplied by canister purge control (b) fuel mass supplied by injection		0.200012	-		
					OR					
					open loop canister purge control	=	TRUE	-		
					OR					
					canister purge control mass flow into the manifold	<=	5.555555556	g/sec		
					((					
					integrated exhaust gas mass flow bank 2 since engine start (see Look-Up-Table #P0420-3)	>	1600 to 2850	g		
					integrated exhaust gas mass flow bank 2 after the following sensors's readiness	>	40	g		
					(					
					Secondary O2 sensor readiness bank 2					
					Primary A/F sensor readiness bank 2					
					)					
						>=	350.0	deg C		
					temperature deviation of Primary A/F sensor heater control bank 2: (a) - (b)	<	64.9922	deg C		
					(a) primary A/F sensor temperature set point for heater control		800.006	deg C		
					(b) measured primary A/F sensor temperature for heater control					
					)					
					statemachine = sm					
					statemachine (sm =0) : inactive	=				
					a commanded lambda active	=	FALSE	-		
					primary A/F commanded lambda	=	1	-		
					if the following conditions are met, sm moves to sm = 2					
					Secondary O2 sensor voltage bank1	>=	0.749512	V		
					if the following conditions are met, sm moves to sm = 1					
					Secondary O2 sensor voltage bank1	<	0.749512	V		
					Secondary O2 sensor voltage bank1	>=	0.450439	V		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					statemachine (sm=1) - rich mixture in catalyst	= TRUE -		
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda bank1	= 0.91992 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 2			
					((			
					Secondary O2 sensor voltage gradient over 0.05s	>= 0.069 V/s		
					Secondary O2 sensor voltage bank1	>= 0.749512 V		
					)			
					OR			
					Secondary O2 sensor voltage bank1	>= 0.749512 V		
					)			
					Integrated exhaust mass flow bank 2	>= 0.12 g		
					if the following conditions are met, sm moves to sm = 3			
					(			
					Secondary O2 sensor voltage bank 2	>= 0.85083 V		
					OR			
					(			
					Secondary O2 sensor voltage bank 2	>= 0.749512 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 2	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda bank 2	<= (a) + (b)		
					(a) Primary lambda control set point bank 2	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 2	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 2	>= 15 g		
					)			
					(			
					Secondary O2 sensor voltage bank 2	> (a) + (b)		
					(a) minimum secondary O2 voltage			
					(b) Offset voltage of Secondary O2 sensor	= 0.030518 V		
					)			
					statemachine (sm=2) - Lean mixture in catalyst			
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda	= 1.08008 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					(			
					Integrated Oxygen Storage Capacity	>= 1.3 g		
					for time	>= 1 sec		
					Primary A/F commanded lambda bank 2	>= 1.1499 -		
					Integreted Exhaust mass flow	>= 100 g		
					for time	>= 0.2 sec		
					)			
					if the following conditions are met, sm moves to sm = 4			
					((			
					Secondary O2 sensor voltage bank 2	<= 0.150146 V		
					for time	>= 0.1 sec		
					)			
					OR			
					(			
					Secondary O2 sensor voltage	<= 0.150146 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 2	> 0.1 g		
					))			
					(			
					Primary A/F sensor lambda	<= (a) + (b)		
					(a) Primary lambda control set point	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda	>= (a) - (b)		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated lean exhaust gas mass flow bank 2	>= 15 g		
					)			
					statemachine (sm=3) - Lean mixture in catalyst	**= TRUE** -		
					a commanded lambda active bank 2	= TRUE -		
					primary A/F commanded lambda bank 2	= 1.08008 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					(			
					Integrated Oxygen Storage Capacity	>= 1.3 g		
					for time	>= 1 sec		
					Primary A/F commanded lambda bank 2	>= 1.1499 -		
					Integreted Exhaust mass flow	>= 100 g		
					for time	>= 0.2 sec		
					)			
					if the following conditions are met, sm moves to sm = 4			
					(			
					Secondary O2 sensor voltage bank 2	<= 0.150146 V		
					for time	>= 0.1 sec		
					OR			
					(			
					Secondary O2 sensor voltage bank 2	<= 0.150146 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 2	> 0.1 g		
					))			
					(			
					Primary A/F sensor lambda bank 2	<= (a) + (b)		
					(a) Primary lambda control set point	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 2	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated lean exhaust gas mass flow bank 2	>= 15 g		
					)			
					statemachine (sm=4) - Rich mixture in catalyst	= TRUE -		
					a commanded lambda active	= TRUE -		
					primary A/F commanded lambda	= 0.91992 -		
					for time	>= 3 sec		
					for time	>= 0.2 sec		
					if the following conditions are met, sm moves to sm = 3			
					(			
					Secondary O2 sensor voltage bank 2	>= 0.85083 V		
					OR			
					(			
					Secondary O2 sensor voltage bank 2	>= 0.749512 V		
					Secondary O2 sensor voltage gradient over 0.05s	<= 0.09944 V/s		
					Secondary O2 sensor voltage gradient over 0.05s	>= -0.09944 V/s		
					Integrated Oxygen mass flow bank 2	> 0.15 g		
					))			
					(			
					Primary A/F sensor lambda bank 2	<= (a) + (b)		
					(a) Primary lambda control set point bank 2	(a)		
					(b) maximum lambda deviation of lean mixture	(b) 0.05005 -		
					Primary A/F sensor lambda bank 2	>= (a) - (b)		
					(a) Primary lambda control set point			
					(b) maximum lambda deviation of rich mixture	0.05005 -		
					for time	>= 0.2 sec		
					Integrated rich exhaust gas mass flow bank 2	>= 15 g		
					)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
							No pending or confirmed DTCs	=	see sheet inhibit table	-				
							Basic enable conditions met	=	see sheet enable tables	-				
O2 Sensor Circuit Bank 1 Sensor 2	P0140	Path 1: Signal range check - open circuit	Mean value of difference between loaded and unloaded sensor voltage for 3 load pulses for time	>= >=	2.797852 5	V sec	Fault suspicion is active for time, which is the following: (Output voltage of O2 sensor Output voltage of O2 sensor)	>= >= <=	3 0.322266 0.551758	sec V V	0	sec	continuous	2 Trips
							Enable conditions for operating readiness of O2 sensor 2 bank 1(refer above common conditions)	=	TRUE	-				
		Path 2: Internal resistance plausibility - interrupted ground wire	Internal resistance of O2 sensor	>	40000	Ohm	Exhaust gas temperature at O2 sensor	>	599.991	deg C				
							Enable conditions for operating readiness of O2 sensor 2 bank 1 (refer above common conditions)	=	TRUE	-				
							Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
O2 Sensor Circuit Bank 2 Sensor 2	P0160	Path 1: Signal range check - open circuit	Mean value of difference between loaded and unloaded sensor voltage for 3 load pulses for time	>= >=	2.797852 5	V sec	Fault suspicion is active for time, which is the following: (Output voltage of O2 sensor Output voltage of O2 sensor)	>= >= <=	3 0.322266 0.551758	sec V V	0	sec	continuous	2 Trips
							Enable conditions for operating readiness of O2 sensor 2 bank 2 (refer above common conditions)	=	TRUE	-				
		Path 2: Internal resistance plausibility - interrupted ground wire	Internal resistance of O2 sensor	>	40000	Ohm	Exhaust gas temperature at O2 sensor	>	599.991	deg C				
							Enable conditions for operating readiness of O2 sensor 2 bank 2 (refer above common conditions)	=	TRUE	-				
							Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
O2 Sensor Circuit Bank 1 Sensor 2	P0138	Signal range check - short circuit to battery	Set point lambda	>	0.995	-	**Common Conditions:** Enable conditions for operating readiness of O2 sensor 2 bank 1	=	TRUE	-	1	sec	continuous	2 Trips
			Output voltage of O2 sensor	>	1.201172	V	(							
							Battery voltage	>	10.9	V				
							Enable conditions for the status of signal fault in the previous driving with the availablilty of internal resistance value	=	TRUE	-				
							(							
							Internal resistance is valid	=	TRUE	-				
							(							
							Internal resistance is valid after X measurements	=	TRUE	-				
							X = counter for validating internal resistance	>	10	counts				
							)							
							O2 Sensor open circuit fault detected	=	FALSE	-				
							)							
							(							
							Expected downstream O2 sensor readiness	=	TRUE	-				
							(							
							Protective heating is finished	=	TRUE	-				
							(							
							Status of downstream O2 sensor heating for hot engine conditions	=	TRUE	-				
							(							
							Engine coolant temperature	>	-9.8	deg C				
							Conditions for enabling sensor heating for O2 sensor	=	TRUE	-				
							(							
							ECU is not in POST DRIVE state	=	TRUE	-				
							Battery Voltage	<=	25.59961	V				
							Engine start is completed	=	TRUE	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					)					
					)					
					Dew point end is reached	=	TRUE	-		
					(					
					(					
					a >= (b) * (((c) * (d)) + 1)					
					Where:					
					(a) Integrated heat release since engine start					
					(b) Downstream O2 sensor heat threshold for release of heating (kJ) (see Look-Up-Table #P0138-1)	=	0 to 120	kJ		
					(c) adjustment factor (see Look-Up-Table #P0138-2)	=	0 to 0.5	-		
					(d) Number of drive cycles without reaching dew point end of downstream sensor (limited to max of 4)					
					)					
					Dew point end is reached at upstream of catalyst					
					(					
					a >= (b) * (((c) * (d)) + 1)					
					Where:					
					(a) Integrated heat release since engine start					
					(b) Upstream O2 sensor heat threshold for release of heating (kJ) (see Look-Up-Table #P0138-3)	=	0 to 96	kJ		
					(c) adjustment factor (see Look-Up-Table #P0138-4)	=	0 to 0.5	-		
					(d) Number of drive cycles without reaching dew point end of downstream sensor (limited to max of 3)					
					)					
					)					
					)					
					for time	>=	A+B	sec		
					where A: Operating readiness, HEGO sensor 2 bank 1 / Debouncing time protective heating finished	=	15	sec		
					B: Operating readiness, HEGO sensor 2 bank 1 / Debouncing time for expected operating readiness	=	30	sec		
					)					
					OR					
					Exhaust gas sensor ready for operation	=	TRUE	-		
					(					
					Status of heating enable conditions for the sensor operating readiness	=	TRUE	-		
					(					
					Protective heating is finished	=	TRUE	-		
					for time	>=	15	sec		
					OR					
					Internal resistance OK for operating readiness	=	TRUE	-		
					(					
					Unfiltered internal resistance of HEGO sensor	<=	2000	Ohm		
					Protective heating is finished	=	TRUE	-		
					Counter for valid internal resistance measurements	>=	3	counts		
					)					
					)					
					Status of sensor signal enable conditions for the sensor operating readiness	=	TRUE	-		
					(					
					Internal resistance OK for operating readiness	=	TRUE	-		
					OR					
					(					
					(					
					Output voltage of HEGO Sensor	>=	0.551758	V		
					and					
					Output voltage of HEGO Sensor	<=	1.201172	V		
					)					
					OR					
					Output voltage of HEGO Sensor	<=	0.322266	V		
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR			
					Sensor voltage stuck in countervoltage band	= TRUE -		
					(			
					(			
					(			
					Output voltage of HEGO Sensor	< 0.551758 V		
					Output voltage of HEGO Sensor	> 0.322266 V		
					)			
					(			
					Sensor open circuit fault existed in previous trip	= TRUE -		
					OR			
					Sensor open circuit fault currently not detected	= TRUE -		
					)			
					Electrical diagnostics enabled	= TRUE -		
					)			
					for time	>= 20 sec		
					)			
					)			
					for time	>= 0.2 sec		
					)			
					)			
					)			
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
	P0158	Signal range check - short circuit to battery	Set point lambda	> 0.995 -	**Common Conditions:**	= TRUE -	1 sec continuous	2 Trips
					Enable conditions for operating readiness of O2 sensor 2 bank 2			
			Output voltage of O2 sensor	> 1.201172 V	(			
					Battery voltage	> 10.9 V		
					Enable conditions for the status of signal fault in the previous driving with the availablity of internal resistance value	= TRUE -		
					(			
					Internal resistance is valid	= TRUE -		
					(			
					Internal resistance is valid after X measurements	= TRUE -		
					X = counter for validating internal resistance	> 10 counts		
					)			
					O2 Sensor open circuit fault detected	= FALSE -		
					)			
					(			
					Expected downstream O2 sensor readiness	= TRUE -		
					(			
					Protective heating is finished	= TRUE -		
					(			
					Status of downstream O2 sensor heating for hot engine conditions	= TRUE -		
					(			
					Engine coolant temperature	> -9.8 deg C		
					Conditions for enabling sensor heating for O2 sensor	= TRUE -		
					(			
					ECU is not in POST DRIVE state	= TRUE -		
					Battery Voltage	<= 25.59961 V		
					Engine start is completed	= TRUE -		
					)			
					)			
					Dew point end is reached	= TRUE -		
					(			
					(			
					a >= (b) * (((c) * (d)) + 1)			
					Where:			
					(a) Integrated heat release since engine start			
					(b) Downstream O2 sensor heat threshold for release of heating (kJ) (see Look-Up-Table #P0158-1)	= 0 to 120 kJ		
					(c) adjustment factor (see Look-Up-Table #P0158-2)	= 0 to 0.5 -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(d) Number of drive cycles without reaching dew point end of downstream sensor (limited to max of 4)			
					)			
					Dew point end is reached at upstream of catalyst			
					(			
					a >= (b) * (((c) * (d)) + 1)			
					Where:			
					(a) Integrated heat release since engine start			
					(b) Upstream O2 sensor heat threshold for release of heating (kJ) (see Look-Up-Table #P0158-3)	= 0 to 96 kJ		
					(c) adjustment factor (see Look-Up-Table #P0158-4)	= 0 to 0.5 -		
					(d) Number of drive cycles without reaching dew point end of downstream sensor (limited to max of 3)			
					)			
					)			
					)			
					for time	>= A+B sec		
					where	= 15 sec		
					A: Operating readiness, HEGO sensor 2 bank 1 / Debouncing time protective heating finished			
					B: Operating readiness, HEGO sensor 2 bank 1 / Debouncing time for expected operating readiness	= 30 sec		
					)			
					OR			
					Exhaust gas sensor ready for operation	= TRUE -		
					(			
					Status of heating enable conditions for the sensor operating readiness	= TRUE -		
					(			
					Protective heating is finished	= TRUE -		
					for time	>= 15 sec		
					OR			
					Internal resistance OK for operating readiness	= TRUE -		
					(			
					Unfiltered internal resistance of HEGO sensor	<= 2000 Ohm		
					Protective heating is finished	= TRUE -		
					Counter for valid internal resistance measurements	>= 3 counts		
					)			
					)			
					Status of sensor signal enable conditions for the sensor operating readiness	= TRUE -		
					(			
					Internal resistance OK for operating readiness	= TRUE -		
					OR			
					(			
					(			
					Output voltage of HEGO Sensor	>= 0.551758 V		
					Output voltage of HEGO Sensor	<= 1.201172 V		
					)			
					OR			
					Output voltage of HEGO Sensor	<= 0.322266 V		
					)			
					OR			
					Sensor voltage stuck in countervoltage band	= TRUE -		
					(			
					(			
					(			
					Output voltage of HEGO Sensor	< 0.551758 V		
					Output voltage of HEGO Sensor	> 0.322266 V		
					)			
					(			
					Sensor open circuit fault existed in previous trip	= TRUE -		
					OR			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Sensor open circuit fault currently not detected) Electrical diagnostics enabled) for time)) for time))) Basic enable conditions met No pending or confirmed DTCs	= TRUE - = TRUE - >= 20 sec >= 0.2 sec = see sheet enable tables - = see sheet inhibit tables -		
O2 Sensor Circuit Bank 1 Sensor 2	P0137	Signal range check - short circuit to ground	Mean value of difference between loaded and unloaded sensor voltage for 3 load pulses for time	< 0.014648 V >= 5 sec	Fault suspicion is active when the following conditions are satisfied for time (Output voltage of O2 sensor Catalyst purge active Deceleration Fuel Cut-Off Battery voltage) Basic enable conditions met No pending or confirmed DTCs	>= 3 sec < 0.058594 V = FALSE - = FALSE - > 10.9 V = see sheet enable tables - = see sheet inhibit tables -	0 sec continuous	2 Trips
O2 Sensor Circuit Bank 2 Sensor 2	P0157	Signal range check - short circuit to ground	Mean value of difference between loaded and unloaded sensor voltage for 3 load pulses for time	< 0.014648 V >= 5 sec	Fault suspicion is active when the following conditions are satisfied for time (Output voltage of O2 sensor Catalyst purge active Deceleration Fuel Cut-Off Battery voltage) Basic enable conditions met No pending or confirmed DTCs	>= 3 sec < 0.058594 V = FALSE - = FALSE - > 10.9 V = see sheet enable tables - = see sheet inhibit tables -	0 sec continuous	2 Trips
O2 Sensor Circuit Bank 1 Sensor 2	P2232	Heater Coupling- Short Circuit between the sensor signal wire and the sensor heater	Difference of the present and the previous output voltage of O2 sensor Counter for Heater turn off events	> 2.001953 V >= 6 events	Time frame for checking heater coupling is active (Dew point end is reached for time Sensor heating is turned on) Enable conditions for operating readiness of O2 sensor 2 bank 1 (refer above common conditions) Basic enable conditions met No pending or confirmed DTCs	< 0.04 sec >= 10 sec = FALSE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	4 events continuous	2 Trips
	P2235	Heater Coupling- Short Circuit between the sensor signal wire and the sensor heater	Difference of the present and the previous output voltage of O2 sensor Counter for Heater turn off events	> 2.001953 V >= 6 events	Time frame for checking heater coupling is active (Dew point end is reached for time Sensor heating is turned on) Enable conditions for operating readiness of O2 sensor 2 bank 2 (refer above common conditions) Basic enable conditions met No pending or confirmed DTCs	< 0.04 sec >= 10 sec = FALSE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	4 events continuous	2 Trips
Downstream Exhaust Gas Sensor	P0141	Compares the measured Secondary HO2S sensor internal resistance with a calibrated threshold*	Internal resistance of Secondary HO2S sensor bank 1 (see Look-Up-Table #P0141-1)	> 500 to 10000 Ohm	(Filtered normalized heating power for Secondary HO2S sensor bank 1	 > 0.6 -	5 sec	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					engine stop time copied at the time of first engine start in the driving cycle	>	120	sec		
		calibrated threshold* = the criteria required to be met by the component vendor for heater circuit performance at high mileage			state of variable TiEngOff_tiFirstStrt (formerly tengszlst)	=	TRUE	-		
					intake air temperature	>	-30	deg C		
					state of start temperatures in dew point end calculated for Secondary HO2S sensor bank 1	=	TRUE	-		
					Battery Voltage	<=	25.59961	V		
					Battery Voltage	>=	10.9	V		
					state for end of start	=	TRUE	-		
					engine speed	>	40	rpm		
					engine speed for normal, non-repeated, key starts (see Look-Up-Table #P0141-2)	>	600 to 700	rpm		
					engine speed fo rrepeated key starts and Stop-Start (see Look-Up-Table #P0141-3)	.>	500 to 700	rpm		
					detection of end of start by engine speed threshold and injection counts (see Look-Up-Table #P0141-4)		4 to 32	counts		
					)					
					(					
					Filtered-modeled exhaust gas temperature for Secondary HO2S sensor bank 1 heating	<=	700.022	deg C		
					Filtered-modeled exhaust gas temperature for Secondary HO2S sensor bank 1 heating	>=	340.022	deg C		
					Bit heater power stage diagnostics enabled	=	TRUE	-		
					enable condition for heater performance diagnosis after stop-phase	=	TRUE	-		
					state for end of start	=	FALSE	-		
					for time	>=	0	sec		
					state for end of start	=	TRUE	-		
					for time	>=	0.5	sec		
					internal resistance measurement valid if the following conditions are met:	=	TRUE	-		
						>	10			
					((					
					Secondary HO2S sensor voltage bank 1	<=	0.410156	V		
					Secondary HO2S sensor voltage bank 1	>=	0	V		
					OR					
					Secondary HO2S sensor voltage bank 1	>	0.489502	V		
					)					
					absolute sensor voltage difference: ABS((a) - (b))	<=	0.025	V		
					(a) Secondary HO2S sensor voltage bank 1					
					(b) Prior Secondary HO2S sensor voltage bank 1					
					Secondary HO2S sensor bank 1 heater control on	=	TRUE	-		
					for time	>=	30	sec		
					Internal resistance measurement active of Secondary HO2S sensor bank 1	=	TRUE	-		
					with					
					Absolute Secondary HO2S sensor bank 1 voltage difference: ABS((a) - (b))	<=	0.200195	V		
					(a) Secondary HO2S sensor bank 1 voltage after freeze for measurement of the internal resistance					
					(b) Secondary HO2S sensor bank 1 voltage without load for the measurement of the internal resistance					
					Absolute Secondary HO2S sensor bank 1 voltage difference: ABS((a) - (b))	>=	0.0	V		
					(a) Secondary HO2S sensor bank 1 voltage with load for the measurement of the internal resistance					
					(b) Secondary HO2S sensor bank 1 voltage without load for the measurement of the internal resistance					
					no electrical sensor diagnostic faults of implausible high internal resistance	=	TRUE	-		
					no DFCO	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Minimum heater performance diagnostic	>= 120 sec		
					Filtered-modeled exhaust gas temperature for Secondary HO2S sensor bank 1 heating	>= 320.006 deg C		
					Internal resistance of Secondary HO2S	< 10000 Ohm		
					No pending or confirmed DTCs	= see sheet inhibit table		
					Basic enable conditions met	= see sheet enable tables -		
Downstream Exhaust Gas Sensor	P0161	Compares the measured Secondary HO2S sensor internal resistance with a calibrated threshold*	Internal resistance of Secondary HO2S sensor bank 2 (see Look-Up-Table #P0161-1)	> 500 to 10000 Ohm			5 sec	2 Trips
					(			
					Filtered normalized heating power for Secondary HO2S sensor bank 2	> 0.6 -		
					engine stop time copied at the time of first engine start in the driving cycle	> 120 sec		
		calibrated threshold* = the criteria required to be met by the component vendor for heater circuit performance at high mileage			state of variable TiEngOff_tiFirstStrt (formerly tengszlst)	= TRUE -		
					state of start temperatures in dew point end calculated for Secondary HO2S sensor bank 2			
					Battery Voltage	<= 25.59961 V		
					Battery Voltage	>= 10.9 V		
					state for end of start	= TRUE -		
					engine speed	> 40 rpm		
					engine speed for normal, non-repeated, key starts (see Look-Up-Table #P0141-2)	> 600 to 700 rpm		
					engine speed fo rrepeated key starts and Stop-Start (see Look-Up-Table #P0141-3)	.> 500 to 700 rpm		
					detection of end of start by engine speed threshold and injection counts (see Look-Up-Table #P0141-4)	4 to 32 counts		
					)			
					(			
					Filtered-modeled exhaust gas temperature for Secondary HO2S sensor bank 2 heating	<= 700.022 deg C		
					Filtered-modeled exhaust gas temperature for Secondary HO2S sensor bank 2 heating	>= 340.022 deg C		
					enable condition for heater performance diagnosis after stop-phase	= TRUE -		
					state for end of start	= FALSE -		
					for time	>= 0 sec		
					state for end of start	= TRUE -		
					for time	>= 0.5 sec		
					internal resistance measurement valid if the following conditions are met:	= TRUE -		
						> 10		
					((			
					Secondary HO2S sensor voltage bank 2	<= 0.410156 V		
					Secondary HO2S sensor voltage bank 2	>= 0 V		
					OR			
					Secondary HO2S sensor voltage bank 2	> 0.489502 V		
					)			
					absolute sensor voltage difference: ABS((a) - (b))	<= 0.025 V		
					(a) Secondary HO2S sensor voltage bank 2			
					(b) Prior Secondary HO2S sensor voltage bank 2			
					Secondary HO2S sensor bank 2 heater control on	= TRUE -		
					for time	>= 30 sec		
					Internal resistance measurement active of Secondary HO2S sensor bank 2	= TRUE -		
					with			
					Absolute Secondary HO2S sensor bank 2 voltage difference: ABS((a) - (b))	<= 0.200195 V		
					(a) Secondary HO2S sensor bank 2 voltage after freeze for measurement of the internal resistance			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(b) Secondary HO2S sensor bank 2 voltage without load for the measurement of the internal resistance			
					Absolute Secondary HO2S sensor bank 2 voltage difference: ABS((a) - (b))	>= 0.0 V		
					(a) Secondary HO2S sensor bank 2 voltage with load for the measurement of the internal resistance			
					(b) Secondary HO2S sensor bank 2 voltage without load for the measurement of the internal resistance			
					no electrical sensor diagnostic faults of implausible high internal resistance	= TRUE -		
					no DFCO	= TRUE -		
					Minimum heater performance diagnostic	>= 120 sec		
					Filtered-modeled exhaust gas temperature for Secondary HO2S sensor bank 2 heating	>= 320.006 deg C		
					Internal resistance of Secondary HO2S	< 10000 Ohm		
					No pending or confirmed DTCs	= see sheet inhibit table		
					Basic enable conditions met	= see sheet enable tables -		
HO2S Heater Control Circuit Bank 1 Sensor 2	P0036	Diagnoses the HO2S Heater Control Bank 1 Sensor 2 low side driver circuit for open circuit faults	Voltage low during driver off state (indicates open circuit)	= Open Circuit:>= 200 K - ECU pin and load	General enabling condition for powerstage diagnosis	= TRUE -	0.5 sec continuous	2 Trips
					(			
					Battery voltage	< 25.5 V		
					Battery voltage	> 10.9 V		
					Engine speed	>= 80 rpm		
					)			
					Conditions for enabling sensor heating for O2 sensor	= TRUE -		
					(			
					ECU is not in POST DRIVE state	= TRUE -		
					and			
					Battery Voltage	<= 25.59961 V		
					and			
					Engine start is completed	= TRUE -		
					)			
					and			
					(			
					(			
					Dew point end is reached	= TRUE -		
					(			
					(			
					Integrated heat release since engine start	>= (b) * (((c) * (d)) + 1) -		
					(b) Downstream O2 sensor heat threshold for release of heating (kJ) (see Look-Up-Table #P0138-1)	0 to 120 kJ		
					(c) adjustment factor (see Look-Up-Table #P0138-2)	0 to 0.5 -		
					(d) Number of drive cycles without reaching dew point end of downstream sensor (limited to max of 4)			
					)			
					and			
					Dew point end is reached at upstream of catalyst			
					(			
					Integrated heat release since engine start	>= (b) * (((c) * (d)) + 1)		
					(b) Upstream O2 sensor heat threshold for release of heating (kJ) (see Look-Up-Table #P0138-3)	0 to 96 kJ		
					(c) adjustment factor (see Look-Up-Table #P0138-4)	0 to 0.5 -		
					(d) Number of drive cycles without reaching dew point end of downstream sensor (limited to max of 3)			
					)			
					)			
					for time	>= 10 sec		
					)			
					OR			
					(			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Battery voltage	<	25.59961	V		
					OR					
					(					
					Environmental temperature	>	3003.56	deg C		
					and					
					Ignition is ON	=	TRUE	-		
					for time	>=	0	sec		
					)					
					)					
					for time	>=	0	sec		
					)					
					Basic enable conditions met	=	see sheet enable tables	-		
					No Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
	P0037	Diagnoses the HO2S Heater Control Bank 1 Sensor 2 low side driver circuit for circuit low faults	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: <= - between signal and controller ground	General enabling condition for powerstage diagnosis	=	TRUE	-	0.5 sec continuous	2 Trips
					(					
					Battery voltage	<	25.5	V		
					Battery voltage	>	10.9	V		
					Engine speed	>=	80	rpm		
					)					
					Conditions for enabling sensor heating for O2 sensor	=	TRUE	-		
					(					
					ECU is not in POST DRIVE state	=	TRUE	-		
					and					
					Battery Voltage	<=	25.59961	V		
					and					
					Engine start is completed	=	TRUE	-		
					)					
					and					
					(					
					(					
					Dew point end is reached	=	TRUE	-		
					(					
					(					
					Integrated heat release since engine start	>=	(b) * (((c) * (d)) + 1)			
					(b) Downstream O2 sensor heat threshold for release of heating (kJ) (see Look-Up-Table #P0138-1)		0 to 120	kJ		
					(c) adjustment factor (see Look-Up-Table #P0138-2)		0 to 0.5	-		
					(d) Number of drive cycles without reaching dew point end of downstream sensor (limited to max of 4)					
					)					
					and					
					Dew point end is reached at upstream of catalyst					
					(					
					Integrated heat release since engine start	>=	(b) * (((c) * (d)) + 1)			
					(b) Upstream O2 sensor heat threshold for release of heating (kJ) (see Look-Up-Table #P0138-3)		0 to 96	kJ		
					(c) adjustment factor (see Look-Up-Table #P0138-4)		0 to 0.5	-		
					(d) Number of drive cycles without reaching dew point end of downstream sensor (limited to max of 3)					
					)					
					)					
					for time	>=	10	sec		
					)					
					OR					
					(					
					Battery voltage	<	25.59961	V		
					OR					
					(					
					Environmental temperature	>	3003.56	deg C		
					and					
					Ignition is ON	=	TRUE	-		
					for time	>=	0	sec		
					)					
					)					
					for time	>=	0	sec		
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Basic enable conditions met	=	see sheet enable tables	-		
					No Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
	P0038	Diagnoses the HO2S Heater Control Bank 1 Sensor 2 low side driver circuit for circuit high faults	Voltage high during driver on state (indicates short-to-power)	- Short to power: - between signal and controller power	General enabling condition for powerstage diagnosis	=	TRUE	-	0.5 sec continuous	2 Trips
					(					
					Battery voltage	<	25.5	V		
					Battery voltage	>	10.9	V		
					Engine speed	>=	80	rpm		
					)					
					Conditions for enabling sensor heating for O2 sensor	=	TRUE	-		
					(					
					ECU is not in POST DRIVE state	=	TRUE	-		
					and					
					Battery Voltage	<=	25.59961	V		
					and					
					Engine start is completed	=	TRUE	-		
					)					
					and					
					(					
					(					
					Dew point end is reached	=	TRUE	-		
					(					
					(					
					Integrated heat release since engine start	>=	(b) * (((c) * (d)) + 1)			
					(b) Downstream O2 sensor heat threshold for release of heating (kJ) (see Look-Up-Table #P0138-1)		0 to 120	kJ		
					(c) adjustment factor (see Look-Up-Table #P0138-2)		0 to 0.5	-		
					(d) Number of drive cycles without reaching dew point end of downstream sensor (limited to max of 4)					
					)					
					and					
					Dew point end is reached at upstream of catalyst					
					(					
					Integrated heat release since engine start	>=	(b) * (((c) * (d)) + 1)			
					(b) Upstream O2 sensor heat threshold for release of heating (kJ) (see Look-Up-Table #P0138-3)		0 to 96	kJ		
					(c) adjustment factor (see Look-Up-Table #P0138-4)		0 to 0.5	-		
					(d) Number of drive cycles without reaching dew point end of downstream sensor (limited to max of 3)					
					)					
					)					
					for time	>=	10	sec		
					)					
					OR					
					(					
					Battery voltage	<	25.59961	V		
					OR					
					(					
					Environmental temperature	>	3003.56	deg C		
					and					
					Ignition is ON	=	TRUE	-		
					for time	>=	0	sec		
					)					
					)					
					for time	>=	0	sec		
					)					
					Basic enable conditions met	=	see sheet enable tables	-		
					No Pending or Confirmed DTCs	=	see sheet inhibit tables	-		
HO2S Heater Control Circuit Bank 2 Sensor 2	P0056	Diagnoses the HO2S Heater Control Bank 2 Sensor 2 low side driver circuit for open circuit faults	Voltage low during driver off state (indicates open circuit)	= Open Circuit:>= 200 K - ECU pin and load	General enabling condition for powerstage diagnosis	=	TRUE	-	0.5 sec continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
					(							
					Battery voltage	<	25.5	V				
					Battery voltage	>	10.9	V				
					Engine speed	>=	80	rpm				
					)							
					Conditions for enabling sensor heating for O2 sensor	=	TRUE	-				
					(							
					ECU is not in POST DRIVE state	=	TRUE	-				
					and							
					Battery Voltage	<=	25.59961	V				
					and							
					Engine start is completed	=	TRUE	-				
					)							
					and							
					(							
					(							
					Dew point end is reached	=	TRUE	-				
					(							
					(							
					Integrated heat release since engine start	>=	(b) * (((c) * (d)) + 1)	-				
					(b) Downstream O2 sensor heat threshold for release of heating (kJ) (see Look-Up-Table #P0158-1)		0 to 120	kJ				
					(c) adjustment factor (see Look-Up-Table #P0158-2)		0 to 0.5	-				
					(d) Number of drive cycles without reaching dew point end of downstream sensor (limited to max of 4)							
					)							
					and							
					Dew point end is reached at upstream of catalyst							
					(							
					Integrated heat release since engine start	>=	(b) * (((c) * (d)) + 1)					
					(b) Downstream O2 sensor heat threshold for release of heating (kJ) (see Look-Up-Table #P0158-3)		0 to 96	kJ				
					(c) adjustment factor (see Look-Up-Table #P0158-4)		0 to 0.5	-				
					(d) Number of drive cycles without reaching dew point end of downstream sensor (limited to max of 3)							
					)							
					)							
					for time	>=	10	sec				
					)							
					OR							
					(							
					Battery voltage	<	25.59961	V				
					OR							
					(							
					Environmental temperature	>	3003.56	deg C				
					and							
					Ignition is ON	=	TRUE	-				
					for time	>=	0	sec				
					)							
					)							
					for time	>=	0	sec				
					)							
					Basic enable conditions met	=	see sheet enable tables	-				
					No Pending or Confirmed DTCs	=	see sheet inhibit tables	-				
	P0057	Diagnoses the HO2S Heater Control Bank 2 Sensor 2 low side driver circuit for circuit low faults	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: <= - between signal and controller ground	General enabling condition for powerstage diagnosis	=	TRUE	-	0.5	sec	continuous	2 Trips
					(							
					Battery voltage	<	25.5	V				
					Battery voltage	>	10.9	V				
					Engine speed	>=	80	rpm				
					)							
					Conditions for enabling sensor heating for O2 sensor	=	TRUE	-				
					(							
					ECU is not in POST DRIVE state	=	TRUE	-				
					and							
					Battery Voltage	<=	25.59961	V				
					and							

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine start is completed	= TRUE -		
					)			
					and			
					(			
					(			
					Dew point end is reached	= TRUE -		
					(			
					(			
					Integrated heat release since engine start	>= (b) * (((c) * (d)) + 1) -		
					(b) Downstream O2 sensor heat threshold for release of heating (kJ) (see Look-Up-Table #P0158-1)	0 to 120 kJ		
					(c) adjustment factor (see Look-Up-Table #P0158-2)	0 to 0.5 -		
					(d) Number of drive cycles without reaching dew point end of downstream sensor (limited to max of 4)			
					)			
					and			
					Dew point end is reached at upstream of catalyst			
					(			
					Integrated heat release since engine start	>= (b) * (((c) * (d)) + 1)		
					(b) Downstream O2 sensor heat threshold for release of heating (kJ) (see Look-Up-Table #P0158-3)	0 to 96 kJ		
					(c) adjustment factor (see Look-Up-Table #P0158-4)	0 to 0.5 -		
					(d) Number of drive cycles without reaching dew point end of downstream sensor (limited to max of 3)			
					)			
					)			
					for time	>= 10 sec		
					)			
					OR			
					(			
					Battery voltage	< 25.59961 V		
					OR			
					(			
					Environmental temperature	> 3003.56 deg C		
					and			
					Ignition is ON	= TRUE -		
					for time	>= 0 sec		
					)			
					)			
					for time	>= 0 sec		
					)			
					Basic enable conditions met	= see sheet enable tables -		
					No Pending or Confirmed DTCs	= see sheet inhibit tables -		
	P0058	Diagnoses the HO2S Heater Control Bank 2 Sensor 2 low side driver circuit for circuit high faults	Voltage high during driver on state (indicates short-to-power)	- Short to power: - between signal and controller power	General enabling condition for powerstage diagnosis	= TRUE -	0.5 sec continuous	2 Trips
					(			
					Battery voltage	< 25.5 V		
					Battery voltage	> 10.9 V		
					Engine speed	>= 80 rpm		
					)			
					Conditions for enabling sensor heating for O2 sensor	= TRUE -		
					(			
					ECU is not in POST DRIVE state	= TRUE -		
					and			
					Battery Voltage	<= 25.59961 V		
					and			
					Engine start is completed	= TRUE -		
					)			
					and			
					(			
					(			
					Dew point end is reached	= TRUE -		
					(			
					(			
					Integrated heat release since engine start	>= (b) * (((c) * (d)) + 1) -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(b) Downstream O2 sensor heat threshold for release of heating (kJ) (see Look-Up-Table #P0158-1)	0 to 120 kJ		
					(c) adjustment factor (see Look-Up-Table #P0158-2)	0 to 0.5 -		
					(d) Number of drive cycles without reaching dew point end of downstream sensor (limited to max of 4)			
					)			
					and			
					Dew point end is reached at upstream of catalyst			
					(			
					Integrated heat release since engine start	>= (b) * (((c) * (d)) + 1)		
					(b) Downstream O2 sensor heat threshold for release of heating (kJ) (see Look-Up-Table #P0158-3)	0 to 96 kJ		
					(c) adjustment factor (see Look-Up-Table #P0158-4)	0 to 0.5 -		
					(d) Number of drive cycles without reaching dew point end of downstream sensor (limited to max of 3)			
					)			
					)			
					for time	>= 10 sec		
					)			
					OR			
					(			
					Battery voltage	< 25.59961 V		
					OR			
					(			
					Environmental temperature	> 3003.56 deg C		
					and			
					Ignition is ON	= TRUE -		
					for time	>= 0 sec		
					)			
					)			
					for time	>= 0 sec		
					)			
					Basic enable conditions met	= see sheet enable tables -		
					No Pending or Confirmed DTCs	= see sheet inhibit tables -		
Crankcase Ventilation System	P04DB	Diagnosis of Disconnected Crankcase Ventilation System- Plausibility check	The measured Crankcase ventilation pressure (see Look-Up Table #P04DB-1)	> -1.95 to 10.0 kPa	Cumulative release time for crankcase ventilation diagnosis	>= 3.1 sec	3.1 sec continuous	2 Trips
					Release of crankcase ventilation monitoring, which is the following conditions:	= TRUE -		
					(			
					Engine speed	<= 5800 rpm		
					Engine speed	>= 2595 rpm		
					Pressure upstream throttle valve bank 1	<= 258 kPa		
					Pressure upstream throttle valve bank 1	>= 105 kPa		
					Low-pass filtered value of the air mass flow for the crankcase monitoring	<= 219.4444444 g/sec		
					Low-pass filtered value of the air mass flow for the crankcase monitoring	>= 57.77777778 g/sec		
					(			
					Throttle Valve actuator position Bank 1	<= 0 to 101 %		
					Throttle Valve actuator position Bank 1	>= 40 to 101 %		
					)			
					for time	> 0.3 sec		
					Ambient pressure	>= 74.5 kPa		
					Enviroment temperature	>= -7.04 deg C		
					Engine is in running state	= TRUE -		
					Time since Engine running state was reached	> 2.0 sec		
					Coolant temperature	> -0.04 deg C		
					)			
					for time	> 0.9 sec		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
Engine Cooling System	P0128	Compares the measured engine coolant temperature with the modeled engine coolant temperature during engine warm-up	Engine coolant temperature difference between the model and the measured: (a) - (b) (a) the modeled engine coolant temperature (b) the measured engine coolant temperature	> -1 deg C	measured engine coolant temperature	< 59.86 deg C	20 sec	2 Trip
					Ignition key on	= TRUE -		
					Time since engine running	> 5 sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Minium engine coolant temperature for the current trip	<= 39.98 deg C		
					measured ambient temperature	> = -7.04 deg C		
					Engine running time	< 2400 sec		
		Regulating engine coolant temperature : 70 degC			monitoring delay time since engine start (see Look-Up-Table #P0128-5)	>= 10 to 60 sec		
					Engine coolant temperature increase	>= 6 deg C		
					PT1 filtered average vehicle speed	> 6.215040398 mph		
					PT1 time constant	= 100 sec		
					Heat to engine coolant	> 6 deg C		
					calculation of the model temperature: ((a) + ((b) * (c)) + (d))	= ((a) + ((b) * (c)) + (d))		
					(a) temperature increment depending on inner torque and ambient temperature (see Look-Up-Table #P0128-3)	0 to 0.2243896 deg C/s		
					(b) Correction factor dependent on vehicle speed and ambient temperature (see Look-Up-Table #P0128-4)	1 to 1.160034 -		
					(c) correction factor for temperature difference over the radiator (see Look-Up-Table #P0128-2)	0 to 0.1 deg C/s		
					(d) temperature model correction during DFCO	(d) = (d1) * (d2)		
					(d1) temperatue model correction dependent on vehicle speed and ambient temperature (see Look-Up-Table #P0128-1)	-0.0810547 to -0.0000488 deg C/s		
					(d2) correction factor	1 -		
		OR						
		Continuously compares the measured engine coolant temperature with the modeled engine coolant temperature after warm-up monitoring	Engine coolant temperature difference between the model and the measured: (a) - (b) (a) the modeled engine coolant temperature (b) the measured engine coolant temperature	> -1 deg C	measured engine coolant temperature	< 59.86 deg C		
					Ignition key on	= TRUE -		
					Time since engine running	> 5 sec		
					Minium engine coolant temperature for the current trip	<= 39.98 deg C		
					measured ambient temperature	> = -7.04 deg C		
					Engine running time	< 2400 s		
		Regulating engine coolant temperature : 70 degC			monitoring delay time since engine start (see Look-Up-Table #P0128-5)	>= 10 to 60 sec		
					Engine coolant temperature increase	>= 6 deg C		
					PT1 filtered average vehicle speed	> 6.215040398 mph		
					PT1 time constant	= 100 sec		
					Heat to engine coolant	> 6 deg C		
					calculation of the model temperature:	= ((a) + ((b) * (c)) +		
					(a) temperature increment depending on inner torque and ambient temperature (see Look-Up-Table #P0128-3)	0 to 0.2243896 deg C/s		
					(b) Correction factor dependent on vehicle speed and ambient temperature (see Look-Up-Table #P0128-4)	1 to 1.160034 -		
					(c) correction factor for temperature difference over the radiator (see Look-Up-Table #P0128-2)	0 to 0.1 deg C/s		
					(d) temperature model correction during DFCO	(d) = (d1) * (d2)		
					(d1) temperatue model correction dependent on vehicle speed and ambient temperature (see Look-Up-Table #P0128-1)	-0.0810547 to -0.0000488 deg C/s		
					(d2) correction factor	1 -		
					No pending or confirmed DTCs	= see sheet inhibit table -		
					Basic enable conditions met	= see sheet enable tables -		
Engine Coolant Temperature Sensor	P0118	Detects if the measured Engine Coolant Temperature sensor voltage is greater than a calibrated threshold for calibrated time.	Engine Coolant Temperature sensor voltage	>= 4.7996 V	Ignition is ON	= TRUE -	2 sec continuous	2 Trips
			Same as		Basic enable conditions met	= see sheet enable tables -		
			Engine Coolant Temperature	<= -46.6 deg C				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor	P0117	Detects if the measured Engine Coolant Temperature sensor voltage is less than a calibrated threshold for calibrated time.	Engine Coolant Temperature sensor voltage	<= 0.104 V	Ignition is ON	= TRUE -	2 sec continuous	2 Trips
			Same as		Basic enable conditions met	= see sheet enable tables -		
			Engine Coolant Temperature	>= 156 deg C				
Engine Coolant Temperature Sensor	P0116	Detects if the difference between mean valve and filetered valve of engine coolant tempearture sensor during cold start is greater than a calibrated threshold for a calibrated time	Difference between mean value and filtered value of engine coolant temperature sensor 1	> 14.96 deg C	Ignition is on	= TRUE -	1 sec Once per driving cycle	2 Trips
					for time	>= 1 sec		
					Combustion engine is running	= TRUE -		
					(			
					Engine is in synchronised state and engine is rotating	= TRUE -		
					for time	= 1 sec		
					(Measured engine stop time	>= 28800 sec		
					(Calculated engine stop time is exact value	= TRUE -		
					OR			
					Minimum engine off time is calculated)	= TRUE -		
					for time)	< 3 sec		
					((Block heater is activated	= FALSE -		
					Diagnosis is inhibited by other temperature sensor errors)	= FALSE -		
					for time)	>= 0 sec		
					No pending or confirmed DTCs	= see sheet Inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P0116	Detects if the difference between filetered valve and mean valve of engine coolant tempearture sensor during cold start greator than calibrated threshold for an calibrated time	Difference between filtered value and mean value of engine coolant temperature sensor 1	> 14.96 deg C	Ignition is on	= TRUE -	1 Once per driving cycle	2 Trips
					for time	>= 1 sec		
					Combustion engine is running	= TRUE -		
					(			
					Engine is in synchronised state and engine is rotating	= TRUE -		
					for time	= 1 sec		
					)			
					(			
					(Measured engine stop time	>= 28800 sec		
					(	= TRUE -		
					Calculated engine stop time is exact value			
					OR			
					Minimum engine off time is calculated)	= TRUE -		
					)			
					for time	< 3 sec		
					(			
					Block heater is activated	= FALSE -		
					Diagnosis is inhibited by other temperature sensor errors	= FALSE -		
					)			
					for time	>= 0 sec		
					No pending or confirmed DTCs	= see sheet Inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
					)			
Idle Control System / Cold Start Strategy	P050A	**Path 1:** Monitoring of idle control for overspeed during catalyst heating	Deviation of idle speed precontrol (set point - current)	< -200 rpm	ECU Sub-State in DRIVE	= TRUE -	5 sec multiple	2 Trips
			OR		Engine start has finished	= TRUE -		
			Number of fuel cut-out phases	>= 255 counts	(	= TRUE -		
					No external torque demand (engine is running in idle)			
					)			
					for time	>= 5 sec		
					Catalyst heating request by cold engine	= TRUE -		
					(			
					(			
					Condition: Request of catalyst heating in case of first start of combustion engine - Initialisation phase	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					First start of combustion in driving cycle	=	FALSE	-		
					Engine is not running	=	TRUE	-		
					Desired value for integrated air mass by catalyst heating by cold engine	>	0	-		
					Intake air temperature in manifold	>	-48.04	deg C		
					Difference between engine coolant temperatures in downstream and at engine stop	>=	50.3	deg C		
					Absolute difference between intake air temperature in manifold and engine coolant temperature in downstream during start	<=	191.3	deg C		
					Release of catalyst heating request by ambient temperature	=	TRUE	-		
					)					
					Condition: Request catalyst heating by cold engine (calculation till end of start is reached)	=	TRUE	-		
					(					
					(					
					Off time of start-end recognition for customer	=	1	-		
					OR					
					(					
					Difference between engine coolant temperatures in downstream and at engine stop	>=	50.3	deg C		
					Absolute difference between intake air temperature in manifold and engine coolant temperature in downstream during start	<=	191.3	deg C		
					)					
					)					
					(					
					End of start is reached	=	FALSE	-		
					Request of catalyst heating in case of first start of combustion engine - Initialisation phase	=	TRUE	-		
					Difference between desired value for integrated air mass by catalyst heating by cold engine and residual heat inside catalyst by start of combustion engine	>=	200.18	g		
					)					
					OR					
					(					
					Condition for evaluation of temperature in first brick of front catalyst for catalyst heating	=	TRUE	-		
					(					
					End of start is reached	=	FALSE	-		
					Off time of start-end recognition for customer	=	1	-		
					Time counter at end of start from last driving cycle	>	120	sec		
					Engine off time based on start- end recognition	<	300	sec		
					)					
					Temperature inside first brick of front catalyst during start (see Look-Up-Table #P050A-1)	<=	399.96 to 439.96	deg C		
					)					
					Altitude correction factor	>	0.400024	-		
					)					
						=	TRUE	-		
					Safety fuel cut off is not active	=	TRUE	-		
					Valid crankshaft signal is present	=	TRUE	-		
					Altitude correction factor	>	0	-		
					Vehicle speed	=	0	mph		
					Engine coolant temperature	<=	143.3	deg C		
					Engine coolant temperature	>=	-39.8	deg C		
					Time after end of start	>=	0	sec		
					Difference between idle speed during catalyst heating and idle speed without catalyst heating	>	300	rpm		
					No pending or confirmed DTCs	=	see sheet inhibit tables	-		
					Basic enabling conditions are met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Path 2: Monitoring of idle control for underspeed during catalyst heating	Deviation of idle speed precontrol (set point - current)	> 100 rpm	ECU Sub-State in DRIVE	= TRUE -	5 sec multiple	2 Trips
					Engine start has finished	= TRUE -		
					(	= TRUE -		
					No external torque demand (engine is running in idle)			
					)			
					for time	>= 5 sec		
					Catalyst heating request by cold engine	= TRUE -		
					(			
					(			
					Condition: Request of catalyst heating in case of first start of combustion engine - Initialisation phase	= TRUE -		
					(			
					First start of combustion in driving cycle	= FALSE -		
					Engine is not running	= TRUE -		
					Desired value for integrated air mass by catalyst heating by cold engine	> 0.0 -		
					Intake air temperature in manifold	> -48.04 deg C		
					Difference between engine coolant temperatures in downstream and at engine stop	>= 50.3 deg C		
					Absolute difference between intake air temperature in manifold and engine coolant temperature in downstream during start	<= 191.3 deg C		
					Release of catalyst heating request by ambient temperature	= TRUE -		
					)			
					Condition: Request catalyst heating by cold engine (calculation till end of start is reached)	= TRUE -		
					(			
					(			
					Off time of start-end recognition for customer	= 1 -		
					OR			
					(			
					Difference between engine coolant temperatures in downstream and at engine stop	>= 50.3 deg C		
					Absolute difference between intake air temperature in manifold and engine coolant temperature in downstream during start	<= 191.3 deg C		
					)			
					)			
					(			
					End of start is reached	= FALSE -		
					Request of catalyst heating in case of first start of combustion engine - Initialisation phase	= TRUE -		
					Difference between desired value for integrated air mass by catalyst heating by cold engine and residual heat inside catalyst by start of combustion engine	>= 200.18 g		
					)			
					OR			
					(			
					Condition for evaluation of temperature in first brick of front catalyst for catalyst heating	= TRUE -		
					(			
					End of start is reached	= FALSE -		
					Off time of start-end recognition for customer	= 1 -		
					Time counter at end of start from last driving cycle	> 120 sec		
					Engine off time based on start- end recognition	< 300 sec		
					)			
					Temperature inside first brick of front catalyst during start (see Look-Up-Table #P050A-1)	<= 399.96 to 439.96 deg C		
					)			
					Altitude correction factor	> 0.400024 -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
							)							
								=	TRUE	-				
							Safety fuel cut off is not active	=	TRUE	-				
							Valid crankshaft signal is present	=	TRUE	-				
							Altitude correction factor	>	0	-				
							Vehicle speed	=	0	mph				
							Engine coolant temperature	<=	143.3	deg C				
							Engine coolant temperature	>=	-39.8	deg C				
							Time after end of start	>=	0	sec				
							Difference between idle speed during catalyst heating and idle speed without catalyst heating	>	300	rpm				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enabling conditions are met	=	see sheet enable tables	-				
Cold Start Ignition Timing Performance	P050B	**Path 1 :** Diagnosis of Cold Start Ignition Timing Performance in Engine Idle Mode	mean deviation of actual ignition effciency and desired catalyst heating ignition efficiency during idle	>	calculated value	-	Catalyst heating activated	=	TRUE	-	1	sec	once per driving cycle	2 Trips
			current time for catalyst heating during cold start during idle	>	5	sec	(							
							End of start is reached	=	TRUE	-				
							Homogenous mode of operation is activated	=	TRUE	-				
							Robust engine run after initial fuelling	=	FALSE	-				
							(							
							Engine coolant temperature	>	39.8	deg C				
							OR							
							Time counter at end of start	>	120	sec				
							OR							
							(							
							Absolute value of fuel rail pressure	>	4	MPa				
							Engine is running	=	TRUE	-				
							)	=	25.5	sec				
							for time							
							OR							
							Vehicle speed	>	0	km/h or mph				
							OR							
							Initial fuelling stopped	=	TRUE	-				
							)							
							(							
							Catalyst heating request for end of line test	=	TRUE	-				
							OR							
							Catalyst heating request by cold engine	=	TRUE	-				
							(							
							(							
							Condition: Request of catalyst heating in case of first start of combustion engine - Initialisation phase	=	TRUE	-				
							(							
							First start of combustion in driving cycle	=	FALSE	-				
							Engine is not running	=	TRUE	-				
							Desired value for integrated air mass by catalyst heating by cold engine	>	0.0	-				
							Intake air temperature in manifold	>	-48.04	deg C				
							Difference between engine coolant temperatures in downstream and at engine stop	>=	50.3	deg C				
							Absolute difference between intake air temperature in manifold and engine coolant temperature in downstream during start	<=	191.3	deg C				
							Release of catalyst heating request by ambient temperature	=	TRUE	-				
							)							
							Condition: Request catalyst heating by cold engine (calculation till end of start is reached)	=	TRUE	-				
							(							
							(							
							Off time of start-end recognition for customer	=	1	-				
							OR							
							(							
							Difference between engine coolant temperatures in downstream and at engine stop	>=	50.3	deg C				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Absolute difference between intake air temperature in manifold and engine coolant temperature in downstream during start	<=	191.3	deg C		
					)					
					)					
					(					
					End of start is reached	=	FALSE	-		
					Request of catalyst heating in case of first start of combustion engine - Initialisation phase	=	TRUE	-		
					Difference between desired value for integrated air mass by catalyst heating by cold engine and residual heat inside catalyst by start of combustion engine	>=	200.18	g		
					)					
					OR					
					(					
					Condition for evaluation of temperature in first brick of front catalyst for catalyst heating	=	TRUE	-		
					(					
					End of start is reached	=	FALSE	-		
					Off time of start-end recognition for customer	=	1	-		
					Time counter at end of start from last driving cycle	>	120	sec		
					Engine off time based on start- end recognition	<	300	sec		
					)					
					Temperature inside first brick of front catalyst during start (see Look-Up table #P050A-1)	<=	399.96 to 439.96	deg C		
					)					
					Altitude correction factor	>	0.400024	-		
					)					
					Reset request for catalyst heating by cold engine	=	FALSE	-		
					(					
					Catalyst heating activated	=	TRUE	-		
					Catalyst heating request by cold engine	=	TRUE	-		
					(					
					Relative amount of integrated air mass at catalyst heating	>=	0.75	-		
					OR					
					Duration of catalyst heating during cold start	>	A * B	-		
					(A * B) where in					
					(A) maximum time for active catalyst heating in dependence from altitude and engine start temperature (see Look-Up table #P050B-1)	=	25 to 45	sec		
					(B) weighing map for consideration of catalyst heating for finishing catalyst heating	=				
					OR					
					(					
					Catalyst heating break off in case of permanent idle	=	FALSE	-		
					Catalyst heating activated	=	FALSE	-		
					Idle speed	=	TRUE	-		
					for time	>=	60	sec		
					)					
					OR					
					(					
					Catalyst heating request by cold engine	=	TRUE	-		
					Catalyst heating request by cold engine (calculation till end of start is reached)	=	FALSE	-		
					)					
					)					
					Engine is running	=	TRUE	-		
					for time	=	1	sec		
					)					
					(					
					(					
					Catalyst heating activated	=	FALSE	-		
					OR					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Terminating factor for catalyst heating	>	0.0	-		
					)					
					Terminating factor for catalyst heating	>	0.1016	-		
					)					
					Relative amount of integrated air mass at catalyst heating	<				
					)					
					)					
					OR					
					Catalyst heating request in case of warming catalyst	=	TRUE	-		
					(					
					Engine operates in catalyst warming mode	=	TRUE	-		
					Factor for weighting catalyst heating request for catalysator warming	>	0.01	-		
					(					
					Engine is running	=	TRUE	-		
					Engine speed	<	A - B	-		
					(A - B) where in					
					(A) maximum engine speed for catalyst warming	=	3000	rpm		
					(B) hysteresis for engine speed for the release of catalyst warming	=	0	rpm		
					Catalyst heating request by cold engine	=	FALSE	-		
					Time counter at first end of start in cycle	>	0	sec		
					Lambda for component protection is active	=	FALSE	-		
					(					
					Lambda closed loop control (upstream catalyst), bank 1	=	TRUE	-		
					Engine coolant temperature	>	-273.04	deg C		
					)					
					OR					
					(					
					Lambda closed loop control (upstream catalyst), bank 1	=	FALSE	-		
					Engine coolant temperature	>	-273.04	deg C		
					)					
					Relative air mass	<	A - B	-		
					(A - B) where in					
					(A) maximum relative air charge for the release of catalyst warming	=	1534.992	%		
					(B) hysteresis for maximum relative air charge for the release of catalyst warming	=	0	%		
					)					
					)					
					(					
					Maximum of two catalyst temperatures in Bank 2	<	A - B	-		
					(A - B) where in					
					(A) maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	=	3003.56	deg C		
					(B) hysteresis of maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	=	0	deg C		
					OR					
					Maximum of two catalyst temperatures in Bank 1	<	A - B	-		
					(A - B) where in					
					(A) maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	=	3003.56	deg C		
					(B) hysteresis of maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	=	0	deg C		
					)					
					Catalyst heating request by cold engine	=	TRUE	-		
					(					
					(					
					Condition: Request of catalyst heating in case of first start of combustion engine - Initialisation phase	=	TRUE	-		
					(					
					First start of combustion in driving cycle	=	FALSE	-		
					Engine is not running	=	TRUE	-		
					Desired value for integrated air mass by catalyst heating by cold engine	>	0.0	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Intake air temperature in manifold	>	-48.04	deg C		
					Difference between engine coolant temperatures in downstream and at engine stop	>=	50.3	deg C		
					Absolute difference between intake air temperature in manifold and engine coolant temperature in downstream during start	<=	191.3	deg C		
					Release of catalyst heating request by ambient temperature	=	TRUE	-		
					)					
					Condition: Request catalyst heating by cold engine (calculation till end of start is reached)	=	TRUE	-		
					(					
					(					
					Off time of start-end recognition for customer	=	1	-		
					OR					
					(					
					Difference between engine coolant temperatures in downstream and at engine stop	>=	50.3	deg C		
					Absolute difference between intake air temperature in manifold and engine coolant temperature in downstream during start	<=	191.3	deg C		
					)					
					)					
					(					
					End of start is reached	=	FALSE	-		
					Request of catalyst heating in case of first start of combustion engine - Initialisation phase	=	TRUE	-		
					Difference between desired value for integrated air mass by catalyst heating by cold engine and residual heat inside catalyst by start of combustion engine	>=	200.18	g		
					)					
					OR					
					(					
					Condition for evaluation of temperature in first brick of front catalyst for catalyst heating	=	TRUE	-		
					(					
					End of start is reached	=	FALSE	-		
					Off time of start-end recognition for customer	=	1	-		
					Time counter at end of start from last driving cycle	>	120	sec		
					Engine off time based on start- end recognition	<	300	sec		
					)					
					Temperature inside first brick of front catalyst during start (see Look-Up table #P050A-1)	<=	399.96 to 439.96	deg C		
					)					
					Altitude correction factor	>	0.400024	-		
					)					
					Reset request for catalyst heating by cold engine	=	FALSE	-		
					(					
					Catalyst heating activated	=	TRUE	-		
					Catalyst heating request by cold engine	=	TRUE	-		
					(					
					Relative amount of integrated air mass at catalyst heating	>=	0.75	-		
					OR					
					Duration of catalyst heating during cold start	>	A * B	-		
					(A * B) where in					
					(A) maximum time for active catalyst heating in dependence from altitude and engine start temperature (see Look-Up table #P050B-1)	=	25 to 45	sec		
					(B) weighing map for consideration of catalyst heating for finishing catalyst heating	=				
					OR					
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Catalyst heating break off in case of permanent idle	= FALSE -		
					Catalyst heating activated	= FALSE -		
					Idle speed	= TRUE -		
					for time	>= 60 sec		
					)			
					OR			
					(			
					Catalyst heating request by cold engine	= TRUE -		
					Catalyst heating request by cold engine (calculation till end of start is reached)	= FALSE -		
					)			
					)			
					Engine is running	= TRUE -		
					for time	= 1 sec		
					)			
					(			
					(			
					Catalyst heating activated	= FALSE -		
					OR			
					Terminating factor for catalyst heating	> 0.0 -		
					)			
					Terminating factor for catalyst heating	> 0.1016 -		
					)			
					Relative amount of integrated air mass at catalyst heating	<		
					)			
					)			
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		
		Path 2: Diagnosis of Cold Start Ignition Timing Performance at Engine Part Load	mean deviation of actual ignition effciency and desired catalyst heating ignition efficiency outside idle	> calculated value -	Catalyst heating activated	= TRUE -	1 sec once per driving cycle	2 Trips
			current time for catalyst heating during cold start outside idle	> 5 sec	(			
					End of start is reached	= TRUE -		
					Homogenous mode of operation is activated	= TRUE -		
					Robust engine run after initial fuelling	= FALSE -		
					(			
					Engine coolant temperature	> 39.8 deg C		
					OR			
					Time counter at end of start	> 120 sec		
					OR			
					(			
					Absolute value of fuel rail pressure	> 4 MPa		
					Engine is running	= TRUE -		
					)	= 25.5 sec		
					for time			
					OR			
					Vehicle speed	> 0 km/h or mph		
					OR			
					Initial fuelling stopped	= TRUE -		
					)			
					(			
					Catalyst heating request for end of line test	= TRUE -		
					OR			
					Catalyst heating request by cold engine	= TRUE -		
					(			
					(			
					Condition: Request of catalyst heating in case of first start of combustion engine - Initialisation phase	= TRUE -		
					(			
					First start of combustion in driving cycle	= FALSE -		
					Engine is not running	= TRUE -		
					Desired value for integrated air mass by catalyst heating by cold engine	> 0.0 -		
					Intake air temperature in manifold	> -48.04 deg C		
					Difference between engine coolant temperatures in downstream and at engine stop	>= 50.3 deg C		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Absolute difference between intake air temperature in manifold and engine coolant temperature in downstream during start	<=	191.3	deg C		
					Release of catalyst heating request by ambient temperature	=	TRUE	-		
					)					
					Condition: Request catalyst heating by cold engine (calculation till end of start is reached)	=	TRUE	-		
					(					
					(					
					Off time of start-end recognition for customer	=	1	-		
					OR					
					(					
					Difference between engine coolant temperatures in downstream and at engine stop	>=	50.3	deg C		
					Absolute difference between intake air temperature in manifold and engine coolant temperature in downstream during start	<=	191.3	deg C		
					)					
					)					
					(					
					End of start is reached	=	FALSE	-		
					Request of catalyst heating in case of first start of combustion engine - Initialisation phase	=	TRUE	-		
					Difference between desired value for integrated air mass by catalyst heating by cold engine and residual heat inside catalyst by start of combustion engine	>=	200.18	g		
					)					
					OR					
					(					
					Condition for evaluation of temperature in first brick of front catalyst for catalyst heating	=	TRUE	-		
					(					
					End of start is reached	=	FALSE	-		
					Off time of start-end recognition for customer	=	1	-		
					Time counter at end of start from last driving cycle	>	120	sec		
					Engine off time based on start- end recognition	<	300	sec		
					)					
					Temperature inside first brick of front catalyst during start (see Look-Up table #P050A-1)	<=	399.96 to 439.96	deg C		
					)					
					Altitude correction factor	>	0.400024	-		
					)					
					Reset request for catalyst heating by cold engine	=	FALSE	-		
					(					
					Catalyst heating activated	=	TRUE	-		
					Catalyst heating request by cold engine	=	TRUE	-		
					(					
					Relative amount of integrated air mass at catalyst heating	>=	0.75	-		
					OR					
					Duration of catalyst heating during cold start	>	A * B	-		
					(A * B) where in					
					(A) maximum time for active catalyst heating in dependence from altitude and engine start temperature (see Look-Up table #P050B-1)	=	25 to 45	sec		
					(B) weighing map for consideration of catalyst heating for finishing catalyst heating	=				
					OR					
					(					
					Catalyst heating break off in case of permanent idle	=	FALSE	-		
					Catalyst heating activated	=	FALSE	-		
					Idle speed	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					for time	>=	60	sec		
					)					
					OR					
					(					
					Catalyst heating request by cold engine	=	TRUE	-		
					Catalyst heating request by cold engine (calculation till end of start is reached)	=	FALSE	-		
					)					
					)					
					Engine is running	=	TRUE	-		
					for time	=	1	sec		
					)					
					(					
					(					
					Catalyst heating activated	=	FALSE	-		
					OR					
					Terminating factor for catalyst heating	>	0.0	-		
					)					
					Terminating factor for catalyst heating	>	0.1016	-		
					)					
					Relative amount of integrated air mass at catalyst heating	<				
					)					
					)					
					OR					
					Catalyst heating request in case of warming catalyst	=	TRUE	-		
					(					
					Engine operates in catalyst warming mode	=	TRUE	-		
					Factor for weighting catalyst heating request for catalysator warming	>	0.01	-		
					(					
					Engine is running	=	TRUE	-		
					Engine speed	<	A - B	-		
					(A - B) where in					
					(A) maximum engine speed for catalyst warming	=	3000	rpm		
					(B) hysteresis for engine speed for the release of catalyst warming	=	0	rpm		
					Catalyst heating request by cold engine	=	FALSE	-		
					Time counter at first end of start in cycle	>	0	sec		
					Lambda for component protection is active	=	FALSE	-		
					(					
					Lambda closed loop control (upstream catalyst), bank 1	=	TRUE	-		
					Engine coolant temperature	>	-273.04	deg C		
					)					
					OR					
					(					
					Lambda closed loop control (upstream catalyst), bank 1	=	FALSE	-		
					Engine coolant temperature	>	-273.04	deg C		
					)					
					Relative air mass	<	A - B	-		
					(A - B) where in					
					(A) maximum relative air charge for the release of catalyst warming	=	1534.992	%		
					(B) hysteresis for maximum relative air charge for the release of catalyst warming	=	0	%		
					)					
					)					
					(					
					Maximum of two catalyst temperatures in Bank 2	<	A - B	-		
					(A - B) where in					
					(A) maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	=	3003.56	deg C		
					(B) hysteresis of maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	=	0	deg C		
					OR					
					Maximum of two catalyst temperatures in Bank 1	<	A - B	-		
					(A - B) where in					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(A) maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	=	3003.56	deg C		
					(B) hysteresis of maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	=	0	deg C		
					)					
					Catalyst heating request by cold engine	=	TRUE	-		
					(					
					(					
					Condition: Request of catalyst heating in case of first start of combustion engine - Initialisation phase	=	TRUE	-		
					(					
					First start of combustion in driving cycle	=	FALSE	-		
					Engine is not running	=	TRUE	-		
					Desired value for integrated air mass by catalyst heating by cold engine	>	0.0	-		
					Intake air temperature in manifold	>	-48.04	deg C		
					Difference between engine coolant temperatures in downstream and at engine stop	>=	50.3	deg C		
					Absolute difference between intake air temperature in manifold and engine coolant temperature in downstream during start	<=	191.3	deg C		
					Release of catalyst heating request by ambient temperature	=	TRUE	-		
					)					
					Condition: Request catalyst heating by cold engine (calculation till end of start is reached)	=	TRUE	-		
					(					
					(					
					Off time of start-end recognition for customer	=	1	-		
					OR					
					(					
					Difference between engine coolant temperatures in downstream and at engine stop	>=	50.3	deg C		
					Absolute difference between intake air temperature in manifold and engine coolant temperature in downstream during start	<=	191.3	deg C		
					)					
					)					
					(					
					End of start is reached	=	FALSE	-		
					Request of catalyst heating in case of first start of combustion engine - Initialisation phase	=	TRUE	-		
					Difference between desired value for integrated air mass by catalyst heating by cold engine and residual heat inside catalyst by start of combustion engine	>=	200.18	g		
					)					
					OR					
					(					
					Condition for evaluation of temperature in first brick of front catalyst for catalyst heating	=	TRUE	-		
					(					
					End of start is reached	=	FALSE	-		
					Off time of start-end recognition for customer	=	1	-		
					Time counter at end of start from last driving cycle	>	120	sec		
					Engine off time based on start- end recognition	<	300	sec		
					)					
					Temperature inside first brick of front catalyst during start (see Look-Up table #P050A-1)	<=	399.96 to 439.96	deg C		
					)					
					Altitude correction factor	>	0.400024	-		
					)					
					Reset request for catalyst heating by cold engine	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					Catalyst heating activated	= TRUE -		
					Catalyst heating request by cold engine	= TRUE -		
					(			
					Relative amount of integrated air mass at catalyst heating	>= 0.75 -		
					OR			
					Duration of catalyst heating during cold start	> A * B -		
					(A * B) where in			
					(A) maximum time for active catalyst heating in dependence from altitude and engine start temperature (see Look-Up table #P050B-1)	= 25 to 45 sec		
					(B) weighing map for consideration of catalyst heating for finishing catalyst heating	= 1 -		
					OR			
					(			
					Catalyst heating break off in case of permanent idle	= FALSE -		
					Catalyst heating activated	= FALSE -		
					Idle speed	= TRUE -		
					for time	>= 60 sec		
					)			
					OR			
					(			
					Catalyst heating request by cold engine	= TRUE -		
					Catalyst heating request by cold engine (calculation till end of start is reached)	= FALSE -		
					)			
					)			
					Engine is running	= TRUE -		
					for time	= 1 sec		
					)			
					(			
					(			
					Catalyst heating activated	= FALSE -		
					OR			
					Terminating factor for catalyst heating	> 0.0 -		
					)			
					Terminating factor for catalyst heating	> 0.1016 -		
					)			
					Relative amount of integrated air mass at catalyst heating	<		
					)			
					)			
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		
High Pressure Fuel System	P053F	Detects if High Pressure fuel system control deviation of rail pressure during cold start is less than maximum threshold for calibrated period of time	Filtered value of rail pressure control deviation	< -3 MPa	Conditions for Plausibility check of Fuel supply system	= TRUE -	7 sec continuous	2 Trips
					(			
					Airbag is activated	= FALSE -		
					Rail pressure sensor voltage is not plausible	= FALSE -		
					Battery voltage	<= 655.34 V		
					Mean value of effective relative volumetric injected fuel mass	>= 7.734 %		
					Mean value of effective relative volumetric injected fuel mass	<= 3071.953 %		
					Initial fueling mode is active	= FALSE -		
					)			
					Time counter at end of start	>= 2 sec		
					Conditions for reset of high-pressure regulation	= FALSE -		
					(			
					(			
					(			
					(			
					Actual number of cylinders with injection cut-off	< 6 -		
					Desired number of cylinders with injection cut-off	< 8 -		
					)			
					OR			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					End of start is reached	=	FALSE	-		
					)					
					OR					
					Difference between the actual rail pressure and filtered rail pressure setpoint (A+B) where in:	>	(A+B)	MPa		
					(A) rail pressure offset during fuel cutoff for activation demand control	=	1	MPa		
					(B) maximum difference between actual rail pressure and set rail pressure for deactivation of MSV if fuel cutt off is active	=	0	MPa		
					)					
					(					
					(					
					High pressure pump is active	=	TRUE	-		
					(					
					Engine is in running state	=	TRUE	-		
					OR					
					Crankshaft signal is detected	=	TRUE	-		
					)					
					for time	=	0.04	sec		
					)					
					OR					
					(					
					High pressure pump is not active	=	FALSE	-		
					End of start is reached	=	TRUE	-		
					))					
					(					
					Start of injection enabled	=	TRUE	-		
					(					
					(					
					Engine start is in pre-injection mode	=	TRUE	-		
					Injection counter (A+B) where in:	>=	(A+B)	-		
					(A) Number of injections for enabling high-pressure controller	=	2	-		
					(B) Number of cylinders	=	8	-		
					)					
					OR					
					(					
					Engine start is not in pre-injection mode	=	FALSE	-		
					Injection counter	>=	2	-		
					))					
					)					
					(					
					Engine state of synchronisation for rail pressure control activation	>=	30	-		
					(					
					Engine is in running state	=	TRUE	-		
					OR					
					Crankshaft signal is detected	=	TRUE	-		
					)					
					for time	=	0.04	sec		
					)					
					)					
					for time	=	7	sec		
					Conditions for high pressure fuel system diagnosis during cold start					
					(					
					(					
					Rail pressure setpoint	<	36	MPa		
					Rail pressure setpoint	>	6	MPa		
					)					
					for time	=	0.2	sec		
					Absolute of difference between rail pressure set point and its filtered value	<	15	MPa		
					for time	=	0.2	sec		
					Engine speed	>	0	rpm		
					Coolant temperature at engine output	>	-3549.94	deg C		
					)					
					Catalyst heating activated	=	TRUE	-		
					(					
					End of start is reached	=	TRUE	-		
					Homogenous mode of operation is activated	=	TRUE	-		
					Robust engine run after initial fuelling	=	FALSE	-		
					(					
					Engine coolant temperature	>	39.8	deg C		
					OR					
					Time counter at end of start	>	120	sec		
					OR					
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Absolute value of fuel rail pressure	>	4	MPa		
					Engine is running	=	TRUE	-		
					)	=	25.5	sec		
					for time					
					OR					
					Vehicle speed	>	0	km/h or mph		
					OR					
					Initial fuelling stopped	=	TRUE	-		
					)					
					(					
					Catalyst heating request for end of line test	=	TRUE	-		
					OR					
					Catalyst heating request by cold engine	=	TRUE	-		
					(					
					(					
					Condition: Request of catalyst heating in case of first start of combustion engine - Initialisation phase	=	TRUE	-		
					(					
					First start of combustion in driving cycle	=	FALSE	-		
					Engine is not running	=	TRUE	-		
					Desired value for integrated air mass by catalyst heating by cold engine	>	0.0	-		
					Intake air temperature in manifold	>	-48.04	deg C		
					Difference between engine coolant temperatures in downstream and at engine stop	>=	50.3	deg C		
					Absolute difference between intake air temperature in manifold and engine coolant temperature in downstream during start	<=	191.3	deg C		
					Release of catalyst heating request by ambient temperature	=	TRUE	-		
					)					
					Condition: Request catalyst heating by cold engine (calculation till end of start is reached)	=	TRUE	-		
					(					
					(					
					Off time of start-end recognition for customer	=	1	-		
					OR					
					(					
					Difference between engine coolant temperatures in downstream and at engine stop	>=	50.3	deg C		
					Absolute difference between intake air temperature in manifold and engine coolant temperature in downstream during start	<=	191.3	deg C		
					)					
					)					
					(					
					End of start is reached	=	FALSE	-		
					Request of catalyst heating in case of first start of combustion engine - Initialisation phase	=	TRUE	-		
					Difference between desired value for integrated air mass by catalyst heating by cold engine and residual heat inside catalyst by start of combustion engine	>=	200.18	g		
					)					
					OR					
					(					
					Condition for evaluation of temperature in first brick of front catalyst for catalyst heating	=	TRUE	-		
					(					
					End of start is reached	=	FALSE	-		
					Off time of start-end recognition for customer	=	1	-		
					Time counter at end of start from last driving cycle	>	120	sec		
					Engine off time based on start- end recognition	<	300	sec		
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Temperature inside first brick of front catalyst during start (see Look-Up table #P050A-1)	<=	399.96 to 439.96	deg C		
					)					
					Altitude correction factor	>	0.400024	-		
					)					
					Reset request for catalyst heating by cold engine	=	FALSE	-		
					(					
					Catalyst heating activated	=	TRUE	-		
					Catalyst heating request by cold engine	=	TRUE	-		
					(					
					Relative amount of integrated air mass at catalyst heating	>=	0.75	-		
					OR					
					Duration of catalyst heating during cold start	>	A * B	-		
					(A * B) where in					
					(A) maximum time for active catalyst heating in dependence from altitude and engine start temperature (see Look-Up table #P050B-1)	=	25 to 45	sec		
					(B) weighing map for consideration of catalyst heating for finishing catalyst heating	=	1	-		
					OR					
					(					
					Catalyst heating break off in case of permanent idle	=	FALSE	-		
					Catalyst heating activated	=	FALSE	-		
					Idle speed	=	TRUE	-		
					for time	>=	60	sec		
					)					
					OR					
					(					
					Catalyst heating request by cold engine	=	TRUE	-		
					Catalyst heating request by cold engine (calculation till end of start is reached)	=	FALSE	-		
					)					
					)					
					Engine is running	=	TRUE	-		
					for time	=	1	sec		
					)					
					(					
					(					
					Catalyst heating activated	=	FALSE	-		
					Terminating factor for catalyst heating	>	0.0	-		
					)					
					Terminating factor for catalyst heating	>	0.1016	-		
					)					
					Relative amount of integrated air mass at catalyst heating	<	65535	-		
					)					
					)					
					OR					
					Catalyst heating request in case of warming catalyst	=	TRUE	-		
					(					
					Engine operates in catalyst warming mode	=	TRUE	-		
					Factor for weighting catalyst heating request for catalysator warming	>	0.01	-		
					(					
					Engine is running	=	TRUE	-		
					Engine speed	<	A - B	-		
					(A - B) where in					
					(A) maximum engine speed for catalyst warming	=	3000	rpm		
					(B) hysteresis for engine speed for the release of catalyst warming	=	0	rpm		
					Catalyst heating request by cold engine	=	FALSE	-		
					Time counter at first end of start in cycle	>	0	sec		
					Lambda for component protection is active	=	FALSE	-		
					(					
					(					
					Lambda closed loop control (upstream catalyst), bank 1	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine coolant temperature	> -273.04 deg C		
					)			
					OR			
					(			
					Lambda closed loop control (upstream catalyst), bank 1	= FALSE -		
					Engine coolant temperature	> -273.04 deg C		
					)			
					)			
					Relative air mass	< A - B -		
					(A - B) where in			
					(A) maximum relative air charge for the release of catalyst warming	= 1534.992 %		
					(B) hysteresis for maximum relative air charge for the release of catalyst warming	= 0 %		
					)			
					)			
					)			
					Maximum of two catalyst temperatures in Bank 2	< A - B -		
					(A - B) where in			
					(A) maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	= 3003.56 deg C		
					(B) hysteresis of maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	= 0 deg C		
					OR			
					Maximum of two catalyst temperatures in Bank 1	< A - B -		
					(A - B) where in			
					(A) maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	= 3003.56 deg C		
					(B) hysteresis of maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	= 0 deg C		
					)			
					)			
					No pending or confirmed DTCs	= see sheet inhibit table -		
					Basic enable conditions met	= see sheet enable table -		
		Detects if High Pressure fuel system control deviation of rail pressure during cold start is greater than minimum threshold for calibrated period of time	Filtered value of rail pressure control deviation	> 3 MPa	Airbag is activated	= FALSE -	5 sec continuous	2 Trips
					Rail pressure sensor voltage is not plausible	= FALSE -		
					Battery voltage	<= 655.34 V		
					Mean value of effective relative volumetric injected fuel mass	>= 7.734 %		
					Mean value of effective relative volumetric injected fuel mass	<= 3071.953 %		
					Initial fueling mode is active	= FALSE -		
					Time counter at end of start	>= 2 sec		
					Conditions for reset of high-pressure regulation	= FALSE -		
					(			
					(			
					(			
					(			
					Actual number of cylinders with injection cut-off	< 6 -		
					Desired number of cylinders with injection cut-off	< 8 -		
					)			
					OR			
					End of start is reached	= FALSE -		
					)			
					OR			
					Difference between the actual rail pressure and filtered rail pressure setpoint (A+B) where in:	> (A+B) MPa		
					(A) rail pressure offset during fuel cutoff for activation demand control	= 1 MPa		
					(B) maximum difference between actual rail pressure and set rail pressure for deactivation of MSV if fuel cutt off is active	= 0 MPa		
					)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					(					
					High pressure pump is active	=	TRUE	-		
					(					
					Engine is in running state	=	TRUE	-		
					OR					
					Crankshaft signal is detected	=	TRUE	-		
					)					
					for time	=	0.04	sec		
					)					
					OR					
					High pressure pump is not active	=	FALSE	-		
					End of start is reached	=	TRUE	-		
					)					
					(					
					Start of injection enabled	=	TRUE	-		
					(					
					Engine start is in pre-injection mode	=	TRUE	-		
					Injection counter	>=	(A+B)	-		
					(A+B) where in:					
					(A) Number of injections for enabling high-pressure controller	=	2	-		
					(B) Number of cylinders	=	8	-		
					OR					
					Engine start is not in pre-injection mode	=	FALSE	-		
					Injection counter	>=	2	-		
					)					
					)					
					(					
					Engine state of synchronisation for rail pressure control activation	>=	30	-		
					(					
					Engine is in running state	=	TRUE	-		
					OR					
					Crankshaft signal is detected	=	TRUE	-		
					)					
					for time	=	0.04	sec		
					)					
					)					
					for time	=	7	sec		
					Conditions for high pressure fuel system diagnosis during cold start					
					(					
					(					
					Rail pressure setpoint	<	36	MPa		
					Rail pressure setpoint	>	6	MPa		
					)					
					for time	=	0.2	sec		
					Absolute of difference between rail pressure set point and its filtered value	<	15	MPa		
					for time	=	0.2	sec		
					Engine speed	>	0	rpm		
					Coolant temperature at engine output	>	-3549.94	deg C		
					)					
					Catalyst heating activated	=	TRUE	-		
					(					
					End of start is reached	=	TRUE	-		
					Homogenous mode of operation is activated	=	TRUE	-		
					Robust engine run after initial fuelling	=	FALSE	-		
					(					
					Engine coolant temperature	>	39.8	deg C		
					OR					
					Time counter at end of start	>	120	sec		
					OR					
					(					
					Absolute value of fuel rail pressure	>	4	MPa		
					Engine is running	=	TRUE	-		
					)	=	25.5	sec		
					for time					
					OR					
					Vehicle speed	>	0	km/h or mph		
					OR					
					Initial fuelling stopped	=	TRUE	-		
					)					
					(					
					Catalyst heating request for end of line test	=	TRUE	-		
					OR					
					Catalyst heating request by cold engine	=	TRUE	-		
					(					
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Condition: Request of catalyst heating in case of first start of combustion engine - Initialisation phase	=	TRUE	-		
					(					
					First start of combustion in driving cycle	=	FALSE	-		
					Engine is not running	=	TRUE	-		
					Desired value for integrated air mass by catalyst heating by cold engine	>	0.0	-		
					Intake air temperature in manifold	>	-48.04	deg C		
					Difference between engine coolant temperatures in downstream and at engine stop	>=	50.3	deg C		
					Absolute difference between intake air temperature in manifold and engine coolant temperature in downstream during start	<=	191.3	deg C		
					Release of catalyst heating request by ambient temperature	=	TRUE	-		
					)					
					Condition: Request catalyst heating by cold engine (calculation till end of start is reached)	=	TRUE	-		
					(					
					(					
					Off time of start-end recognition for customer	=	1	-		
					OR					
					(					
					Difference between engine coolant temperatures in downstream and at engine stop	>=	50.3	deg C		
					Absolute difference between intake air temperature in manifold and engine coolant temperature in downstream during start	<=	191.3	deg C		
					)					
					)					
					(					
					End of start is reached	=	FALSE	-		
					Request of catalyst heating in case of first start of combustion engine - Initialisation phase	=	TRUE	-		
					Difference between desired value for integrated air mass by catalyst heating by cold engine and residual heat inside catalyst by start of combustion engine	>=	200.18	g		
					)					
					OR					
					(					
					Condition for evaluation of temperature in first brick of front catalyst for catalyst heating	=	TRUE	-		
					(					
					End of start is reached	=	FALSE	-		
					Off time of start-end recognition for customer	=	1	-		
					Time counter at end of start from last driving cycle	>	120	sec		
					Engine off time based on start- end recognition	<	300	sec		
					)					
					Temperature inside first brick of front catalyst during start (see Look-Up table #P050A-1)	<=	399.96 to 439.96	deg C		
					)					
					Altitude correction factor	>	0.400024	-		
					)					
					Reset request for catalyst heating by cold engine	=	FALSE	-		
					(					
					Catalyst heating activated	=	TRUE	-		
					Catalyst heating request by cold engine	=	TRUE	-		
					(					
					Relative amount of integrated air mass at catalyst heating	>=	0.75	-		
					OR					
					Duration of catalyst heating during cold start	>	A * B	-		
					(A * B) where in					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(A) maximum time for active catalyst heating in dependence from altitude and engine start temperature (see Look-Up table #P050B-1)	= 25 to 45 sec		
					(B) weighing map for consideration of catalyst heating for finishing catalyst heating	= 1 -		
					OR			
					(			
					Catalyst heating break off in case of permanent idle	= FALSE -		
					Catalyst heating activated	= FALSE -		
					Idle speed	= TRUE -		
					for time	>= 60 sec		
					)			
					OR			
					(			
					Catalyst heating request by cold engine	= TRUE -		
					Catalyst heating request by cold engine (calculation till end of start is reached)	= FALSE -		
					)			
					)			
					Engine is running	= TRUE -		
					for time	= 1 sec		
					)			
					(			
					(			
					Catalyst heating activated	= FALSE -		
					Terminating factor for catalyst heating	> 0.0 -		
					)			
					Terminating factor for catalyst heating	> 0.1016 -		
					)			
					Relative amount of integrated air mass at catalyst heating	< 65535 -		
					)			
					)			
					OR			
					Catalyst heating request in case of warming catalyst	= TRUE -		
					(			
					Engine operates in catalyst warming mode	= TRUE -		
					Factor for weighting catalyst heating request for catalysator warming	> 0.01 -		
					(			
					Engine is running	= TRUE -		
					Engine speed	< A - B -		
					(A - B) where in			
					(A) maximum engine speed for catalyst warming	= 3000 rpm		
					(B) hysteresis for engine speed for the release of catalyst warming	= 0 rpm		
					Catalyst heating request by cold engine	= FALSE -		
					Time counter at first end of start in cycle	> 0 sec		
					Lambda for component protection is active	= FALSE -		
					(			
					Lambda closed loop control (upstream catalyst), bank 1	= TRUE -		
					Engine coolant temperature	> -273.04 deg C		
					)			
					OR			
					(			
					Lambda closed loop control (upstream catalyst), bank 1	= FALSE -		
					Engine coolant temperature	> -273.04 deg C		
					)			
					Relative air mass	< A - B -		
					(A - B) where in			
					(A) maximum relative air charge for the release of catalyst warming	= 1534.992 %		
					(B) hysteresis for maximum relative air charge for the release of catalyst warming	= 0 %		
					)			
					)			
					)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Maximum of two catalyst temperatures in Bank 2	< A - B -		
					(A - B) where in			
					(A) maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	= 3003.56 deg C		
					(B) hysteresis of maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	= 0 deg C		
					OR			
					Maximum of two catalyst temperatures in Bank 1	< A - B -		
					(A - B) where in			
					(A) maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	= 3003.56 deg C		
					(B) hysteresis of maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	= 0 deg C		
					)			
					)			
					No pending or confirmed DTCs	= see sheet inhibit table -		
					Basic enable conditions met	= see sheet enable table -		
Cold start monitoring for camshaft diagnosis	P05CC	Detects stuck error when the deviation between the desired position and actual position of phase actuator intake camshaft is greater than calibrated threshold for a calibrated period of time	Deviation between setpoint and actual angle of camshaft intake actuator for CSERS diagnosis	> 6 degrees	Conditions for enabling camshaft phase shift actuator diagnosis for CSERS (Cold Start Emission Reduction Strategy)	= TRUE -	5 sec continuous	2 Trips
					(			
					Condition for requesting the cold start diagnosis request for intake camshaft	= TRUE -		
					(			
					Condition catalyst heating activated	= TRUE -		
					(			
					End of start is reached	= TRUE -		
					Homogenous mode of operation is activated	= TRUE -		
					Robust engine run after initial fuelling	= FALSE -		
					(			
					Engine coolant temperature	> 39.8 deg C		
					OR			
					Time counter at end of start	> 120 sec		
					OR			
					(			
					Absolute value of fuel rail pressure	> 4 MPa		
					Engine is running	= TRUE -		
					) for time	= 25.5 sec		
					OR			
					Vehicle speed	> 0 km/h or mph		
					OR			
					Initial fuelling stopped	= TRUE -		
					)			
					Catalyst heating request for end of line test	= TRUE -		
					)			
					Catalyst heating request by cold engine	= TRUE -		
					(			
					(			
					Condition: Request of catalyst heating in case of first start of combustion engine - Initialisation phase	= TRUE -		
					(			
					First start of combustion in driving cycle	= FALSE -		
					Engine is not running	= TRUE -		
					Desired value for integrated air mass by catalyst heating by cold engine	> 0.0 -		
					Intake air temperature in manifold	> -48.04 deg C		
					Difference between engine coolant temperatures in downstream and at engine stop	>= 50.3 deg C		
					Absolute difference between intake air temperature in manifold and engine coolant temperature in downstream during start	<= 191.3 deg C		
					Release of catalyst heating request by ambient temperature	= TRUE -		
					)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Condition: Request catalyst heating by cold engine (calculation till end of start is reached)	=	TRUE	-		
					(					
					(					
					Off time of start-end recognition for customer	=	1	-		
					OR					
					(					
					Difference between engine coolant temperatures in downstream and at engine stop	>=	50.3	deg C		
					Absolute difference between intake air temperature in manifold and engine coolant temperature in downstream during start	<=	191.3	deg C		
					)					
					)					
					(					
					End of start is reached	=	FALSE	-		
					Request of catalyst heating in case of first start of combustion engine - Initialisation phase	=	TRUE	-		
					Difference between desired value for integrated air mass by catalyst heating by cold engine and residual heat inside catalyst by start of combustion engine	>=	200.18	g		
					)					
					OR					
					(					
					Condition for evaluation of temperature in first brick of front catalyst for catalyst heating	=	TRUE	-		
					(					
					End of start is reached	=	FALSE	-		
					Off time of start-end recognition for customer	=	1	-		
					Time counter at end of start from last driving cycle	>	120	sec		
					Engine off time based on start- end recognition	<	300	sec		
					)					
					Temperature inside first brick of front catalyst during start (see Look-Up table #P050A-1)	<=	399.96 to 439.96	deg C		
					)					
					Altitude correction factor	>	0.400024	-		
					)					
					Reset request for catalyst heating by cold engine	=	FALSE	-		
					(					
					Catalyst heating activated	=	TRUE	-		
					Catalyst heating request by cold engine	=	TRUE	-		
					(					
					Relative amount of integrated air mass at catalyst heating	>=	0.75	-		
					OR					
					Duration of catalyst heating during cold start	>	A * B	-		
					(A * B) where in					
					(A) maximum time for active catalyst heating in dependence from altitude and engine start temperature (see Look-Up table #P050B-1)	=	25 to 45	sec		
					(B) weighing map for consideration of catalyst heating for finishing catalyst heating	=	1	-		
					OR					
					(					
					Catalyst heating break off in case of permanent idle	=	FALSE	-		
					Catalyst heating activated	=	FALSE	-		
					Idle speed	=	TRUE	-		
					for time	>=	60	sec		
					)					
					OR					
					(					
					Catalyst heating request by cold engine	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Catalyst heating request by cold engine (calculation till end of start is reached)	= FALSE -		
					)			
					)			
					Engine is running	= TRUE -		
					for time	= 1 sec		
					)			
					(			
					(			
					Catalyst heating activated	= FALSE -		
					OR			
					Terminating factor for catalyst heating	> 0.0 -		
					)			
					Terminating factor for catalyst heating	> 0.1016 -		
					)			
					Relative amount of integrated air mass at catalyst heating	< 65535 -		
					)			
					)			
					OR			
					Catalyst heating request in case of warming catalyst	= TRUE -		
					(			
					Engine operates in catalyst warming mode	= TRUE -		
					Factor for weighting catalyst heating request for catalysator warming	> 0.01 -		
					(			
					Engine is running	= TRUE -		
					Engine speed	< A - B -		
					(A - B) where in			
					(A) maximum engine speed for catalyst warming	= 3000 rpm		
					(B) hysteresis for engine speed for the release of catalyst warming	= 0 rpm		
					Catalyst heating request by cold engine	= FALSE -		
					Time counter at first end of start in cycle	> 0 sec		
					Lambda for component protection is active	= FALSE -		
					(			
					Lambda closed loop control (upstream catalyst), bank 1	= TRUE -		
					Engine coolant temperature	> -273.04 deg C		
					)			
					OR			
					(			
					Lambda closed loop control (upstream catalyst), bank 1	= FALSE -		
					Engine coolant temperature	> -273.04 deg C		
					)			
					Relative air mass	< A - B -		
					(A - B) where in			
					(A) maximum relative air charge for the release of catalyst warming	= 1534.992 %		
					(B) hysteresis for maximum relative air charge for the release of catalyst warming	= 0 %		
					)			
					)			
					(			
					Maximum of two catalyst temperatures in Bank 2	< A - B -		
					(A - B) where in			
					(A) maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	= 3003.56 deg C		
					(B) hysteresis of maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	= 0 deg C		
					OR			
					Maximum of two catalyst temperatures in Bank 1	< A - B -		
					(A - B) where in			
					(A) maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	= 3003.56 deg C		
					(B) hysteresis of maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	= 0 deg C		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					)					
					)					
					Catalyst heating request by cold engine	=	TRUE	-		
					Weighting factor for nominal angle of intake camshaft during catalyst heating	>	0	-		
					)					
					Ambient conditions for cold start diagnosis fulfilled	=	TRUE	-		
					(					
					Oil temperature at cylinder head	>=	-20.04	deg C		
					Oil temperature at cylinder head	<=	179.96	deg C		
					(					
					Engine Speed	>	10200	rpm		
					Engine Speed	<	500	rpm		
					)					
					Battery voltage	>=	10.9	V		
					)					
					State governor intake camshaft bank1	=	TRUE	-		
					(					
					Release conditions for intake camshaft control	=	TRUE	-		
					(					
					Engine Speed (see Look-Up-Table #P05CC-2)	>	1000 to 1150	rpm		
					Global enable conditions for camshaft control depending on oil pressure, temperature and battery voltage	=	TRUE	-		
					(					
					Battery Voltage	>	10	V		
					Battery Voltage	<=	655.34	V		
					)					
					(					
					Starting value of downstream engine coolant temperature	>=	3003.56	deg C		
					(					
					Oil temperature enabling conditions for camshaft diagnosis	=	TRUE	-		
					(					
					Oil temperature	>	-20.04	deg C		
					Oil temperature	<=	149.96	deg C		
					)					
					)					
					)					
					OR					
					(					
					Starting value of downstream engine coolant temperature	<	3003.56	deg C		
					Oil pressure enabling conditions for camshaft diagnosis	>=	0	sec		
					(					
					Oil pressure	>	250	kPa		
					for time	>=	0.03	sec		
					)					
					Oil temperature enabling conditions for camshaft diagnosis	=	TRUE	-		
					)					
					(					
					(					
					(					
					Engine is in running state	=	TRUE	-		
					No engine stall detected and engine is in running state	=	TRUE	-		
					and					
					Crankshaft signal has not failed and engine speed is available	=	TRUE	-		
					)					
					for time (see Look-Up-Table #P05CC-1)	>=	2 to 4	sec		
					)					
					OR					
					No stop request from start stop system and engine is active	=	TRUE	-		
					)					
					OR					
					Intake camshaft sensor is unlocked	=	TRUE	-		
					)					
					Difference between reference position phase actuator and desired position phase actuator intake camshaft bank1	>=	0	degrees		
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					No adaptation of the reference position is requested	=	FALSE	-		
					OR					
					Intake camshaft sensor is unlocked	=	TRUE	-		
					)					
					for time (see Look-Up-Table #3)	>=	0.2 to 0.7	sec		
					)					
					Difference between Desired position phase actuator and desired value intake camshaft nonCSERS bank1	>	6	degrees		
					)					
					No pending or confirmed DTCs	=	see sheet inhibit tables	-		
					Basic enable conditions met	=	see sheet enable tables	-		
	P05CD	Detects stuck error when the deviation between the desired position and actual position of phase actuator intake camshaft bank 2 is greater than calibrated threshold for a calibrated period of time	Deviation between setpoint and actual angle of camshaft intake actuator for CSERS	> 6 degrees	Conditions for enabling camshaft phase shift actuator diagnosis for CSERS (Cold Start Emission Reduction Strategy)	=	TRUE	-	5 sec continuous	2 Trips
					(					
					Condition for requesting the cold start diagnosis request for intake camshaft	=	TRUE	-		
					(					
					Condition catalyst heating activated	=	TRUE	-		
					(					
					End of start is reached	=	TRUE	-		
					Homogenous mode of operation is activated	=	TRUE	-		
					Robust engine run after initial fuelling	=	FALSE	-		
					(					
					Engine coolant temperature	>	39.8	deg C		
					OR					
					Time counter at end of start	>	120	sec		
					OR					
					(					
					Absolute value of fuel rail pressure	>	4	MPa		
					Engine is running	=	TRUE	-		
					) for time	=	25.5	sec		
					OR					
					Vehicle speed	>	0	km/h or mph		
					OR					
					Initial fuelling stopped	=	TRUE	-		
					)					
					Catalyst heating request for end of line test	=	TRUE	-		
					)					
					Catalyst heating request by cold engine	=	TRUE	-		
					(					
					(					
					Condition: Request of catalyst heating in case of first start of combustion engine - Initialisation phase	=	TRUE	-		
					(					
					First start of combustion in driving cycle	=	FALSE	-		
					Engine is not running	=	TRUE	-		
					Desired value for integrated air mass by catalyst heating by cold engine	>	0.0	-		
					Intake air temperature in manifold	>	-48.04	deg C		
					Difference between engine coolant temperatures in downstream and at engine stop	>=	50.3	deg C		
					Absolute difference between intake air temperature in manifold and engine coolant temperature in downstream during start	<=	191.3	deg C		
					Release of catalyst heating request by ambient temperature	=	TRUE	-		
					)					
					Condition: Request catalyst heating by cold engine (calculation till end of start is reached)	=	TRUE	-		
					(					
					(					
					Off time of start-end recognition for customer	=	1	-		
					OR					
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Difference between engine coolant temperatures in downstream and at engine stop	>=	50.3	deg C		
					Absolute difference between intake air temperature in manifold and engine coolant temperature in downstream during start	<=	191.3	deg C		
					)					
					)					
					(					
					End of start is reached	=	FALSE	-		
					Request of catalyst heating in case of first start of combustion engine - Initialisation phase	=	TRUE	-		
					Difference between desired value for integrated air mass by catalyst heating by cold engine and residual heat inside catalyst by start of combustion engine	>=	200.18	g		
					)					
					OR					
					(					
					Condition for evaluation of temperature in first brick of front catalyst for catalyst heating	=	TRUE	-		
					(					
					End of start is reached	=	FALSE	-		
					Off time of start-end recognition for customer	=	1	-		
					Time counter at end of start from last driving cycle	>	120	sec		
					Engine off time based on start- end recognition	<	300	sec		
					)					
					Temperature inside first brick of front catalyst during start (see Look-Up table #P050A-1)	<=	399.96 to 439.96	deg C		
					)					
					Altitude correction factor	>	0.400024	-		
					)					
					Reset request for catalyst heating by cold engine	=	FALSE	-		
					(					
					Catalyst heating activated	=	TRUE	-		
					Catalyst heating request by cold engine	=	TRUE	-		
					(					
					Relative amount of integrated air mass at catalyst heating	>=	0.75	-		
					OR					
					Duration of catalyst heating during cold start	>	A * B	-		
					(A * B) where in					
					(A) maximum time for active catalyst heating in dependence from altitude and engine start temperature (see Look-Up table #P050B-1)	=	25 to 45	sec		
					(B) weighing map for consideration of catalyst heating for finishing catalyst heating	=	1	-		
					OR					
					(					
					Catalyst heating break off in case of permanent idle	=	FALSE	-		
					Catalyst heating activated	=	FALSE	-		
					Idle speed	=	TRUE	-		
					for time	>=	60	sec		
					)					
					OR					
					(					
					Catalyst heating request by cold engine	=	TRUE	-		
					Catalyst heating request by cold engine (calculation till end of start is reached)	=	FALSE	-		
					)					
					)					
					Engine is running	=	TRUE	-		
					for time	=	1	sec		
					)					
					(					
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Catalyst heating activated	=	FALSE	-		
					OR					
					Terminating factor for catalyst heating	>	0.0	-		
					)					
					Terminating factor for catalyst heating	>	0.1016	-		
					)					
					Relative amount of integrated air mass at catalyst heating	<	65535	-		
					)					
					)					
					OR					
					Catalyst heating request in case of warming catalyst	=	TRUE	-		
					(					
					Engine operates in catalyst warming mode	=	TRUE	-		
					Factor for weighting catalyst heating request for catalysator warming	>	0.01	-		
					(					
					Engine is running	=	TRUE	-		
					Engine speed	<	A - B	-		
					(A - B) where in					
					(A) maximum engine speed for catalyst warming	=	3000	rpm		
					(B) hysteresis for engine speed for the release of catalyst warming	=	0	rpm		
					Catalyst heating request by cold engine	=	FALSE	-		
					Time counter at first end of start in cycle	>	0	sec		
					Lambda for component protection is active	=	FALSE	-		
					(					
					Lambda closed loop control (upstream catalyst), bank 1	=	TRUE	-		
					Engine coolant temperature	>	-273.04	deg C		
					)					
					OR					
					(					
					Lambda closed loop control (upstream catalyst), bank 1	=	FALSE	-		
					Engine coolant temperature	>	-273.04	deg C		
					)					
					Relative air mass	<	A - B	-		
					(A - B) where in					
					(A) maximum relative air charge for the release of catalyst warming	=	1534.992	%		
					(B) hysteresis for maximum relative air charge for the release of catalyst warming	=	0	%		
					)					
					)					
					(					
					Maximum of two catalyst temperatures in Bank 2	<	A - B	-		
					(A - B) where in					
					(A) maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	=	3003.56	deg C		
					(B) hysteresis of maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	=	0	deg C		
					OR					
					Maximum of two catalyst temperatures in Bank 1	<	A - B	-		
					(A - B) where in					
					(A) maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	=	3003.56	deg C		
					(B) hysteresis of maximum temperature of the first and second catalyst of Bank2 to which no catalyst warming is required	=	0	deg C		
					)					
					)					
					Catalyst heating request by cold engine	=	TRUE	-		
					Weighting factor for nominal angle of intake camshaft during catalyst heating	>	0	-		
					)					
					Ambient conditions for cold start diagnosis fulfilled	=	TRUE	-		
					(					
					Oil temperature at cylinder head	>=	-20.04	deg C		
					Oil temperature at cylinder head	<=	179.96	deg C		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					Engine Speed	>	10200	rpm		
					Engine Speed	<	500	rpm		
					)					
					Battery voltage	>=	10.9	V		
					)					
					State governor intake camshaft bank2	=	TRUE	-		
					(					
					Release conditions for intake camshaft control	=	TRUE	-		
					(					
					Engine Speed (see Look-Up-Table #P05CC-2)	>	1000 to 1150	rpm		
					Global enable conditions for camshaft control depending on oil pressure, temperature and battery voltage	=	TRUE	-		
					(					
					Battery Voltage	>	10	V		
					Battery Voltage	<=	655.34	V		
					)					
					(					
					Starting value of downstream engine coolant temperature	>=	3003.56	deg C		
					(					
					Oil temperature enabling conditions for camshaft diagnosis	=	TRUE	-		
					(					
					Oil temperature	>	-20.04	deg C		
					Oil temperature	<=	149.96	deg C		
					)					
					)					
					)					
					OR					
					(					
					Starting value of downstream engine coolant temperature	<	3003.56	deg C		
					Oil pressure enabling conditions for camshaft diagnosis	>=	0	sec		
					(					
					Oil pressure	>	250	kPa		
					for time	>=	0.03	sec		
					)					
					Oil temperature enabling conditions for camshaft diagnosis	=	TRUE	-		
					)					
					(					
					(					
					(					
					Engine is in running state	=	TRUE	-		
					No engine stall detected and engine is in running state	=	TRUE	-		
					Crankshaft signal has not failed and engine speed is available	=	TRUE	-		
					)					
					for time (see Look-Up-Table #P05CC-1)	>=	2 to 4	sec		
					)					
					OR					
					No stop request from start stop system and engine is active	=	TRUE	-		
					)					
					OR					
					Intake camshaft sensor is unlocked	=	TRUE	-		
					)					
					Difference between reference position phase actuator and desired position phase actuator intake camshaft bank2	>=	0	degrees		
					(					
					No adaptation of the reference position is requested	=	FALSE	-		
					OR					
					Intake camshaft sensor is unlocked	=	TRUE	-		
					)					
					for time (see Look-Up-Table #3)	>=	0.2 to 0.7	sec		
					)					
					Difference between Desired position phase actuator and desired value intake camshaft nonCSERS bank2	>	6	degrees		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
Cold Start Strategy	P2B95	**Path 1:** Detection of faulty injection output while catalyst heating with multiple injections	Ratio of the number of faulty combustions under catalyst heating condition to the number of combustions under catalyst heating condition with multiple injections active	> 0.100006 -	ECU is in drive state	= TRUE -	Once per driving cycle	2 Trips
					((Catalyst heating activated (see parameter definition)	= FALSE -		
					OR Catalyst heating request by cold engine (see parameter definition))	= FALSE -		
					Condition catalyst heating with desired operation mode for Cold start emission reduction strategy diagnosis	= FALSE -		
					Catalyst heating is completed for time)	= 10 sec		
					Monitor has not completed this drive cycle (i.e. monitor runs once per trip)	= TRUE -		
					No pending or confirmed DTCs	= see sheet Inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
		Path 2: Detecting abnormal injector closing time delay	Error ratio calculated with correctly measured injector closing event per injection for diagnosis of catalyst heating with multiple injections	> 0.149994 -	ECU is in drive state	= TRUE -	Once per driving cycle	2 Trips
			injector closing delay of last CVO measurement	>= 620 us	((Catalyst heating activated	= FALSE -		
			injector closing delay of last CVO measurement	<= 200 us	OR Catalyst heating request by cold engine)	= FALSE -		
					Condition catalyst heating with desired operation mode for Cold start emission reduction strategy diagnosis	= FALSE -		
					time with status of catalyst heating with multiple injections)	>= 9 sec		
					Counter of CVO-measurements during catalyst heating	>= 400 counts		
					Monitor has not completed this drive cycle (i.e. monitor runs once per trip)	= TRUE -		
					No pending or confirmed DTCs	= see sheet Inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P2C9B	Monitoring of turbine bypass valve bank 1 jammed at open position during CSER	Actual position of turbine bypass valve bank 1	<= 50 %	(			
					Control valve was detected as jammed	= TRUE -		
					for time)	> 1 sec		
					Rapid heat-up mode	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
			Actual position of turbine bypass valve bank 1	> 50 %	(			
					Control valve was detected as jammed	= TRUE -		
					for time	> 1 sec		
					)			
					Rapid heat-up mode	= TRUE -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P2C9C	Monitoring of turbine bypass valve bank 2 jammed at open position during CSER	Actual position of turbine bypass valve bank 2	<= 50 %	(			
					Control valve was detected as jammed	= TRUE -		
					for time	> 1 sec		
					)			
					Rapid heat-up mode	= TRUE -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
			Actual position of turbine bypass valve bank 2	> 50 %	(			
					Control valve was detected as jammed	= TRUE -		
					for time	> 1 sec		
					)			
					Rapid heat-up mode	= TRUE -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
VVT System	P0011	Monitoring of intake camshaft bank 1 position - Target error	(Actual angle has not reached target value threshold for allowed time within running monitoring cycle	= TRUE -	Ignition is on	= TRUE -	4 events continuous	2 Trips
			For time to reach setpoint	> 1 sec	(Oil temperature cylinder head	>= -20.04 deg C		
			and		Oil temperature cylinder head	<= 179.96 deg C		
			Absolute deviation between the highest (max) / lowest (min) camshaft position and the stored setpoint value at the beginning of the monitoring	< 3 degrees	Engine speed	> 500 rpm		
			)		Engine speed	<= 10200 rpm		
					)			
			for a number of events	>= 4 events	(State governor intake camshaft bank1 is working in closed loop operation	= TRUE -		
					Engine is in auto-stop mode	= TRUE -		
					Diagnosis is released after engine start for time	>= 0 sec		
					Battery voltage	>= 10.9 V		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P0014	Monitoring of outlet camshaft bank 1 position - Target error	(Actual angle has not reached target value threshold within running monitoring cycle	= TRUE -	Ignition is on	= TRUE -	4 events continuous	2 Trips
			For time to reach setpoint	> 1 sec	(Oil temperature cylinder head	>= -20.04 deg C		
			AND		Oil temperature cylinder head	<= 179.96 deg C		
			Absolute deviation between the highest (max) / lowest (min) camshaft position and the stored setpoint value at the beginning of the monitoring	< 3 degrees	Engine speed	> 500 rpm		
			)		Engine speed	<= 10200 rpm		
					)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
			for a number of events	>=	4	events	(State governor outlet camshaft bank1 is working in closed loop operation	=	TRUE	-				
							Engine is in auto-stop mode	=	TRUE	-				
							Diagnosis is released after engine start for time	>=	0	sec				
							Battery voltage	>=	10.9	V				
							)							
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P0021	Monitoring of intake camshaft bank 2 position - Target error	(Actual angle has not reached target value threshold within running monitoring cycle	=	TRUE	-	Ignition is on	=	TRUE	-	4	events	continuous	2 Trips
			For time to reach setpoint	>	1	sec	(Oil temperature cylinder head	>=	-20.04	deg C				
			AND				Oil temperature cylinder head	<=	179.96	deg C				
			Absolute deviation between the highest (max) / lowest (min) camshaft position and the stored setpoint value at the beginning of the monitoring	<	3	degrees	Engine speed	>	500	rpm				
			)				Engine speed	<=	10200	rpm				
							)							
			for a number of events	>=	4	events	(State governor intake camshaft bank2 is working in closed loop operation	=	TRUE	-				
							Engine is in auto-stop mode	=	TRUE	-				
							Diagnosis is released after engine start for time	>=	0	sec				
							Battery voltage	>=	10.9	V				
							)							
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P0024	Monitoring of outlet camshaft bank 2 position - Target error	(Actual angle has not reached target value threshold within running monitoring cycle	=	TRUE	-	Ignition is on	=	TRUE	-	4	events	continuous	2 Trips
			For time to reach setpoint	>	1	sec	(Oil temperature cylinder head	>=	-20.04	deg C				
			AND				Oil temperature cylinder head	<=	179.96	deg C				
			Absolute deviation between the highest (max) / lowest (min) camshaft position and the stored setpoint value at the beginning of the monitoring	<	3	degrees	Engine speed	>	500	rpm				
			)				Engine speed	<=	10200	rpm				
							)							
			for a number of events	>=	4	events	(State governor outlet camshaft bank2 is working in closed loop operation	=	TRUE	-				
							Engine is in auto-stop mode	=	TRUE	-				
							Diagnosis is released after engine start for time	>=	0	sec				
							Battery voltage	>=	10.9	V				
							)							
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P000A	Monitoring of intake camshaft bank 1 position - slow response fault	(Actual angle has not reached target value threshold for allowed time within running monitoring cycle	=	TRUE	-	Ignition is on	=	TRUE	-	4	events	continuous	2 Trips
			For time to reach setpoint	>	1	sec	(Oil temperature cylinder head	>=	-20.04	deg C				
			and				Oil temperature cylinder head	<=	179.96	deg C				
			Absolute deviation between the highest (max) / lowest (min) camshaft position and the stored setpoint value at the beginning of the monitoring	>	3	degrees	Engine speed	>	500	rpm				
			)				Engine speed	<=	10200	rpm				
							)							
			for a number of events	>=	4	events	(State governor intake camshaft bank1 is working in closed loop operation	=	TRUE	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine is in auto-stop mode	= TRUE -		
					Diagnosis is released after engine start for time	>= 0 sec		
					Battery voltage	>= 10.9 V		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P000B	Monitoring of outlet camshaft bank 1 position - slow response fault	(Actual angle has not reached target value threshold within running monitoring cycle	= TRUE -	Ignition is on	= TRUE -	4 events continuous	2 Trips
			For time to reach setpoint	> 1 sec	(Oil temperature cylinder head	>= -20.04 deg C		
			AND		Oil temperature cylinder head	<= 179.96 deg C		
			Absolute deviation between the highest (max) / lowest (min) camshaft position and the stored setpoint value at the beginning of the monitoring	> 3 degrees	Engine speed	> 500 rpm		
			)		Engine speed	<= 10200 rpm		
					)			
			for a number of events	>= 4 events	(State governor outlet camshaft bank1 is working in closed loop operation	= TRUE -		
					Engine is in auto-stop mode	= TRUE -		
					and			
					Diagnosis is released after engine start for time	>= 0 sec		
					Battery voltage	>= 10.9 V		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P000C	Monitoring of intake camshaft bank 2 position - slow response fault	(Actual angle has not reached target value threshold within running monitoring cycle	= TRUE -	Ignition is on	= TRUE -	4 events continuous	2 Trips
			For time to reach setpoint	> 1 sec	(Oil temperature cylinder head	>= -20.04 deg C		
			AND		Oil temperature cylinder head	<= 179.96 deg C		
			Absolute deviation between the highest (max) / lowest (min) camshaft position and the stored setpoint value at the beginning of the monitoring	> 3 degrees	Engine speed	> 500 rpm		
			)		Engine speed	<= 10200 rpm		
					)			
			for a number of events	>= 4 events	(State governor intake camshaft bank2 is working in closed loop operation	= TRUE -		
					Engine is in auto-stop mode	= TRUE -		
					Diagnosis is released after engine start for time	>= 0 sec		
					Battery voltage	>= 10.9 V		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P000D	Monitoring of outlet camshaft bank 2 position - slow response fault	(Actual angle has not reached target value threshold within running monitoring cycle	= TRUE -	Ignition is on	= TRUE -	4 events continuous	2 Trips
			For time to reach setpoint	> 1 sec	(Oil temperature cylinder head	>= -20.04 deg C		
			AND		Oil temperature cylinder head	<= 179.96 deg C		
			Absolute deviation between the highest (max) / lowest (min) camshaft position and the stored setpoint value at the beginning of the monitoring	> 3 degrees	Engine speed	> 500 rpm		
			)		Engine speed	<= 10200 rpm		
					)			
			for a number of events	>= 4 events	(State governor outlet camshaft bank2 is working in closed loop operation	= TRUE -		
					Engine is in auto-stop mode	= TRUE -		
					Diagnosis is released after engine start for time	>= 0 sec		
					Battery voltage	>= 10.9 V		
					)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No pending or confirmed DTCs Basic enable conditions met	= see sheet inhibit tables - = see sheet enable tables -		
MAF Sensor B1 - Airflow	P0103	Monitoring of MAF sensor signal - MAF sensor signal permanently high	(Time overflow error reported by MAF sensor OR Maximum period violation error reported by MAF sensor) **Pinpointing** Current level of the PWM signal	= TRUE - = TRUE - = HIGH -	Ignition is on Battery voltage Battery voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V < 655.34 V = see sheet inhibit tables - = see sheet enable tables -	1 sec continuous	2 Trips
	P0102	Monitoring of MAF sensor signal - MAF sensor signal permanently low	(Time overflow error reported by MAF sensor OR Maximum period violation error reported by MAF sensor) **Pinpointing** Current level of the PWM signal	= TRUE - = TRUE - = LOW -	Ignition is on Battery voltage Battery voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V < 655.34 V = see sheet inhibit tables - = see sheet enable tables -	1 sec continuous	2 Trips
	P0101	**Path 1:** Signal range check - out of range high	Raw value of time period transmitted by MAF sensor	> 980 us	Ignition is on Battery voltage Battery voltage Error in the sensor self diagnosis Error in the electric line diagnosis Error in the electric line diagnosis No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V < 655.34 V = FALSE - = FALSE - = FALSE - = see sheet inhibit tables - = see sheet enable tables -	1.5 sec continuous	2 Trips
		Path 2: Signal range check - out of range low	Raw value of time period transmitted by MAF sensor	< 6.50 us	Ignition is on Battery voltage Battery voltage Error in the electric line diagnosis Error in the sensor self diagnosis Error in the sensor self diagnosis No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V < 655.34 V = FALSE - = FALSE - = FALSE - = see sheet inhibit tables - = see sheet enable tables -	1.5 sec continuous	2 Trips
		Path 3: Sensor self diagnosis - MAF frequency in default range which indicates MAF has detected an internal error	Raw value of time period transmitted by MAF sensor and Raw value of time period transmitted by MAF sensor	> 1800 us < 2200 us	Ignition is on Battery voltage Battery voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V < 655.34 V = see sheet inhibit tables - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Path 4: Comparison of Maximum Modelled and actual Air Mass Flow (Plausibility Check)	Measured MAF from bank 1 sensor with (A) Maximum modelled MAF at throttle body (B) Factor MAF sensor tolerance for min value	> (A) / (B) g/sec = calculated parameter g/sec = 0.600006 factor	Engine is rotating forwards and Measured air mass flow sensor signal is invalid and Delta mass flow between compressor and DK through Delta pressure is valid for bank1 and Air mass flow through throttle valve for MAF diagnosis is valid	= TRUE - = FALSE - = TRUE - = TRUE -	2 sec continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No pending or confirmed DTCs Basic enable conditions met	= see sheet inhibit tables - = see sheet enable tables -		
		Path 5: Comparison of Minimum Modelled and actual Air Mass Flow (Plausibility Check)	Measured MAF from bank 1 sensor with (A) Minimum modelled MAF at throttle body (B) Factor MAF sensor tolerance for max value	< (C) / (D) g/sec = calculated parameter g/sec = 1.970001 factor	Engine is rotating forwards and Measured air mass flow sensor signal is invalid and Delta mass flow between compressor and DK through Delta pressure is valid for bank1 and Air mass flow through throttle valve for MAF diagnosis is valid No pending or confirmed DTCs Basic enable conditions met	= TRUE - = FALSE - = TRUE - = TRUE - = see sheet inhibit tables - = see sheet enable tables -	2 sec continuous	2 Trips
MAF Sensor B2 - Airflow	P010D	Monitoring of MAF sensor signal - MAF sensor signal permanently low	(Time overflow error reported by MAF sensor OR Maximum period violation error reported by MAF sensor) **Pinpointing** Current level of the PWM signal	= TRUE - = TRUE - = HIGH -	Ignition is on Battery voltage Battery voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V < 655.34 V = see sheet inhibit tables - = see sheet enable tables -	1.5 sec continuous	2 Trips
	P010C	Monitoring of MAF sensor signal - MAF sensor signal permanently low	(Time overflow error reported by MAF sensor OR Maximum period violation error reported by MAF sensor) **Pinpointing** Current level of the PWM signal	= TRUE - = TRUE - = LOW -	Ignition is on Battery voltage Battery voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V < 655.34 V = see sheet inhibit tables - = see sheet enable tables -	1.5 sec continuous	2 Trips
MAF Sensor B2 - Airflow	P010B	**Path 1:** Signal range check - out of range high	Raw value of time period transmitted by HFM sensor in Bank 2	> 980 us	Ignition is on Battery voltage Battery voltage Error in the sensor self diagnosis Error in the electric line diagnosis Error in the electric line diagnosis No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V < 655.34 V = FALSE - = FALSE - = FALSE - = see sheet inhibit tables - = see sheet enable tables -	1.5 sec continuous	2 Trips
	P010B	**Path 2:** Signal range check - out of range low	Raw value of time period transmitted by HFM sensor in Bank 2	< 6.5 us	Ignition is on Battery voltage Battery voltage Error in the sensor self diagnosis Error in the electric line diagnosis Error in the electric line diagnosis No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V < 655.34 V = FALSE - = FALSE - = FALSE - = see sheet inhibit tables - = see sheet enable tables -	1.5 sec continuous	2 Trips
	P010B	**Path 3:** Sensor self diagnosis - MAF frequency in default range which indicates MAF has detected an internal error	Raw value of time period transmitted by HFM sensor in Bank 2 and Raw value of time period transmitted by HFM sensor in Bank 2	> 1800 us < 2200 us	Ignition is on Battery voltage Battery voltage	= TRUE - > 10.9 V < 655.34 V	1.5 sec continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No pending or confirmed DTCs Basic enable conditions met	= see sheet inhibit tables - = see sheet enable tables -		
MAF Sensor B2 - Airflow	P010B	**Path 4:** Comparison of Maximum Modelled and actual Air Mass Flow (Plausibility Check)	Measured MAF from bank 2 sensor with (A) Maximum modelled MAF at throttle body (B) Factor MAF sensor tolerance for min value	> (A) / (B) g/sec = calculated parameter g/sec = 0.600006 factor	Engine is rotating forwards and Measured air mass flow sensor signal at bank 2 is invalid and Delta mass flow between compressor and DK through Delta pressure is valid for bank2 and Air mass flow through throttle valve for MAF diagnosis is valid for bank 2 No pending or confirmed DTCs Basic enable conditions met	= TRUE - = FALSE - = TRUE - = TRUE - = see sheet inhibit tables - = see sheet enable tables -	2 sec continuous	2 Trips
	P010B	**Path 5:** Comparison of Minimum Modelled and actual Air Mass Flow (Plausibility Check)	Measured MAF from bank 2 sensor with (A) Minimum modelled MAF at throttle body (B) Factor MAF sensor tolerance for max value	< (C) / (D) g/sec = calculated parameter g/sec = 1.970001 factor	Engine is rotating forwards and Measured air mass flow sensor signal at bank 2 is invalid and Delta mass flow between compressor and DK through Delta pressure is valid for bank2 and Air mass flow through throttle valve for MAF diagnosis is valid for bank 2 No pending or confirmed DTCs Basic enable conditions met	= TRUE - = FALSE - = TRUE - = TRUE - = see sheet inhibit tables - = see sheet enable tables -	2 sec continuous	2 Trips
MAF Sensor B1 - Temperature	P0113	Detects physical range check of Intake Air Temperature sensor - out of range high error when the intake air temperature falls above the threshold	Filtered Temperature value of the Intake Air Temperature sensor	> 122.76 deg C	((Ratio of Desired upstream Throttle valve pressure to Ambient Pressure Engine speed with low resolution) for time) No pending or confirmed DTCs Basic enable conditions met	 > 1.2 - > 3520 rpm = 10 sec = see sheet inhibit table - = see sheet enable tables -	2 sec continuous	2 Trips
	P0112	Detects physical range check of Intake Air Temperature sensor - out of range low error when the intake air temperature falls below the threshold	Intake air temperature	< -42.04 deg C	((Coolant temperature at engine output Cylinder air mass flow Vehicle speed) for time OR Starting value of downstream engine coolant temperature)	 >= -41.04 deg C <= 14.44444444 g/sec <= 6.215040398 mph = 3 sec > 142.96 deg C	2 sec continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No pending or confirmed DTCs	= see sheet inhibit table -		
					Basic enable conditions met	= see sheet enable tables -		
	P0111	Cross check of Intake Air Temperature sensor during Cold start when difference between the intake air temperature and mean temperature value exceeding the minimum threshold	Difference between the minimum intake air temperature from start and mean temperature value from the temperature sensors	> 14.96 deg C	First engine start has happened	= FALSE -	continuous	2 trips
					Ignition is on	= TRUE -		
					for time	1 sec		
					Combustion engine is running	= TRUE -		
					(			
					Engine is in synchronised state and engine is rotating	= TRUE -		
					for time	1 sec		
					)			
					End of start is reached and engine is running	= TRUE -		
					(Ignition ON	= TRUE -		
					for time	1 sec		
					)			
					(			
					Measured engine stop time	>= 28800 sec		
					(Engine stop time is calculated and is correct	= 1 -		
					OR			
					Calculated engine stop time is a minimal value and overflow could be a reason	= 2 -		
					)			
					)			
					for time	< 3 sec		
					)			
					Block heater is activated	= FALSE -		
					Diagnosis is inhibited by other temperature sensor errors	= FALSE -		
					(			
					(			
					(			
					Combustion engine is running	= FALSE -		
					or			
					Combustion engine end of start is reached	= FALSE -		
					for time	>= 5 sec		
					)	-		
					Preliminary error with the coolant engine temperature sensor	= TRUE -		
					(			
					Difference between engine coolant temperature and mean temperature value from temperature sensors	> 14.96 deg C		
					OR	sec		
					Difference between mean temperature value from temperature sensors and engine coolant temperature	< 14.96 deg C		
					)			
					Engine coolant temperature sensor value	>= 49.96 deg C		
					)			
					for time	< 0 sec		
					)			
					or			
					Combustion engine is running	= TRUE -		
					for time	>= 0 sec		
					)			
					No pending or confirmed DTCs	= see sheet inhibit table -		
					Basic enable conditions met	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Cross check of Intake Air Temperature sensor during Cold start when difference between the mean temperature value and intake air temperature exceeding the minimum threshold	Difference between mean temperature value from the temperature sensors and the minimum intake air temperature from start	>	14.96	deg C	First engine start has happened	=	FALSE	-	continuous	2 trips
							Ignition is on	=	TRUE	-		
							for time		1	sec		
							Combustion engine is running	=	TRUE	-		
							(					
							Engine is in synchronised state and engine is rotating	=	TRUE	-		
							for time		1	sec		
							)					
							End of start is reached and engine is running	=	TRUE	-		
							(Ignition ON	=	TRUE	-		
							for time		1	sec		
							)					
							(					
							Measured engine stop time	>=	28800	sec		
							(Engine stop time is calculated and is correct	=	1	-		
							OR					
							Calculated engine stop time is a minimal value and overflow could be a reason	=	1	-		
							)					
							)					
							for time	<	3	sec		
							)					
							Block heater is activated	=	FALSE	-		
							Diagnosis is inhibited by other temperature sensor errors	=	FALSE	-		
							(					
							(					
							(					
							Combustion engine is running	=	FALSE	-		
							or					
							Combustion engine end of start is reached	=	FALSE	-		
							for time	>=	5	sec		
							)			-		
							Preliminary error with the coolant engine temperature sensor	=	TRUE	-		
							(					
							Difference between engine coolant temperature and mean temperature value from temperature sensors	>	14.96	deg C		
							OR			sec		
							Difference between mean temperature value from temperature sensors and engine coolant temperature	<	14.96	deg C		
							)					
							Engine coolant temperature sensor value	>=	49.96	deg C		
							)					
							for time	<	0	sec		
							)					
							or					
							Combustion engine is running	=	TRUE	-		
							for time	>=	0	sec		
							)					
							No pending or confirmed DTCs	=	see sheet inhibit table	-		
							Basic enable conditions met	=	see sheet enable tables	-		
		Detection of stuck error of Intake Air Temperature sensor when the difference between the maximum and the minimum intake air temperature, since engine start is less than the calibrated threshold	Difference between the maximum and the minimum intake air temperature values (see Look-Up-Table #P0111-2)	<	0.36 to 1.56	deg C	Engine coolant downstream temperature during the first engine start of the driving cycle	<=	100.96	deg C	continuous	2 Trips
							Counter for high-phases of intake air Temperature sensor	>=	3	counts		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Conditions for intake air temperature sensor (high phases): ((Cylinder air mass flow Vehicle speed Engine coolant temperature Integrated Air mass flow (see Look-Up-Table #P0111-1)) for time) Counter for low-phases of intake air temperature sensor Conditions for low intake air temperature (low phases): ((Vehicle speed Cylinder air mass flow Cylinder air mass flow) for time) No pending or confirmed DTCs Basic enable conditions met	= TRUE - < 5.55555556 g/sec < 15.53428 mph > 57.96 deg C > 460 to 20020 g > 35 sec >= 2 counts > 29.82582 mph >= 7.777777778 g/sec <= 70 g/sec > 64 sec = see sheet inhibit table - = see sheet enable tables -		
MAF Sensor B1 - Temperature	P0114	Detects the max error of the Gradient for the intake air temperature sensor after air filter, Bank 1	Absolute difference etween raw and filtered temperature values from Intake air temperature sensor 1 for time	> 10 deg C >= 25 sec	Ignition ON No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit table - = see sheet enable tables -	continuous	2 Trips
MAF Sensor B1 - Temperature	U1346	Detects Bus off error at LIN channel 2.	LIN channel 2 indicates bus off error	= TRUE -	Ignition is on No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	10 counts continuous	1 Trip
MAF Sensor B1 - Temperature	U0611	Detects when the time since the last message from the 'Intake Air Temperature Sensor Bank 1 Sensor 1 Module' for frame "MAF1_Rsp_TmpHum"(0x2A) was received via LIN 1 Channel is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Intake Air Temperature Sensor Bank 1 Sensor 1 for frame "MAF1_Rsp_TmpHum"(0x2A) was received via LIN 2Channel	> 0.1 sec	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	3 counts Continuous	2 Trips
MAF Sensor B1 - Temperature	U1370	Monitoring of Temperature Alive Rolling Counter (ARC) LIN signal of Mass Air Flow Sensor	Wrong alive rolling counter received by the frame "MAF1_Rsp_TmpHum" (0x2A) from MAF1 Temperature humidity signals received over LIN	= TRUE -	Status of DIO pin connected to the mass air flow sensor line is not grounded Basic enable conditions met	= TRUE - = see sheet enable tables -	10 counts continuous	2 Trips
MAF Sensor B1 - Pressure	P222D	Monitoring of Barometric Pressure Sensor for Signal range Check - High	Raw value of upstream booster pressure sensor	> 115 kPa	(Raw value of pressure sensor signal upstream of compressor is valid) for time No pending or confirmed DTCs Basic enable conditions met	= TRUE - >= 0.04 sec = see sheet inhibit tables - = see sheet enable tables -	2 sec continuous	2 Trips
MAF Sensor B1 - Pressure	P222C	Monitoring of Barometric Pressure Sensor for Signal range Check - Low	Raw value of upstream booster pressure sensor	< 50 kPa	(Raw value of pressure sensor signal upstream of compressor is valid) for time No pending or confirmed DTCs Basic enable conditions met	= TRUE - >= 0.04 sec = see sheet inhibit tables - = see sheet enable tables -	2 sec continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
MAF Sensor B1 - Pressure	P222B	**Path 1:** Monitoring of Barometric Pressure Sensor for Rationality Check - High	Difference between raw value of upstream booster pressure sensor and ambient air pressure raw value measured	>	15	kPa	(Raw value of pressure sensor signal upstream of compressor is valid)	=	TRUE	-	2	sec	continuous	2 Trips
							for time	>=	0.04	sec				
							Pressure value from Ambient Pressure Sensor is valid	=	TRUE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Path 2: Monitoring of Barometric Pressure Sensor for Rationality Check - High during startup	Difference between raw value of upstream booster pressure sensor and maximal reference pressure for delta pressure sensordiagnoses	>	3.5313	kPa	Engine not in running state	=	TRUE	-	2	sec	once per driving cycle	2 Trips
							for time	>=	5	sec				
							ECU in drive state	=	TRUE	-				
							Pressure value from Ambient Pressure Sensor is valid	=	TRUE	-				
							Healing of ambient pressure sensor by delta pressure sensor	=	TRUE	-				
							Healing of manifold pressure sensor by delta pressure sensor	=	TRUE	-				
							Healing of pressure upstream of throttle sensor by delta pressure sensor	=	TRUE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Path 3: Monitoring of Barometric Pressure Sensor for Rationality Check - Low	Difference between raw value of upstream booster pressure sensor and minimal reference pressure for delta pressure sensordiagnoses	<	3.5313	kPa	Engine not in running state	=	TRUE	-	2	sec	continuous	2 Trips
							for time	>=	5	sec				
							ECU in drive state	=	TRUE	-				
							Healing of ambient pressure sensor by delta pressure sensor	=	TRUE	-				
							Healing of manifold pressure sensor by delta pressure sensor	=	TRUE	-				
							Healing of pressure upstream of throttle sensor by delta pressure sensor	=	TRUE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
MAF Sensor B1 - Pressure	U068A	Detects when the time since the last message from the 'Barometric Pressure Sensor Bank 1 Sensor 2 Module' for frame "MAF1_Rsp_Press"(0x2B) was received via LIN 1 Channel is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Barometric Pressure Sensor Bank 1 Sensor 2 for frame "MAF1_Rsp_Press"(0x2B) was received via LIN 2 Channel	>	0.025	sec	Ignition is ON	=	TRUE	-	3	counts	Continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
MAF Sensor B1 - Pressure	U1371	Monitoring of Pressure Alive Rolling Counter (ARC) LIN signal of Mass Air Flow Sensor	Wrong alive rolling counter received by the frame "MAF1_Rsp_Press" (0x2B) from MAF1 Pressure signals received over LIN	=	TRUE	-	Status of DIO pin connected to the mass air flow sensor line is not grounded	=	TRUE	-	10	counts	continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
MAF Sensor B2 - Temperature	P00AD	Detects physical range check of Intake Air Temperature sensor - out of range high error when the intake air temperature falls above the threshold	Filtered Temperature value of the Intake Air Temperature sensor	>	122.76	deg C	((				3	sec	continuous	2 Trips
							Ratio of Desired upstream Throttle valve pressure to Ambient Pressure	>	1.2	-				
							Engine speed with low resolution	>	3520	rpm				
							) for time	=	10	sec				
							)							

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No pending or confirmed DTCs	= see sheet inhibit table -		
					Basic enable conditions met	= see sheet enable tables -		
	P00AC	Detects physical range check of Intake Air Temperature sensor - out of range low error when the intake air temperature falls below the threshold	Intake air temperature	< -42.04 deg C			3 sec continuous	2 Trips
					(			
					Coolant temperature at engine output	>= -41.04 deg C		
					Cylinder air mass flow	<= 14.44444444 g/sec		
					Vehicle speed	<= 6.215040398 mph		
					)			
					for time	= 3 sec		
					OR			
					Starting value of downstream engine coolant temperature	> 142.96 deg C		
					No pending or confirmed DTCs	= see sheet inhibit table -		
					Basic enable conditions met	= see sheet enable tables -		
	P00AB	Cross check of Intake Air Temperature sensor during Cold start when difference between the Intake air Temperature and mean temperature value exceeding the minimum threshold	Difference between the minimum intake air temperature from start and mean temperature value from the temperature sensors	> 14.96 deg C	First engine start has happened	= FALSE -	continuous	2 Trips
					Ignition is on	= TRUE -		
					for time	1 sec		
					Combustion engine is running	= TRUE -		
					(			
					Engine is in synchronised state and engine is rotating	= TRUE -		
					for time	= 1 sec		
					)			
					End of start is reached and engine is running	= TRUE -		
					(	= TRUE -		
					Ignition ON			
					for time	1 sec		
					)			
					(			
					Measured engine stop time	>= 28800 sec		
					(	= TRUE -		
					Engine stop time is calculated and is correct			
					OR			
					Calculated engine stop time is a minimal value and overflow could be a reason	= TRUE -		
					)			
					)			
					for time	< 3 sec		
					)			
					Block heater is activated	= FALSE -		
					Diagnosis is inhibited by other temperature sensor errors	= FALSE -		
					(			
					(			
					(			
					Combustion engine is running	= FALSE -		
					or			
					Combustion engine end of start is reached	= FALSE -		
					for time	>= 5 sec		
					)	-		
					Preliminary error with the coolant engine temperature sensor	= TRUE -		
					(			
					Difference between engine coolant temperature and mean temperature value from temperature sensors	> 14.96 deg C		
					OR	sec		
					Difference between mean temperature value from temperature sensors and engine coolant temperature	< 14.96 deg C		
					)			
					Engine coolant temperature sensor value	>= 49.96 deg C		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					)			
					for time	< 0 sec		
					)			
					or			
					Combustion engine is running	= TRUE -		
					for time	>= 0 sec		
					)			
					No pending or confirmed DTCs	= see sheet inhibit table -		
					Basic enable conditions met	= see sheet enable tables -		
		Cross check of Intake Air Temperature sensor during Cold start when difference between the mean temperature value and Intake air temperature exceeding the minimum threshold	Difference between mean temperature value from the temperature sensors and the minimum intake air temperature from start	> 14.96 deg C	First engine start has happened	= FALSE -	continuous	2 Trips
					Ignition is on	= TRUE -		
					for time	1 sec		
					Combustion engine is running	= TRUE -		
					(			
					Engine is in synchronised state and engine is rotating	= TRUE -		
					for time	= 1 sec		
					)			
					End of start is reached and engine is running	= TRUE -		
					(	= TRUE -		
					Ignition ON			
					for time	1 sec		
					)			
					(			
					Measured engine stop time	>= 28800 sec		
					(	= TRUE -		
					Engine stop time is calculated and is correct			
					OR			
					Calculated engine stop time is a minimal value and overflow could be a reason	= TRUE -		
					)			
					)			
					for time	< 3 sec		
					)			
					Block heater is activated	= FALSE -		
					Diagnosis is inhibited by other temperature sensor errors	= FALSE -		
					(			
					(			
					(			
					Combustion engine is running	= FALSE -		
					or			
					Combustion engine end of start is reached	= FALSE -		
					for time	>= 5 sec		
					)	-		
					Preliminary error with the coolant engine temperature sensor	= TRUE -		
					(			
					Difference between engine coolant temperature and mean temperature value from temperature sensors	> 14.96 deg C		
					OR	sec		
					Difference between mean temperature value from temperature sensors and engine coolant temperature	< 14.96 deg C		
					)			
					Engine coolant temperature sensor value	>= 49.96 deg C		
					)			
					for time	< 0 sec		
					)			
					or			
					Combustion engine is running	= TRUE -		
					for time	>= 0 sec		
					)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
							No pending or confirmed DTCs	=	see sheet inhibit table	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Detection of stuck error of Intake Air Temperature sensor when the difference between the maximum and the minimum Intake air Temperature, since engine start is less than the calibrated threshold	Difference between the maximum and the minimum intake air temperature values (see Look-Up-Table #P00AB-2)	<	0.36 to 1.56	deg C	Engine coolant downstream temperature during the first engine start of the driving cycle	<=	100.96	deg C			continuous	2 Trips
							Counter for high-phases of intake air Temperature sensor	>=	3	counts				
							Conditions for intake air temperature sensor (high phases):	=	TRUE	-				
							(							
							(							
							Cylinder air mass flow	<	5.55555556	g/sec				
							Vehicle speed	<	15.53428	mph				
							Engine coolant temperature	>	57.96	deg C				
							Integrated Air mass flow (see Look-Up-Table #P00AB-1)	>	460 to 20020	g				
							)							
							for time	>	35	sec				
							)							
							Counter for low-phases of intake air temperature sensor	>=	2	counts				
							Conditions for low intake air temperature (low phases)							
							(							
							(							
							Vehicle speed	>	29.82582	mph				
							Cylinder air mass flow	>=	7.777777778	g/sec				
							Cylinder air mass flow	<=	70	g/sec				
							)							
							for time	>	64	sec				
							)							
							No pending or confirmed DTCs	=	see sheet inhibit table	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P00AE	Detects the max error of the Gradient for the intake air temperature sensor after air filter, Bank 2	Absolute difference etween raw and filtered temperature values from Intake air temperature sensor 3	>	10	deg C	Ignition ON	=	TRUE	-			continuous	2 Trips
			for time	>=	25	sec	No pending or confirmed DTCs	=	see sheet inhibit table	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	U1349	Detects Bus off error at LIN channel 5.	LIN channel 5 indicates bus off error	=	TRUE	-	Ignition is on	=	TRUE	-	10	counts	continuous	1 Trip
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	U0612	Detects when the time since the last message from the 'Intake Air Temperature Sensor Bank 1 Sensor 1 Module' for frame "MAF2_Rsp_TmpHum"(0x2A) was received via LIN 1 Channel is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Intake Air Temperature Sensor Bank 1 Sensor 1 for frame "MAF2_Rsp_TmpHum"(0x2A) was received via LIN 5 Channel	>	0.1	sec	Ignition is ON	=	TRUE	-	3	counts	Continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
	U1372	Monitoring of Temperature Alive Rolling Counter (ARC) LIN signal of Mass Air Flow Sensor 2	Wrong alive rolling counter received by the frame "MAF2_Rsp_TmpHum" (0x2A) from MAF2 Temperature humidity signals received over LIN	=	TRUE	-	Status of DIO pin connected to the mass air flow sensor line bank 2 is not grounded	=	TRUE	-	10	counts	continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
MAF Sensor B2 - Pressure	P227D	Monitoring of Barometric Pressure Sensor for Signal range Check - High	Raw value of second upstream booster pressure sensor	>	115	kPa	(Raw value of second pressure sensor signal upstream of compressor is valid)	=	TRUE	-	2	sec	continuous	2 Trips
							for time	>=	0.04	sec				
							and							
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
							Basic enable conditions met	=	see sheet enable tables	-				
MAF Sensor B2 - Pressure	P227C	Monitoring of Barometric Pressure Sensor for Signal range Check - Low	Raw value of second upstream booster pressure sensor	<	50	kPa	(Raw value of second pressure sensor signal upstream of compressor is valid)	=	TRUE	-	2	sec	continuous	2 Trips
							for time	>=	0.04	sec				
							and							
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
MAF Sensor B2 - Pressure	P227B	**Path 1:** Monitoring of Barometric Pressure Sensor for Rationality Check - High	Difference between raw value of second upstream booster pressure sensor and ambient air pressure raw value measured	>	15	kPa	(Raw value of second pressure sensor signal upstream of compressor is valid)	=	TRUE	-	2	sec	continuous	2 Trips
							for time	>=	0.04	sec				
							Pressure value from Ambient Pressure Sensor is valid	=	TRUE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Path 2: Monitoring of Barometric Pressure Sensor for Rationality Check - High during startup	Difference between raw value of second upstream booster pressure sensor and maximal reference pressure for delta pressure sensordiagnoses	>	3.5313	kPa	Engine not in running state	=	TRUE	-	2	sec	once per driving cycle	2 Trips
							for time	>=	5	sec				
							ECU in drive state	=	TRUE	-				
							Pressure value from Ambient Pressure Sensor is valid	=	TRUE	-				
							Healing of ambient pressure sensor by delta pressure sensor	=	TRUE	-				
							Healing of manifold pressure sensor by delta pressure sensor	=	TRUE	-				
							Healing of pressure upstream of throttle sensor by delta pressure sensor	=	TRUE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Path 3: Monitoring of Barometric Pressure Sensor for Rationality Check - Low	Difference between raw value of second upstream booster pressure sensor and minimal reference pressure for delta pressure sensordiagnoses	<	3.5313	kPa	Engine not in running state	=	TRUE	-	2	sec	continuous	2 Trips
							for the time	>=	5	sec				
							ECU in drive state	=	TRUE	-				
							Healing of ambient pressure sensor by delta pressure sensor	=	TRUE	-				
							Healing of manifold pressure sensor by delta pressure sensor	=	TRUE	-				
							Healing of pressure upstream of throttle sensor by delta pressure sensor	=	TRUE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
MAF Sensor B2 - Pressure	U0680	Detects when the time since the last message from the 'Barometric Pressure Sensor Bank 1 Sensor 2 Module' for frame "MAF2_Rsp_Press"(0x2B) was received via LIN 1 Channel is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Barometric Pressure Sensor Bank 1 Sensor 2 for frame "MAF2_Rsp_Press"(0x2B) was received via LIN 5 Channel	>	0.025	sec	Ignition is ON	=	TRUE	-	3	counts	Continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
MAF Sensor B2 - Pressure	U1373	Monitoring of Pressure Alive Rolling Counter (ARC) LIN signal of Mass Air Flow Sensor 2	Wrong alive rolling counter received by the frame "MAF2_Rsp_Press" (0x2B) from MAF2 Pressure signals received over LIN	=	TRUE	-	Status of DIO pin connected to the mass air flow sensor line bank 2 is not grounded	=	TRUE	-	10	counts	continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature 2 - B1	P0098	Detects signal range check of Intake Air Temperature sensor - out of range high when the voltage of the intake air temperature sensor is greater than the calibrated threshold	Intake air temperature sensor voltage	> 4.7994 V	(		2 sec continuous	2 Trips
					Engine coolant temperature	>= -41.04 deg C		
					Air mass flow	<= 14.44444444 g/sec		
					Vehicle speed	<= 6.215040398 mph		
					)			
					for time	= 3 sec		
					OR			
					Engine coolant temperature at engine start	> 142.96 deg C		
					Basic enable conditions met	= See sheet enable tables -		
	P0097	Detects signal range check of Intake Air Temperature sensor - out of range low when the voltage of the intake air temperature sensor is less than the calibrated threshold	Intake air temperature sensor voltage	< 0.195 V	(		2 sec continuous	2 Trips
					Ratio of modelled boost pressure to ambient pressure	<= 1.2 -		
					OR			
					Engine speed	<= 3520 rpm		
					)			
					for time	= 120 sec		
					Basic enable conditions met	= See sheet enable tables -		
	P0096	Cross check of Intake Air Temperature sensor during Cold start when difference between the intake air temperature and mean temperature value exceeding the minimum threshold	Difference between the minimum intake air temperature from start and mean temperature value from the temperature sensors	> 14.96 deg C	First engine start has happened	= FALSE -	continuous	2 Trips
					Ignition ON	= TRUE -		
					for time	1 sec		
					Combustion engine is running	= TRUE -		
					(			
					Engine is in synchronised state and engine is rotating	= TRUE -		
					for time	1 sec		
					)			
					Engine start is finished (*)	= TRUE -		
					(	= TRUE -		
					Ignition ON			
					for time	1 sec		
					)			
					(			
					Engine off time	>= 28800 sec		
					(	= TRUE -		
					Engine stop time is calculated and is correct			
					OR			
					Calculated engine stop time is a minimal value and overflow could be a reason	= TRUE -		
					)			
					)			
					for time	< 3 sec		
					)			
					Block heater is activated	= FALSE -		
					Diagnosis is inhibited by other temperature sensor errors	= FALSE -		
					(			
					(			
					(			
					Combustion engine is running	= FALSE -		
					or			
					Engine start is finished (*)	= FALSE -		
					for time	>= 5 sec		
					)	-		
					Preliminary error with the coolant engine temperature sensor	= TRUE -		
					(			
					Difference between engine coolant temperature and mean temperature value from temperature sensors	> 14.96 deg C		
					OR			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Difference between mean temperature value from temperature sensors and engine coolant temperature	< 14.96 deg C		
					)			
					Engine coolant temperature	>= 49.96 deg C		
					)			
					for time	< 0 sec		
					)			
					or			
					Combustion engine is running	= TRUE -		
					for time	>= 0 sec		
					)			
					No pending or confirmed DTCs	= See sheet inhibit table -		
					Basic enable conditions met	= See sheet enable tables -		
		Cross check of Intake Air Temperature sensor during Cold start when difference between the mean temperature value and Intake air temperature exceeding the minimum threshold	Difference between mean temperature value from the temperature sensors and the minimum intake air temperature from start	> 14.96 deg C	First engine start has happened	= FALSE -	continuous	2 Trips
					Ignition ON	= TRUE -		
					for time	1 sec		
					Combustion engine is running	= TRUE -		
					(			
					Engine is in synchronised state and engine is rotating	= TRUE -		
					for time	1 sec		
					)			
					Engine start is finished (*)	= TRUE -		
					(	= TRUE -		
					Ignition ON			
					for time	1 sec		
					)			
					(			
					Engine off time	>= 28800 sec		
					(	= TRUE -		
					Engine stop time is calculated and is correct			
					OR			
					Calculated engine stop time is a minimal value and overflow could be a reason	= TRUE -		
					)			
					)			
					for time	< 3 sec		
					)			
					Block heater is activated	= FALSE -		
					Diagnosis is inhibited by other temperature sensor errors	= FALSE -		
					(			
					(			
					(			
					Combustion engine is running	= FALSE -		
					or			
					Engine start is finished (*)	= FALSE -		
					for time	>= 5 sec		
					)	-		
					Preliminary error with the coolant engine temperature sensor	= TRUE -		
					(			
					Difference between engine coolant temperature and mean temperature value from temperature sensors	> 14.96 deg C		
					OR			
					Difference between mean temperature value from temperature sensors and engine coolant temperature	< 14.96 deg C		
					)			
					Engine coolant temperature	>= 49.96 deg C		
					)			
					for time	< 0 sec		
					)			
					or			
					Combustion engine is running	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for time	>= 0 sec		
					)			
					No pending or confirmed DTCs	= See sheet inhibit table -		
					Basic enable conditions met	= See sheet enable tables -		
		Detection of stuck error of Intake Air Temperature sensor when the difference between the maximum and the minimum Intake air Temperature since engine start is less than the calibrated threshold	Difference between the maximum and the minimum intake air temperature values (See Look-Up Table #P0096-2)	< 0.76 to 1.96 deg C	Engine coolant downstream temperature during the first engine start of the driving cycle	<= 100.96 deg C	continuous	2 Trips
					Counter for high-phases of intake air Temperature sensor	>= 2 counts		
					Conditions for intake air temperature sensor (high phases):	= TRUE -		
					(			
					(			
					Air mass flow	< 5.55555556 g/sec		
					Vehicle speed	< 15.53428 mph		
					Engine coolant temperature	> 57.96 deg C		
					Integrated Air mass flow (See Look-Up Table #P0096-1)	> 460 to 20020 g		
					)			
					for time	> 35 sec		
					)			
					Counter for low-phases of intake air temperature sensor	>= 1 counts		
					Conditions for low intake air temperature (low phases)			
					(			
					(			
					Vehicle speed	> 43.49598 mph		
					Air mass flow	>= 6.666666667 g/sec		
					Air mass flow	<= 70 g/sec		
					)			
					for time	> 70 sec		
					)			
					No pending or confirmed DTCs	= See sheet inhibit table -		
					Basic enable conditions met	= See sheet enable tables -		
	P0099	Detects electrical error (non plausible signal) of Intake Air Temperature sensor when the difference between raw voltage signal and filtered voltage signal of intake air temperature sensor exceeds the calibrated threshold	Absolute value of difference between raw voltage signal of Intake air temperature sensor and filtered voltage signal of Intake air temperature sensor	> 0.12 V	No errors with signal range detected in Intake air temperature sensor		20 sec continuous	2 Trips
					(			
					Signal Range check : out of range low error for intake air temperature sensor	= FALSE -		
					Signal Range check : out of range high error for intake air temperature sensor	= FALSE -		
					)			
					Basic enable conditions met	= See sheet enable tables -		
Intake Air Temperature 2 - B2	P00A8	Detects signal range check of Intake Air Temperature sensor - out of range high when the voltage of the intake air temperature sensor is greater than the calibrated threshold	Intake air temperature sensor voltage	> 4.7994 V	(		2 sec continuous	2 Trips
					Engine coolant temperature	>= -41.04 deg C		
					Air mass flow	<= 14.44444444 g/sec		
					Vehicle speed	<= 6.215040398 mph		
					)			
					for time	= 3 sec		
					OR			
					Engine coolant temperature at engine start	> 142.96 deg C		
					Basic enable conditions met	= See sheet enable tables -		
	P00A7	Detects signal range check of Intake Air Temperature sensor - out of range low when the voltage of the intake air temperature sensor is less than the calibrated threshold	Intake air temperature sensor voltage	< 0.195 V	(		2 sec continuous	2 Trips
					Ratio of modelled boost pressure to ambient pressure	<= 1.2 -		
					OR			
					Engine speed	<= 3520 rpm		
					)			
					for time	= 120 sec		
					Basic enable conditions met	= See sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	P00A6	Cross check of Intake Air Temperature sensor in intake manifold during Cold start when difference between the Intake air Temperature and mean temperature value exceeding the minimum threshold	Difference between the minimum intake air temperature from start and mean temperature value from the temperature sensors	> 14.96 deg C	First engine start has happened	= FALSE -	continuous	2 Trips
					Ignition ON	= TRUE -		
					for time	1 sec		
					Combustion engine is running	= TRUE -		
					(			
					Engine is in synchronised state and engine is rotating	= TRUE -		
					for time	= 1 sec		
					)			
					Engine start is finished (*)	= TRUE -		
					(	= TRUE -		
					Ignition ON			
					for time	1 sec		
					)			
					(			
					Engine off time	>= 28800 sec		
					(	= 1 -		
					Engine stop time is calculated and is correct			
					OR			
					Calculated engine stop time is a minimal value and overflow could be a reason	= 1 -		
					)			
					)			
					for time	< 3 sec		
					)			
					Block heater is activated	= FALSE -		
					Diagnosis is inhibited by other temperature sensor errors	= FALSE -		
					(			
					(			
					(			
					Combustion engine is running	= FALSE -		
					or			
					Engine start is finished (*)	= FALSE -		
					for time	>= 5 sec		
					)	-		
					Preliminary error with the coolant engine temperature sensor	= TRUE -		
					(			
					Difference between engine coolant temperature and mean temperature value from temperature sensors	> 14.96 deg C		
					OR			
					Difference between mean temperature value from temperature sensors and engine coolant temperature	< 14.96 deg C		
					)			
					Engine coolant temperature	>= 49.96 deg C		
					)			
					for time	< 0 sec		
					)			
					or			
					Combustion engine is running	= TRUE -		
					for time	>= 0 sec		
					)			
					No pending or confirmed DTCs	= See sheet inhibit table -		
					Basic enable conditions met	= See sheet enable tables -		
		Cross check of Intake Air Temperature sensor in intake manifold during Cold start when difference between the mean temperature value and Intake air temperature exceeding the minimum threshold	Difference between mean temperature value from the temperature sensors and the minimum intake air temperature from start	> 14.96 deg C	First engine start has happened	= FALSE -	continuous	2 Trips
					Ignition ON	= TRUE -		
					for time	1 sec		
					Combustion engine is running	= TRUE -		
					(			
					Engine is in synchronised state and engine is rotating	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for time) Engine start is finished (*) (Ignition ON for time) (Engine off time (Engine stop time is calculated and is correct OR Calculated engine stop time is a minimal value and overflow could be a reason)) for time) Block heater is activated Diagnosis is inhibited by other temperature sensor errors (((Combustion engine is running or Engine start is finished (*) for time) Preliminary error with the coolant engine temperature sensor (Difference between engine coolant temperature and mean temperature value from temperature sensors OR Difference between mean temperature value from temperature sensors and engine coolant temperature) Engine coolant temperature) for time) or Combustion engine is running for time) No pending or confirmed DTCs Basic enable conditions met	= 1 sec = TRUE - = TRUE - 1 sec >= 28800 sec = 1 - = 1 - < 3 sec = FALSE - = FALSE - = FALSE - = FALSE - >= 5 sec - = TRUE - > 14.96 deg C < 14.96 deg C >= 49.96 deg C < 0 sec = TRUE - >= 0 sec = See sheet inhibit table - = See sheet enable tables -		
		Detection of stuck error of Intake Air Temperature sensor in intake manifold when the difference between the maximum and the minimum Intake air Temperature, since engine start is less than the calibrated threshold	Difference between the maximum and the minimum intake air temperature values (See Look-Up Table #P00A6-2)	< 0.76 to 1.96 deg C	Engine coolant downstream temperature during the first engine start of the driving cycle Counter for high-phases of intake air Temperature sensor Conditions for intake air temperature sensor (high phases): ((Air mass flow Vehicle speed Engine coolant temperature Integrated Air mass flow (See Look-Up Table #P00A6-1)) for time) Counter for low-phases of intake air temperature sensor	<= 100.96 deg C >= 2 counts = TRUE - < 5.55555556 g/sec < 15.53428 mph > 57.96 deg C > 460 to 20020 g > 35 sec >= 1 counts	continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Conditions for low intake air temperature (low phases) ((Vehicle speed and Air mass flow Air mass flow) for time) No pending or confirmed DTCs Basic enable conditions met	 > 43.49598 mph >= 6.66666667 g/sec <= 70 g/sec > 70 sec = See sheet inhibit table - = See sheet enable tables -		
	P00A9	Detects electrical error (non plausible signal) of Intake Air Temperature sensor when the difference between raw voltage signal and filtered voltage signal of intake air temperature sensor exceeds the calibrated threshold	Absolute value of difference between raw voltage signal of Intake air temperature sensor and filtered voltage signal of Intake air temperature sensor	> 0.12 V	No errors with signal range detected in Intake air temperature sensor (Signal Range check : out of range low error for intake air temperature sensor P00A7 Signal Range check : out of range high error for intake air temperature sensor P00A8) Basic enable conditions met	 = FALSE - = FALSE - = See sheet enable tables -	20 sec continuous	2 Trips
Battery Sensor (External Sensor) - Internal Temperature	P16DF	**Path 1:** Diagnosis of Battery Monitor Internal Temperature circuit high fault - Historical	Communication message indicating Battery Module Raw temperatue sensor 1 Communication message indicating historical temperature data down counter Communication message indicating historical temperature data down counter	< -43 degC > 0 - <= 24 -	Battery Monitor module diagnosis is active, which is the following conditions: (Battery voltage Condition general function request Intelligent Battery Sensor (IBS) communication is active Communication fault is active) No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V = FALSE - = TRUE - = FALSE - = see sheet inhibit tables - = see sheet enable tables -	40 counts continuous	2 Trips
		Path 2: Diagnosis of Battery Monitor Internal Temperature circuit high fault - Continuous	Communication message indicating Battery Module Raw temperatue sensor 1 Communication message indicating historical temperature data down counter	< -43 degC = 0 -	Battery Monitor module diagnosis is active, which is the following conditions: (Battery voltage Condition general function request Intelligent Battery Sensor (IBS) communication is active Communication fault is active) No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V = FALSE - = TRUE - = FALSE - = see sheet inhibit tables - = see sheet enable tables -	40 counts continuous	2 Trips
	P16DE	**Path 1:** Diagnosis of Battery Monitor Internal Temperature circuit low fault - Historical	Communication message indicating Battery Module Raw temperatue sensor 1 Communication message indicating historical temperature data down counter Communication message indicating historical temperature data down counter	> 120 degC > 0 - <= 24 -	Battery Monitor module diagnosis is active, which is the following conditions: (Battery voltage Condition general function request Intelligent Battery Sensor (IBS) communication is active Communication fault is active) No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V = FALSE - = TRUE - = FALSE - = see sheet inhibit tables - = see sheet enable tables -	40 counts continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Path 2: Diagnosis of Battery Monitor Internal Temperature circuit low fault - Continuous	Communication message indicating Battery Module Raw temperatue sensor 1 Communication message indicating historical temperature data down counter	> 120 degC = 0 -	Battery Monitor module diagnosis is active, which is the following conditions: (Battery voltage Condition general function request Intelligent Battery Sensor (IBS) communication is active Communication fault is active) No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V = FALSE - = TRUE - = FALSE - = see sheet inhibit tables - = see sheet enable tables -	40 counts continuous	2 Trips
	P100D	Diagnosis of Battery Monitor Module for Internal Temperature Erratic behavior	Maximum completed String Length for the NTC raw temperature Counter for the Internal Temperature samples Communication message indicating historical temperature data down counter	> 70 degC > 10 - = 0 -	Battery Monitor module diagnosis is active, which is the following conditions: (Battery voltage Condition general function request Intelligent Battery Sensor (IBS) communication is active Communication fault is active) No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V = FALSE - = TRUE - = FALSE - = see sheet inhibit tables - = see sheet enable tables -	5 counts continuous	2 Trips
	U01B0	Detects when the time since the last message from the "Battery Sensor Module" for frame "IBSAmpHourChg"(0x18) was received via LIN 1 Channel is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the "Battery Sensor Module" for frame "IBSAmpHourChg"(0x18) was received via LIN 1 Channel	> 0.5 sec	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	3 counts Continuous	2 Trips
		Detects when the time since the last message from the "Battery Sensor Module" for frame "IBSAmpHourDisChrg" (0x19) was received via LIN 1 Channel is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the "Battery Sensor Module" for frame "IBSAmpHourDisChrg" (0x19) was received via LIN 1 Channel	> 0.5 sec	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	3 counts Continuous	2 Trips
		Detects when the time since the last message from the "Battery Sensor Module" for frame "IBSCalcData"(0x16) was received via LIN 1 Channel is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the "Battery Sensor Module" for frame "IBSCalcData"(0x16) was received via LIN 1 Channel	> 0.5 sec	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	3 counts Continuous	2 Trips
		Detects when the time since the last message from the "Battery Sensor Module" for frame "IBSCfgDataRtn"(0x1E) was received via LIN 1 Channel is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the "Battery Sensor Module" for frame "IBSCfgDataRtn"(0x1E) was received via LIN 1 Channel	> 1 sec	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	3 counts Continuous	2 Trips
		Detects when the time since the last message from the "Battery Sensor Module" for frame "IBSCurrentFOMData" (0x1A) was received via LIN 1 Channel is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the "Battery Sensor Module" for frame "IBSCurrentFOMData" (0x1A) was received via LIN 1 Channel	> 2 sec	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	3 counts Continuous	2 Trips
		Detects when the time since the last message from the "Battery Sensor Module" for frame "IBSFOMData" (0x1C) was received via LIN 1 Channel is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the "Battery Sensor Module" for frame "IBSFOMData" (0x1C) was received via LIN 1 Channel	> 2 sec	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	3 counts Continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
		Detects when the time since the last message from the "Battery Sensor Module" for frame "IBSMeasuredTemp" (0x17) was received via LIN 1 Channel is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the "Battery Sensor Module" for frame "IBSMeasuredTemp" (0x17) was received via LIN 1 Channel	>	0.25	sec	Ignition is ON	=	TRUE	-	3	counts	Continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
		Detects when the time since the last message from the "Battery Sensor Module" for frame "IBSMVIData" (0x15) was received via LIN 1 Channel is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the "Battery Sensor Module" for frame "IBSMVIData"(0x15) was received via LIN 1 Channel	>	0.25	sec	Ignition is ON	=	TRUE	-	3	counts	Continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
		Detects when the time since the last message from the "Battery Sensor Module" for frame "IBSVehStartData"(0x1D) was received via LIN 1 Channel is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the "Battery Sensor Module" for frame "IBSVehStartData"(0x1D) was received via LIN 1 Channel	>	0.5	sec	Ignition is ON	=	TRUE	-	3	counts	Continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
		Detects when the time since the last message from the "Battery Sensor Module" for frame "IBSVoltageFOMData"(0x1B) was received via LIN 1 Channel is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the "Battery Sensor Module" for frame "IBSVoltageFOMData"(0x1B) was received via LIN 1 Channel	>	2	sec	Ignition is ON	=	TRUE	-	3	counts	Continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
	U04B1	Detects when wrong alive rolling counter received by the frame IBSAmpHourChg(0x18) in LIN1 channel from Battery Monitor Sensor module	Wrong alive rolling counter received by the frame IBSAmpHourChg(0x18) in LIN1 channel from Battery Monitor Sensor module	=	TRUE	-	Ignition is ON	=	TRUE	-	10	counts	Continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
		Detects when wrong alive rolling counter received by the frame IBSAmpHourDisChrg(0x19) in LIN1 channel from Battery Monitor Sensor module	Wrong alive rolling counter received by the frame IBSAmpHourDisChrg(0x19) in LIN1 channel from Battery Monitor Sensor module	=	TRUE	-	Ignition is ON	=	TRUE	-	10	counts	Continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
		Detects when wrong alive rolling counter received by the frame IBSCalcData(0x16) in LIN1 channel from Battery Monitor Sensor module	Wrong alive rolling counter received by the frame IBSCalcData(0x16) in LIN1 channel from Battery Monitor Sensor module	=	TRUE	-	Ignition is ON	=	TRUE	-	10	counts	Continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
		Detects when wrong alive rolling counter received by the frame IBSCfgDataRtn(0x1E) in LIN1 channel from Battery Monitor Sensor module	Wrong alive rolling counter received by the frame IBSCfgDataRtn(0x1E) in LIN1 channel from Battery Monitor Sensor module	=	TRUE	-	Ignition is ON	=	TRUE	-	10	counts	Continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
		Detects when wrong alive rolling counter received by the frame IBSCurrentFOMData(0x1A) in LIN1 channel from Battery Monitor Sensor module	Wrong alive rolling counter received by the frame IBSCurrentFOMData(0x1A) in LIN1 channel from Battery Monitor Sensor module	=	TRUE	-	Ignition is ON	=	TRUE	-	10	counts	Continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
		Detects when wrong alive rolling counter received by the frame IBSFOMData(0x1C) in LIN1 channel from Battery Monitor Sensor module	Wrong alive rolling counter received by the frame IBSFOMData(0x1C) in LIN1 channel from Battery Monitor Sensor module	=	TRUE	-	Ignition is ON	=	TRUE	-	10	counts	Continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
		Detects when wrong alive rolling counter received by the frame IBSMeasuredTemp(0x17) in LIN1 channel from Battery Monitor Sensor module	Wrong alive rolling counter received by the frame IBSMeasuredTemp(0x17) in LIN1 channel from Battery Monitor Sensor module	=	TRUE	-	Ignition is ON	=	TRUE	-	10	counts	Continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Detects when wrong alive rolling counter received by the frame IBSMVIData(0x15) in LIN1 channel from Battery Monitor Sensor module	Wrong alive rolling counter received by the frame IBSMVIData(0x15) in LIN1 channel from Battery Monitor Sensor module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	10 counts Continuous	2 Trips
		Detects when wrong alive rolling counter received by the frame IBSVehStartData(0x1D) in LIN1 channel from Battery Monitor Sensor module	Wrong alive rolling counter received by the frame IBSVehStartData(0x1D) in LIN1 channel from Battery Monitor Sensor module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	10 counts Continuous	2 Trips
		Detects when wrong alive rolling counter received by the frame IBSVoltageFOMData(0x1B) in LIN1 channel from Battery Monitor Sensor module	Wrong alive rolling counter received by the frame IBSVoltageFOMData(0x1B) in LIN1 channel from Battery Monitor Sensor module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	10 counts Continuous	2 Trips
Battery Sensor (External Sensor) - Temperature	P058E	**Path 1:** Diagnosis Battery Monitor Module Temperature Out Of Range High - Historical	Communication message indicating Battery Module Raw temperature sensor 2 Communication message indicating historical temperature data down counter Communication message indicating historical temperature data down counter	> 120 degC > 0 - <= 24 -	Battery Monitor module diagnosis is active, which is the following conditions: (Battery voltage Condition general function request Intelligent Battery Sensor (IBS) communication is active Communication fault is active) No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V = FALSE - = TRUE - = FALSE - = see sheet inhibit tables - = see sheet enable tables -	40 counts continuous	2 Trips
		Path 2: Diagnosis Battery Monitor Module Temperature Out Of Range High - Continuous	Communication message indicating Battery Module Raw temperatue sensor 2 Communication message indicating historical temperature data down counter	> 120 degC = 0 -	Battery Monitor module diagnosis is active, which is the following conditions: (Battery voltage Condition general function request Intelligent Battery Sensor (IBS) communication is active Communication fault is active) No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V = FALSE - = TRUE - = FALSE - = see sheet inhibit tables - = see sheet enable tables -	40 counts continuous	2 Trips
	P058F	**Path 1:** Diagnosis of Battery Monitor Module Temperature Out Of Range Low - Historical	Communication message indicating Battery Module Raw temperatue sensor 2 Communication message indicating historical temperature data down counter Communication message indicating historical temperature data down counter	< -43 degC > 0 - <= 24 -	Battery Monitor module diagnosis is active, which is the following conditions: (Battery voltage Condition general function request Intelligent Battery Sensor (IBS) communication is active Communication fault is active) No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V = FALSE - = TRUE - = FALSE - = see sheet inhibit tables - = see sheet enable tables -	40 counts continuous	2 Trips
		Path 2: Diagnosis of Battery Monitor Module Temperature Out Of Range Low - Continuous	Communication message indicating Battery Module Raw temperatue sensor 2 Communication message indicating historical temperature data down counter	< -43 degC = 0 -	Battery Monitor module diagnosis is active, which is the following conditions: (Battery voltage Condition general function request Intelligent Battery Sensor (IBS) communication is active Communication fault is active	= TRUE - > 10.9 V = FALSE - = TRUE - = FALSE -	40 counts continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					) No pending or confirmed DTCs Basic enable conditions met	= see sheet inhibit tables - = see sheet enable tables -		
	P100C	Diagnosis of Battery Monitor Module for Temperature Erratic behavior	Maximum completed String Length for the ASIC internal raw temperature Counter for the Temperature samples Communication message indicating historical temperature data down counter	> 70 degC > 10 - = 0 -	Battery Monitor module diagnosis is active, which is the following conditions: (Battery voltage Condition general function request Intelligent Battery Sensor (IBS) communication is active Communication fault is active) No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V = FALSE - = TRUE - = FALSE - = see sheet inhibit tables - = see sheet enable tables -	5 counts continuous	2 Trips
	P058C	**Path 1:** Diagnosis of Battery Monitor Module Temperature Monitoring performance - Historical	Absolute difference between the IBS NTC Raw Temperature and the IBS ASIC Raw Temperature Communication message indicating historical temperature data down counter Communication message indicating historical temperature data down counter	> 10 degC > 0 - <= 24 -	Battery Monitor module diagnosis is active, which is the following conditions: (Battery voltage Condition general function request Intelligent Battery Sensor (IBS) communication is active Communication fault is active) No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V = FALSE - = TRUE - = FALSE - = see sheet inhibit tables - = see sheet enable tables -	40 counts continuous	2 Trips
		Path 2: Diagnosis of Battery Monitor Module Temperature Monitoring performance - Continuous	Absolute difference between the IBS NTC Raw Temperature and the IBS ASIC Raw Temperature Communication message indicating historical temperature data down counter	> 10 degC = 0 -	Battery Monitor module diagnosis is active, which is the following conditions: (Battery voltage Condition general function request Intelligent Battery Sensor (IBS) communication is active Communication fault is active) No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V = FALSE - = TRUE - = FALSE - = see sheet inhibit tables - = see sheet enable tables -	40 counts continuous	2 Trips
Battery Sensor (External Sensor) - Current Shunt Sensor	P16DD	Diagnosis of Battery Monitor Module Current High fault	Communication message for Shunt Voltage out of range High indicates a diagnostic failure	= TRUE -	Battery Monitor module diagnosis is active, which is the following conditions: (Battery voltage Condition general function request Intelligent Battery Sensor (IBS) communication is active Communication fault is active) No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V = FALSE - = TRUE - = FALSE - = see sheet inhibit tables - = see sheet enable tables -	continuous	2 Trips
	P16D6	Diagnosis of Battery Monitor Module Current Low fault	Communication message for Shunt Voltage out of range Low indicates a diagnostic failure	= TRUE -	Battery Monitor module diagnosis is active, which is the following conditions: (Battery voltage Condition general function request Intelligent Battery Sensor (IBS) communication is active Communication fault is active) No pending or confirmed DTCs	= TRUE - > 10.9 V = FALSE - = TRUE - = FALSE - = see sheet inhibit tables -	continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Basic enable conditions met	= see sheet enable tables -		
	P058B	Diagnosis of Battery Monitor Module Current Monitoring performance fault	Communication message for Battery Current performance indicates a diagnostic failure	= TRUE -	Battery Monitor module diagnosis is active, which is the following conditions:	= TRUE -	continuous	2 Trips
					(			
					Battery voltage	> 10.9 V		
					Condition general function request	= FALSE -		
					Intelligent Battery Sensor (IBS) communication is active	= TRUE -		
					Communication fault is active	= FALSE -		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
Battery Sensor (External Sensor) - Module	P16E1		Communication message for Internal Battery Sensor - RAM internal fault indicates a diagnostic failure	= TRUE -	Battery Monitor module diagnosis is active, which is the following conditions:	= TRUE -	continuous	2 Trips
					(			
					Battery voltage	> 10.9 V		
					Condition general function request	= FALSE -		
					Intelligent Battery Sensor (IBS) communication is active	= TRUE -		
					Communication fault is active	= FALSE -		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P16E2	error	Communication message for Internal Battery Sensor - ROM internal fault indicates a diagnostic failure	= TRUE -	Battery Monitor module diagnosis is active, which is the following conditions:	= TRUE -	continuous	2 Trips
					(			
					Battery voltage	> 10.9 V		
					Condition general function request	= FALSE -		
					Intelligent Battery Sensor (IBS) communication is active	= TRUE -		
					Communication fault is active	= FALSE -		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P16E3	**Path 1:** Diagnosis of Battery monitor Module data Incompatible diagnostic - Historical	(Absolute difference between the IBS Return Nominal C20 and ECM Nominal C20 Calibration	> 5 Ah	Battery Monitor module diagnosis is active, which is the following conditions:	= TRUE -	10 counts continuous	2 Trips
			OR Absolute difference between the IBS Return Battery Type and ECM Battery Type Calibration	> 0 -	(Battery voltage	> 10.9 V		
			OR Absolute difference between the IBS Return U40 Battery Calibration and ECM U40 Battery Calibration	> 0.502 V	Condition general function request	= FALSE -		
					Intelligent Battery Sensor (IBS) communication is active	= TRUE -		
			OR Absolute difference between the IBS Return U80 Battery Calibration and ECM U80 Battery Calibration	> 0.502 V	Communication fault is active	= FALSE -		
			)		)			
			Manufacturer Enable Counter used to automatically arm Seed & Key	>= 0 -	No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
		Path 2: Diagnosis of Battery monitor Module data Incompatible diagnostic - Continuous	Absolute difference between the IBS Return Nominal C20 and ECM Nominal C20 Calibration	> 5 Ah	Battery Monitor module diagnosis is active, which is the following conditions:	= TRUE -	10 counts continuous	2 Trips
			OR Absolute difference between the IBS Return Battery Type and ECM Battery Type Calibration	> 0 -	(Battery voltage	> 10.9 V		
			OR Absolute difference between the IBS Return U40 Battery Calibration and ECM U40 Battery Calibration	> 0.502 V	Condition general function request	= FALSE -		
					Intelligent Battery Sensor (IBS) communication is active	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
			OR Absolute difference between the IBS Return U80 Battery Calibration and ECM U80 Battery Calibration	> >	 0.502	 V	Communication fault is active)	=	FALSE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
Battery Monitor Module	P058A	Diagnosis of Battery Monitor Module Communication - Initialization error	Communication message for Battery Sensor initialization indicates a diagnostic failure	=	TRUE	-	Battery Monitor module diagnosis is active, which is the following conditions: (	=	TRUE	-			continuous	2 Trips
							Battery voltage	>	10.9	V				
							Condition general function request	=	FALSE	-				
							Intelligent Battery Sensor (IBS) communication is active	=	TRUE	-				
							Communication fault is active)	=	FALSE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
Battery Sensor (External Sensor) - Voltage Sensor	P16D5	Diagnosis of Battery Monitor Module Circuit High Voltage fault	Communication message for Battery Voltage out of range High indicates a diagnostic failure	=	TRUE	-	Battery Monitor module diagnosis is active, which is the following conditions: (	=	TRUE	-			continuous	2 Trips
							Battery voltage	>	10.9	V				
							Condition general function request	=	FALSE	-				
							Intelligent Battery Sensor (IBS) communication is active	=	TRUE	-				
							Communication fault is active)	=	FALSE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P16D4	Diagnosis of Battery Monitor Module Circuit Low Voltage fault	Communication message for Battery Voltage out of range Low indicates a diagnostic failure	=	TRUE	-	Battery Monitor module diagnosis is active, which is the following conditions: (	=	TRUE	-			continuous	2 Trips
							Battery voltage	>	10.9	V				
							Condition general function request	=	FALSE	-				
							Intelligent Battery Sensor (IBS) communication is active	=	TRUE	-				
							Communication fault is active)	=	FALSE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P058D	Diagnosis of Battery Monitor Module Voltage Monitoring performance fault	Absolute difference between IBS Measured Voltage and System 12V Battery Voltage	>	5	V	Battery Monitor module diagnosis is active, which is the following conditions: (	=	TRUE	-	100	counts	continuous	no MIL
							Battery voltage	>	10.9	V				
							Condition general function request	=	FALSE	-				
							Intelligent Battery Sensor (IBS) communication is active	=	TRUE	-				
							Communication fault is active)	=	FALSE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
Battery Volatge	P0563	Detects if the battery voltage is higher than calibrated threshold for calibrated amount of time	Battery voltage	>	3.1802	V	ECU is not in the PREDRIVE state	=	TRUE	-	10	sec	continuous	no MIL
							Engine is in running state	=	TRUE	-				
							for time	>=	2	sec				
							Vehicle speed	>=	2.486016159	mph				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
Battery Volatge	P0562	Detects if the battery voltage is lower than calibrated threshold for calibrated amount of time	Battery voltage	<	1.582	V	ECU is not in the PREDRIVE state	=	TRUE	-	10	sec	continuous	no MIL
							Engine is in running state	=	TRUE	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for time No pending or confirmed DTCs Basic enable conditions met	>= 2 sec = see sheet inhibit tables - = see sheet enable tables -		
Brake Position Sensor - Primary	P057D	Detects if the brake pedal position sensor voltage is higher than calibrated threshold for calibrated amount of time	Brake pedal position sensor voltage	> 4.597 V	Ignition is on Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
	P057C	Detects if the brake pedal position sensor voltage is lower than calibrated threshold for calibrated amount of time	Brake pedal position sensor voltage	< 0.449 V	Ignition is on Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
	P057B	**Path 1:** Detects when brake pedal position ratio is higher than calibrated threshold for calibrated amount of time	Brake pedal ratio	> 109.9976 %	Ignition is on No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	1 sec continuous	1 Trip
		Path 2: Detects when brake pedal position ratio is lower than calibrated threshold for calibrated amount of time	Brake pedal ratio	< -18.0054 %	Ignition is on No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	1 sec continuous	1 Trip
		Path 3: Detects when brake pedal switch EWMA(Exponentially Weighted Moving Average) factor is less than calibrated threshold	EWMA filtered test result based on the difference of |(a) - (b)| where (a) maximum analog brake sensor raw voltage during test (b) minimum analog brake sensor raw voltage during test where difference of the brake sensor voltage corresponds to a corrected value of (see Look-Up-Table # P057B-1)	<= 0.400024 - = calculated parameter V = calculated parameter V = 0 to 1 factor	Battery voltage Control for starter powerstage for time Conditions for fast test scheduler (Number of reference voltage samples considered for fast EWMA calculation Absolute difference between maximum and minimum voltage obtained during the EWMA calculation in fast test scheduler) Conditions for slow test scheduler (Slow test completion cycle Vehicle is in parking state (Gear position in case of automatic transmission system is in parking) Number of reference voltage samples considered for slow EWMA calculation Gear position in case of automatic transmission system is not in parking Vehicle speed Accelerator pedal position) Number of successful EWMA test completed No pending or confirmed DTCs Basic enable conditions met	> 10.9 V = FALSE - >= 0.04 sec > 50 - > 0.051 V = FALSE - = TRUE - = TRUE - > 200 - = TRUE - >= 4.350528278 mph < 5.0049 % >= 2 events = see sheet inhibit tables - = see sheet enable tables -	2 events continuous	1 Trip
	P138B	Checks if the voltage of the released brake pedal is within the zero point range	Brake pedal position sensor voltage OR Brake pedal position sensor voltage	> 1.445 V < 0.6 V	Conditions for first zero point learning (Brake pedal released (Detection through pedal switch)) OR	 = TRUE -	1.5 sec continuous	1 Trip

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Brake stroke sensor learning Continuous zero point learning conditions (Accelerator pedal position Accelerator pedal position Vehicle speed Vehicle speed Vehicle acceleration Vehicle acceleration Absolute difference between filtered brake pedal volatge and raw value brake pedal position voltage Engine is in running state Starter is not engaged) No pending or confirmed DTCs Basic enable conditions met	= TRUE - < 69.9951 % > 9.9976 % < 74.58048477 mph > 7.458048477 mph < 0.8 m/s^2 > 0.1 m/s^2 < 0.03 V = TRUE - = TRUE - = see sheet inhibit tables - = see sheet enable tables -		
Brake Position Sensor - Secondary	P0572	Detects when redundant brake pedal initial travel status is achieved but redundant brake switch is not set	Redundant brake pedal initial travel status Redundant brake switch status	= TRUE - = FALSE -	Ignition is on No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	5 sec continuous	1 Trip
	P0573	Detects when redundant brake pedal initial travel status is not achieved but redundant brake switch is set	Redundant brake pedal initial travel status Redundant brake switch status	= FALSE - = TRUE -	Ignition is on No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	5 sec continuous	1 Trip
Coolant Temperature Sensor	P0119	Engine Coolant Temperature Sensor 1 - Circuit continuity check - loose contact detection	Difference between raw sensor value and coolant tempearture sensor 1	>= 0.12 V	Engine Coolant Temperature Sensor 1 Circuit Low Engine Coolant Temperature Sensor 1 Circuit High and Basic enable conditions met	= FALSE - = FALSE - = see sheet enable tables -	20 sec continuous	2 Trips
Crank Case Vapor Pressure Sensor	P051D	Detects if the crankcase pressure sensor voltage is greater than a calibrated threshold for calibrated time	Raw voltage from the crankcase pressure sensor same as Crankcase pressure	> 4.7 V > -5.625 to 6.25 kPa	Ignition is on No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables = see sheet enable tables	2 sec continuous	2 Trips
Crank Case Vapor Pressure Sensor	P051C	Detects if the crankcase pressure sensor voltage is less than a calibrated threshold for calibrated time	Raw voltage from the crankcase pressure sensor same as Crankcase pressure	< 0.2 V < -5.625 to 6.25 kPa	Ignition is on No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables = see sheet enable tables	2 sec continuous	2 Trips
Crank Case Vapor Pressure Sensor	P051B	Diagnosis of Crankcase Pressure Sensor plausibility check	Absolute value of Sensed crank case ventilation pressure	> 0.646 kPa	ECU is in afterrun state No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	0.01 sec once per driving cycle	2 Trips
DC/DC Converter (External sensor) - Output Voltage Sensing Circuit 1	P3053	Signal range check - out of range high	Raw value of circuit 1 voltage	> 28 V	Ignition is on Battery voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 7 V = see sheet inhibit tables - = see sheet enable tables -	800 counts continuous	2 Trips
	P3051	Signal range check - out of range low	Raw value of circuit 1 voltage	< 1.00 V	Ignition is on Battery voltage	= TRUE - > 7 V	800 counts continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No pending or confirmed DTCs Basic enable conditions met	= see sheet inhibit tables - = see sheet enable tables -		
	P3055		Absolute difference between Host ECU Process System Voltage and Circuit 1 Voltage	> 1.00 V	Ignition is on Battery voltage (Engine is running and for time OR Ignition is on and for time OR Engine Auto Stop Active) No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 7 V >= 1 sec >= 1 sec = TRUE - = see sheet inhibit tables - = see sheet enable tables -	800 counts continuous	2 Trips
	P3055		Absolute difference between Host ECU Pre-Crank System Voltage and Circuit 1 Voltage	> 1.00 V	Ignition is on Battery voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 7 V = see sheet inhibit tables - = see sheet enable tables -	2 counts continuous	2 Trips
	U0599	Detects when wrong alive rolling counter (DC Converter Actuator Voltage ADC Value Alive Rolling Count) received by the frame PPEI_DC_Conv_General_Status_PE (0xA0) from DC to DC Converter Control Module "A"	Wrong alive rolling counter (DC Converter Actuator Voltage ADC Value Alive Rolling Count) received by the frame PPEI_DC_Conv_General_Status_PE (0xA0) from DC to DC Converter Control Module "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	10 counts continuous	2 Trips
		Detects when wrong protection value (DC Converter Actuator Voltage ADC Value Protection Value) received by the frame PPEI_DC_Conv_General_Status_PE (0xA0) from DC to DC Converter Control Module "A"	Wrong protection value (DC Converter Actuator Voltage ADC Value Protection Value) received by the frame PPEI_DC_Conv_General_Status_PE (0xA0) from DC to DC Converter Control Module "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	10 counts continuous	2 Trips
		Detects when wrong alive rolling counter received by the frame PPEI_DC_Cnv_Int_Health_Stat_PE (0x1D2) from DC to DC Converter Control Module "A"	Wrong alive rolling counter received by the frame PPEI_DC_Cnv_Int_Health_Stat_PE (0x1D2) from DC to DC Converter Control Module "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	10 counts continuous	2 Trips
		Detects when wrong protection value received by the frame PPEI_DC_Cnv_Int_Health_Stat_PE (0x1D2) from DC to DC Converter Control Module "A"	Wrong protection value received by the frame PPEI_DC_Cnv_Int_Health_Stat_PE (0x1D2) from DC to DC Converter Control Module "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	10 counts continuous	2 Trips
		Detects when sliding window error received by the frame PPEI_DC_Cnv_Int_Health_Stat_PE from DC to DC Converter Control Module "A"	Sliding window error received by the frame PPEI_DC_Cnv_Int_Health_Stat_PE from DC to DC Converter Control Module "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	10 counts continuous	2 Trips
		Detects when wrong alive rolling counter (DC Converter Crank Terminal Status Alive Rolling Count) received by the frame PPEI_DC_Conv_General_Status_PE (0xA0) from DC to DC Converter Control Module "A"	Wrong alive rolling counter (DC Converter Crank Terminal Status Alive Rolling Count) received by the frame PPEI_DC_Conv_General_Status_PE (0xA0) from DC to DC Converter Control Module "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	10 counts continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Detects when wrong protection value (DC Converter Crank Terminal Status Protection Value) received by the frame PPEI_DC_Conv_General_Status_PE (0xA0) from DC to DC Converter Control Module "A"	Wrong protection value (DC Converter Crank Terminal Status Protection Value) received by the frame PPEI_DC_Conv_General_Status_PE (0xA0) from DC to DC Converter Control Module "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	10 counts continuous	2 Trips
		Detects when wrong alive rolling counter error(DC Converter Crank Control Terminal Status Alive Rolling Count) received by the frame PPEI_DC_Conv_General_Status_PE (0xA0) from DC to DC Converter Control Module "A"	Wrong alive rolling counter error(DC Converter Crank Control Terminal Status Alive Rolling Count) received by the frame PPEI_DC_Conv_General_Status_PE (0xA0) from DC to DC Converter Control Module "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	10 counts continuous	2 Trips
		Detects when wrong protection value received by the frame PPEI_DC_Conv_General_Status_PE (0xA0) from DC to DC Converter Control Module "A"	Wrong protection value received by the frame PPEI_DC_Conv_General_Status_PE (0xA0) from DC to DC Converter Control Module "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	10 counts continuous	2 Trips
		Detects when sliding windows error is received by frame PPEI_DC_Cnv_Int_Health_Stat_PE(0x1D2) from DC Converter Internal Health Status module	sliding windows error is received by frame PPEI_DC_Cnv_Int_Health_Stat_PE(0x1D2) from DC Converter Internal Health Status module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	10 counts continuous	2 Trips
		Detects when sliding windows error is received by frame PPEI_DC_Conv_General_Status_PE(0xA0) from DC Converter Actuator Voltage ADC module	sliding windows error is received by frame PPEI_DC_Conv_General_Status_PE(0xA0) from DC Converter Actuator Voltage ADC module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	10 counts continuous	2 Trips
		Detects when sliding error is received by frame PPEI_DC_Conv_General_Status_PE(0xA0) from DC Converter Crank Control Terminal Status module	sliding error is received by frame PPEI_DC_Conv_General_Status_PE(0xA0) from DC Converter Crank Control Terminal Status module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	10 counts continuous	2 Trips
		Detects when sliding error is received by frame PPEI_DC_Conv_General_Status_PE(0xA0) from DC Converter Run Crank Terminal Status module	sliding error is received by frame PPEI_DC_Conv_General_Status_PE(0xA0) from DC Converter Run Crank Terminal Status module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	10 counts continuous	2 Trips
		Detects when wrong ARC is received by frame PPEI_DC_Conv_General_Status_PE(0xA0) from DC Converter Crank Terminal Status module	wrong ARC is received by frame PPEI_DC_Conv_General_Status_PE(0xA0) from DC Converter Crank Terminal Status module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	10 counts continuous	2 Trips
DC/DC Converter (External sensor) - Output Voltage Sensing Circuit 2	P3054	Signal range check - out of range high	Raw value of circuit 2 voltage	> 28 V	Ignition is on Battery voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 7 V = see sheet inhibit tables - = see sheet enable tables -	800 counts continuous	2 Trips
	P3052	Signal range check - out of range low	Raw value of circuit 2 voltage	< 1.00 V	Ignition is on Battery voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 7 V = see sheet inhibit tables - = see sheet enable tables -	800 counts continuous	2 Trips
	P3056		Absolute difference between Host ECU Process System Voltage and Circuit 2 Voltage	> 1.00 V	Ignition is on	= TRUE -	800 counts continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Battery voltage Engine is in the start phase (Engine is running and for time OR Ignition is on and for time OR Engine Auto Stop Active) No pending or confirmed DTCs Basic enable conditions met	> 7 V = FALSE - >= 1 sec >= 1 sec = TRUE - = see sheet inhibit tables - = see sheet enable tables -		
	P3056		Absolute difference between Host ECU Pre-Crank System Voltage and Circuit 2 Voltage	> 1.00 V	Ignition is on Battery voltage Engine is in the start phase No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 7 V = TRUE - = see sheet inhibit tables - = see sheet enable tables -	2 counts continuous	2 Trips
DC/DC Converter (External sensor) - Crank Input Signal	P305D	Crank Control Sensor Circuit High Voltage Fault	The status of the starter output acquired from DC/DC converter	<> The status of the starter output to the powerstage -	Ignition is ON: ECU is in DRIVE mode Battery voltage Starter output to the powerstage No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 7 V = FALSE - = see sheet inhibit tables - = see sheet enable tables -	800 counts continuous	2 Trips
	P305E	Crank Control Sensor Circuit Low Voltage Fault	The status of the starter output acquired from DC/DC converter	<> The status of the starter output to the powerstage -	Battery voltage Starter output to the powerstage No pending or confirmed DTCs Basic enable conditions met	> 7 V = TRUE - = see sheet inhibit tables - = see sheet enable tables -	30 counts continuous	2 Trips
DC/DC Converter (External sensor) - Ignition Switch Run/Start Position Circuit	P305B	Ignition Switch Circuit High Voltage Fault	DC/DC-converter Run Crank Terminal Status	<> Engine Controller Run Crank Terminal Status -	Ignition is OFF: ECU is in PREDRIVE or POSTDRIVE mode Battery voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 7 V = see sheet inhibit tables - = see sheet enable tables -	400 counts continuous	2 Trips
	P305C	Ignition Switch Circuit Low Voltage Fault	DC/DC-converter Run Crank Terminal Status	<> Engine Controller Run Crank Terminal Status -	Ignition is ON: ECU is in DRIVE mode Battery voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 7 V = see sheet inhibit tables - = see sheet enable tables -	800 counts continuous	2 Trips
Ambient Air Temperature Sensor	P0073	Detection of ambient temperature sensor voltage exceeding the maximum threshold	Raw voltage of the Ambient temperature sensor Same as: Ambient air temperature	> 4.913 V < -46.17 Deg C	Ignition is ON No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	2 sec Continuous	2 Trips
	P0072	Detection of ambient temperature sensor voltage falling below the minimum threshold	Raw voltage of the Ambient temperature sensor Same as: Ambient air temperature	< 0.351 V > 99.96 Deg C	Ignition is ON No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	2 sec Continuous	2 Trips
Ambient Air Temperature Sensor	P0071	Plausibility check of Ambient Temperature sensor when compared with model temperature value higher than maximum threshold	Difference between ambient temperature sensor value and model temperature	> 14.96 deg C	Errors with ambient temperature sensor (	= FALSE -	5 sec continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Signal Range check : out of range low error for ambient air temperature sensor (P0072) Signal Range check : out of range high error for ambient air temperature sensor (P0073)) (Ambient temperature model released and updated on the current drive cycle) Basic enable conditions met No pending or confirmed DTCs	= FALSE - = FALSE - = see sheet enable tables - = see sheet inhibit tables -		
	P0071	Plausibility check of Ambient Temperature sensor when compared with model temperature value higher than minimum threshold	Difference between model temperature and ambient temperature sensor value	< 14.96 deg C	Errors with ambient temperature sensor (Signal Range check : out of range low error for ambient air temperature sensor (P0072) Signal Range check : out of range high error for ambient air temperature sensor (P0073)) (Ambient temperature model released and updated on the current drive cycle) Basic enable conditions met No pending or confirmed DTCs	= FALSE - = FALSE - = FALSE - = see sheet enable tables - = see sheet inhibit tables -	5 sec continuous	2 Trips
Ambient Air Temperature Sensor	P0074	Detects Environment Air Temperature implausible / Environmental temperature signal erratic	Absolute difference between measured and filtered ambient temperatures for time	> 10.06 deg C >= 20 sec	Ignition ON No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables = see sheet enable tables -	continuous	2 Trips
Barometric pressure sensor	P2229	Monitoring of Barometric Pressure Sensor for Signal range check - High	Error information message A fom digital ambient air pressure sensor returns a CRC (Cyclical Redundancy Checking) error OR Error information message A fom digital ambient air pressure sensor returns a short circuit to VDD	= TRUE - = TRUE -	Reading message A fom digital ambient air pressure sensor has been successful and has delivered valid values Ambient pressure sensor boot is done ECU is in drive state No pending or confirmed DTCs Basic enable conditions met	= TRUE - = TRUE - = TRUE - = see sheet inhibit tables - = see sheet enable tables -	2 sec Continous	2 Trips
	P2228	Monitoring of Barometric Pressure Sensor for Signal range check - Low	Error information message A fom digital ambient air pressure sensor returns a short circuit to ground	= TRUE -	Reading message A fom digital ambient air pressure sensor has been successful and has delivered valid values Ambient pressure sensor boot is done ECU is in drive state No pending or confirmed DTCs Basic enable conditions met	= TRUE - = TRUE - = TRUE - = see sheet inhibit tables - = see sheet enable tables -	2 sec Continous	2 Trips
Barometric pressure sensor	P2227	**Path 1:** Continuity check - positive deviation too high	Difference between filtered ambient air pressure raw value and its delayed value (20s)	> 5 kPa	Ambient pressure sensor valid, which is the following condition: (Ambient pressure sensor raw value exceeded for time) No pending or confirmed DTCs Basic enable conditions met	= TRUE - = TRUE - >= 0.2 sec = see sheet inhibit tables - = see sheet enable tables -	2 sec continous	2 Trip

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
			Difference between measured ambient air pressure raw value and maximum modeled ambient pressure	>	1.5	kPa	Threshold model for ambient pressure valid, which is the following condition for time	>=	2.6	sec	2	sec	continous	2 Trip
							(							
							(							
							Throttle valve/actuator position	<	8.0078	%				
							Engine speed	<	1000	rpm				
							)							
							OR							
							Engine speed	=	0	rpm				
							ECU is in DRIVE state	=	TRUE	-				
							Measured pressure upstream throttle valve is valid	=	TRUE	-				
							)							
							Ambient pressure sensor valid, which is the following condition:	=	TRUE	-				
							(							
							Ambient pressure sensor raw value exceeded	=	TRUE	-				
							for time	>=	0.2	sec				
							)							
							Error suspision from contionious check, which is the following condition:	=	TRUE	-				
							(							
							Difference between measured ambient air pressure raw value and its delayed value (20s)	>	5	kPa				
							OR							
							Fault suspicion from continuity check between the drives, which is the following condition:	=	TRUE	-				
							(							
							(							
							Absolute value of difference between ambient pressure from actual driving cycle and ambient pressure from last driving cycle	<	10	kPa				
							Zyklus flag for diagnosis by comparing actual and last driving cycle ambient pressure	=	TRUE	-				
							(							
							Ambient pressure from last driving cycle valid	=	TRUE	-				
							Cycle flag ambient pressure from current driving cycle adopted	=	TRUE	-				
							)							
							)							
							OR							
							Healing of continuity check with additional value	=	TRUE	-				
							(							
							Condition threshold modells for ambient pressure valid	=	TRUE	-				
							Difference between ambient air pressure raw value measured and maximum modelled ambient pressure	<	1.5	kPa				
							Difference between minimal modelled ambient pressure and ambient air pressure raw value measured	<	1.5	kPa				
							)							
							OR							
							Condition deadlock threshold modells for ambient pressure valid	=	TRUE	-				
							(							
							Condition for error suspision from contionious check	=	TRUE	-				
							Validity of the pressure sensor of the intake manifold - bank 1	=	TRUE	-				
							)							
							)							
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Path 2: Continuity check - negative deviation too high	Difference between delayed (20s) ambient air pressure and measured ambient air pressure raw value	>	5	kPa	Ambient pressure sensor valid, which is the following condition:	=	TRUE	-	2	sec	continous	2 Trip
							(							
							Ambient pressure sensor raw value exceeded	=	TRUE	-				
							for time	>=	0.2	sec				
							)							

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
			Difference between minimum modeled ambient pressure and measured ambient air pressure raw value	> 1.5 kPa	Threshold model for ambient pressure valid, which is the following condition for time	>= 2.6 sec	2 sec continous	2 Trip
					(			
					(			
					Throttle valve/actuator position	< 8.0078 %		
					Engine speed	< 1000 rpm		
					)			
					OR			
					Engine speed	= 0 rpm		
					ECU is in DRIVE state	= TRUE -		
					Measured pressure upstream throttle valve is valid	= TRUE -		
					)			
					Ambient pressure sensor valid, which is the following condition:	= TRUE -		
					(			
					Ambient pressure sensor raw value exceeded	= TRUE -		
					for time	>= 0.2 sec		
					)			
					Error suspision from contionious check, which is the following condition:	= TRUE -		
					(			
					Difference between measured ambient air pressure raw value and its delayed value (20s)	> 5 kPa		
					OR			
					Fault suspicion from continuity check between the drives, which is the following condition:	= TRUE -		
					(			
					(			
					Absolute value of difference between ambient pressure from actual driving cycle and ambient pressure from last driving cycle	< 10 kPa		
					Zyklus flag for diagnosis by comparing actual and last driving cycle ambient pressure	= TRUE -		
					(			
					Ambient pressure from last driving cycle valid	= TRUE -		
					Cycle flag ambient pressure from current driving cycle adopted	= TRUE -		
					)			
					)			
					OR			
					Healing of continuity check with additional value	= TRUE -		
					(			
					Condition threshold modells for ambient pressure valid	= TRUE -		
					Difference between ambient air pressure raw value measured and maximum modelled ambient pressure	< 1.5 kPa		
					Difference between minimal modelled ambient pressure and ambient air pressure raw value measured	< 1.5 kPa		
					)			
					OR			
					Condition deadlock threshold modells for ambient pressure valid	= TRUE -		
					(			
					Condition for error suspision from contionious check	= TRUE -		
					Validity of the pressure sensor of the intake manifold - bank 1	= TRUE -		
					)			
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
		Path 3: Rationality check - out of range high	Difference between measured ambient pressure and the maximal reference pressure for delta pressure sensor diagnosis	>	2.2344	kPa	ECU is in DRIVE state	=	TRUE	-	2	sec	continous	2 Trip
							(							
							Engine is not running	=	TRUE	-				
							for time	>=	5	sec				
							)							
							(							
							(							
							(							
							Condition ambient pressure sensor valid	=	TRUE	-				
							Condition ambient pressure from sensor valid	=	TRUE	-				
							)							
							for time	>	0.2	sec				
							)							
							OR							
							(							
							(							
							Condition ambient pressure sensor valid	=	TRUE	-				
							Condition ambient pressure from sensor valid	=	TRUE	-				
							)							
							for time	=	0.2	sec				
							)							
							Ambient pressure sensor reference for delta pressure sensor is stable	=	FALSE	-				
							)							
							Ambient pressure sensor measured is valid	=	TRUE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Path 4: Rationality check - out of range low	Difference between the minimal reference pressure for delta pressure sensor diagnosis and the measured ambient pressure	>	2.2344	kPa	ECU is in DRIVE state	=	TRUE	-	2	sec	continous	2 Trip
							(							
							Engine is not running	=	TRUE	-				
							for time	>=	5	sec				
							)							
							(							
							(							
							(							
							Condition ambient pressure sensor valid	=	TRUE	-				
							Condition ambient pressure from sensor valid	=	TRUE	-				
							)							
							for time	>	0.2	sec				
							)							
							OR							
							(							
							(							
							Condition ambient pressure sensor valid	=	TRUE	-				
							Condition ambient pressure from sensor valid	=	TRUE	-				
							)							
							for time	=	0.2	sec				
							)							
							Ambient pressure sensor reference for delta pressure sensor is stable	=	FALSE	-				
							)							
							Ambient pressure sensor measured is valid	=	TRUE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Path 5: Sensor plausibility check	Information from digital ambient pressure sensor for QUEUE FULL	=	TRUE	-	Sensor reset is triggered	=	TRUE	-	2	sec	continous	2 Trip
			OR				(							
			Information from digital ambient pressure sensor for SENSOR DEFECT	=	TRUE	-	Ambient pressure sensor boot done	=	TRUE	-				
			OR				ECU Sub-State in DRIVE	=	TRUE	-				
			Information from digital ambient pressure sensor for VALUE TOO LOW	=	TRUE	-	)							
			OR				No pending or confirmed DTCs	=	see sheet inhibit tables	-				
			Information from digital ambient pressure sensor for VALUE TOO HIGH	=	TRUE	-	Basic enable conditions met	=	see sheet enable tables	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
Fuel Rail Pressure Sensor - Dual Pressure - Primary value (SENT)	P128A	Diagnosis of Fuel Rail Pressure Sensor1 Bank1 - Out of Range Error	Raw pressure data of SENT rail pressure sensor channel 1	>	4088	-	Ignition is on	=	FALSE	-	0.5	sec	Continuous	1 Trip
			OR				Loss due to high level on SENT sensor signal line of SENT Rail pressure sensor	=	FALSE	-				
			Raw pressure data of SENT rail pressure sensor channel 1	<	1	-	Loss due to low level on SENT sensor signal line of SENT Rail pressure sensor	=	FALSE	-				
							Error in SENT rail pressure sensor	=	FALSE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	U0625	**Path1:** Diagnosis of message loss due to sensor signal line on high level	Loss due to high level on SENT sensor signal line of SENT rail pressure sensor	=	TRUE	-	Ignition is on	=	FALSE	-	0.5	sec	Continuous	1 Trip
							Loss due to low level on SENT sensor signal line of SENT rail pressure sensor	=	FALSE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Path2: Diagnosis of message loss due to sensor signal line on low level	Loss due to low level on SENT sensor signal line of SENT rail pressure sensor	=	TRUE	-	Ignition is on	=	FALSE	-	0.5	sec	Continuous	1 Trip
							Loss due to high level on SENT sensor signal line of SENT rail pressure sensor	=	FALSE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	U1374	Diagnosis of Fuel Rail Pressure Protocol Error	Protocol error for SENT rail pressure sensor detected	=	TRUE	-	Ignition is on	=	FALSE	-	0.5	sec	Continuous	1 Trip
							Loss due to high level on SENT sensor signal line of SENT Rail pressure sensor	=	FALSE	-				
							Loss due to low level on SENT sensor signal line of SENT Rail pressure sensor	=	FALSE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
Fuel Rail Pressure Sensor Performance	P0191	**Path 1:** Rationality Diagnosis of Fuel Rail Pressure Sensor	difference of the two rail pressure data values (see Look-up-table #P0191-1)	>	241 to 290	-	Raw data for rail pressure from SENT	<=	1	-	1	sec	Continuous	1 Trip
							Raw data for rail pressure from SENT	>=	4088	-				
							Raw data for rail pressure from SENT sensor channel 2	<=	1	-				
							Raw data for rail pressure from SENT sensor channel 2	>=	4088	-				
							Message loss due to high level on SENT sensor signal line of SENT Rail pressure sensor	=	FALSE	-				
							Message loss due to low level on SENT sensor signal line of SENT Rail pressure sensor	=	FALSE	-				
							Protocol error of SENT rail pressure sensor	=	FALSE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
Fuel System High Pressure Sensor	P0191	**Path 2:** High pressure sensor digital raw value is lesser than calibrated threshold for a calibrated period of time	High pressure sensor digital raw value	<	-1.5	MPa	Fuel pre-supply pump is ON	=	TRUE	-	1	sec	Continuous	1 Trips
							(							

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Rail pressure sensor voltage is not plausible	= TRUE -		
					(			
					(Condition error in stuck check, no voltage difference, which is the following conditions	= FALSE -		
					(Rail pressure sensor voltage difference between minimum and maximum value over one cycle	> 4 -		
					(			
					Number of injections	< 8 -		
					ECU is in drive state	= FALSE -		
					)			
					)			
					Rail pressure sensor voltage is plausible	= TRUE -		
					(			
					Pressure from SENT is not plausible	= FALSE -		
					(			
					Raw data for rail pressure from SENT	<= 4088 -		
					Raw data for rail pressure from SENT	>= 1 -		
					)			
					OR			
					Pressure from SENT is not plausible, channel 2	= FALSE -		
					(			
					Data for rail pressure from SENT Sensor channel 2	<= 4088 -		
					Data for rail pressure from SENT Sensor channel 2	>= 1 -		
					)			
					)			
					)			
					)			
					)			
					Condition for initial fuelling of fuel supply system is active	= FALSE -		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
Fuel System Pressure Sensor High Pressure Side	P0191	**Path 3:** Signal stuck check	Rail pressure sensor voltage difference between minimum and maximum value over one cycle	<= 4 -	Condition error in stuck check, no voltage difference, which is the following conditions	= TRUE -	2 sec continuous	1 Trip
					(			
					Number of injections	>= 8 -		
					ECU is in drive state	= TRUE -		
					)			
					Rail pressure sensor voltage is plausible	= TRUE -		
					(			
					Pressure from SENT is not plausible	= FALSE -		
					(			
					Raw data for rail pressure from SENT	<= 4088 -		
					Raw data for rail pressure from SENT	>= 1 -		
					)			
					OR			
					Pressure from SENT is not plausible, channel 2	= TRUE -		
					(			
					Data for rail pressure from SENT, channel 2	<= 4088 -		
					Data for rail pressure from SENT, channel 2	>= 1 -		
					)			
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
Fuel Rail Pressure Sensor - Dual Pressure - Backup value (SENT)	P128B	Diagnosis of Fuel Rail Pressure Sensor2 Bank1 - Out of Range Error	Raw pressure data of SENT rail pressure sensor channel 2	> 4088 -	Ignition is on	= FALSE -	0.5 sec Continuous	1 Trip

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
			OR				Loss due to high level on SENT sensor signal line of SENT Rail pressure sensor	=	FALSE	-				
			Raw pressure data of SENT rail pressure sensor channel 2	<	1	-	Loss due to low level on SENT sensor signal line of SENT Rail pressure sensor	=	FALSE	-				
							Error in SENT rail pressure sensor	=	FALSE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	U101B	**Path1:** Diagnosis of message loss due to sensor signal line on high level	Loss due to high level on SENT sensor signal line of SENT rail pressure sensor	=	TRUE	-	Ignition is on	=	FALSE	-	0.5	sec	Continuous	1 Trip
							Loss due to low level on SENT sensor signal line of SENT rail pressure sensor	=	FALSE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Path2: Diagnosis of message loss due to sensor signal line on low level	Loss due to low level on SENT sensor signal line of SENT rail pressure sensor	=	TRUE	-	Ignition is on	=	FALSE	-	0.5	sec	Continuous	1 Trip
							Loss due to high level on SENT sensor signal line of SENT rail pressure sensor	=	FALSE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	U1375	Diagnosis of Fuel Rail Pressure Protocol Error	Protocol error for SENT rail pressure sensor detected	=	TRUE	-	Ignition is on	=	FALSE	-	0.5	sec	Continuous	1 Trip
							Loss due to high level on SENT sensor signal line of SENT Rail pressure sensor	=	FALSE	-				
							Loss due to low level on SENT sensor signal line of SENT Rail pressure sensor	=	FALSE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
Fuel Tank Pressure Sensor (S1 CAN)	P0453	Detects if the fuel tank pressure sensor voltage is higher than a calibrated threshold for a calibrated period of time	Fuel tank pressure sensor voltage	>	4.6484	V	(Engine start is finished	=	TRUE	-	2	sec	continuous	2 Trips
			same as				means:							
			Fuel tank pressure	<	-4.2	kPa	(							
							Engine speed	>	200	rpm				
							)							
							OR							
							Engine speed	=	0	rpm				
							OR							
							Engine state is in auto stop mode	=	TRUE	-				
							)							
							ECU is in pre-drive state	=	FALSE	-				
							No pending or confirmed DTCs	=	See sheet inhibit tables	-				
							Basic enable conditions met	=	See sheet enable tables	-				
Fuel Tank Pressure Sensor (S1 CAN)	P0452	Detects if the fuel tank pressure sensor voltage is lower than a calibrated threshold for a calibrated period of time	Fuel tank pressure sensor voltage	<	0.3516	V	(Engine start is finished	=	TRUE	-	2	sec	continuous	2 Trips
			same as				means:							
			Fuel tank pressure	>	1.63	kPa	(							
							Engine speed	>	200	rpm				
							)							
							OR							
							Engine speed	=	0	rpm				
							OR							
							Engine state is in auto stop mode	=	TRUE	-				
							)							
							ECU is in pre-drive state	=	FALSE	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
							No pending or confirmed DTCs	=	See sheet inhibit tables	-				
							Basic enable conditions met	=	See sheet enable tables	-				
	P0451	Absolute value of Pressure difference for check of tank pressure sensor for drift is greater than the threshold for a calibrated period of time	Absolute value of Pressure difference for check of tank pressure sensor for drift	>	0.813	kPa	Tank pressure sensor for start check for drift is fulfilled, which is the following conditions for time	>=	3	sec	7	sec	continuous	2 Trips
							(							
							Canister vent valve (CVV) commanded open	=	TRUE	-				
							(							
							EVAP purge flow	<=	0.000541667	g/sec				
							(	<	93.22560597	mph				
							Vehicle speed							
							(							
							Vehicle speed	>	0	mph				
							Purge mass for tank pressure sensor ((a/36)+b)	>=	0.3	g				
							where a - EVAP purge flow							
							where b - Integrated CPV - mass flow for tank pressure sensor							
							)							
							for time	>=	30	sec				
							)							
							OR							
							(	=	TRUE	-				
							ECU control for ECU switch off delay is available							
							(							
							Condition refueling is recognized	=	FALSE	-				
							(	>	0.119995	kPa				
							(							
							Filtered tank pressure							
							Band pass filtered tank pressure signal for refueling or cap opening detection	>	0.030029	kPa				
							)							
							OR							
							Absolute band pass filtered tank pressure signal for refueling or cap opening detection	>	0.040039	kPa				
							)							
							(	=	FALSE	-				
							Condition refueling is detected							
							(	=	FALSE	-				
							Condition refueling possible							
							OR							
							Difference between unfiltered fuel volume and stopped fuel level	<=	16	l				
							)							
							)							
							OR							
							(	=	FALSE	-				
							Condition refueling bit valid							
							(	=	TRUE	-				
							Condition refueling possible							
							OR							
							Refuel indication is active	=	TRUE	-				
							Difference between unfiltered fuel volume and stopped fuel level	>	16	l				
							)							
							)							
							)							
							for time	>	300	sec				
							)							
							(							
							Ambient pressure	>=	70	kPa				
							(	=	FALSE	-				
							Condition maximum fuel level for diagnostic function							
							(							
							fuel level	<	64	l				
							)							

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Condition minimum fuel level for diagnostic function (	= FALSE -		
					fuel level	< 7.7 l		
					)))			
					Fuel level	< 63 l		
					(Ambient air temperature	<= 35.26 deg C		
					Ambient air temperature)	>= -7.04 deg C		
					Reference value for check of tank pressure sensor for drift stored in this driving cycle	= TRUE -		
					(Engine not stopped after first start	> 5 sec		
					Ambient air temperature sensor model is error free	= TRUE -		
					Temperature difference for cold start detection for check of tank pressure sensor for drift))	<= 9.86 deg C		
					)			
					No pending or confirmed DTCs	= See sheet inhibit tables -		
					Basic enable conditions met	= See sheet enable tables -		
		Absolute value of tank pressure filtered for offset-diagnosis tank pressure sensor is greater than calibrated threshold	Absolute fuel tank pressure filtered for offset-diagnosis tank pressure sensor	> 1 kPa	Tank pressure sensor start check for offset is fulfilled, which is the following conditions for time	>= 3.2 sec	continuous	2 Trips
					(Ambient pressure for offset diagnosis is fulfilled	= TRUE -		
					(Ambient air temperature	<= 35.26 deg C		
					Ambient air temperature)	>= -7.04 deg C		
					(Ambient pressure	>= 70 kPa		
					(Condition maximum fuel level for diagnostic function (	= FALSE -		
					fuel level)	< 64 l		
					Condition minimum fuel level for diagnostic function (	= FALSE -		
					fuel level)))	< 7.7 l		
					Vehicle speed conditions are fulfilled for offset diagnosis	= TRUE -		
					(Absolute vehicle acceleration for offset-diagnosis of tank pressure sensor	<= 1.997 m/s^2		
					(Vehicle speed	<= 80.77825 mph		
					Vehicle speed))	>= 3.107520199 mph		
					Tank pressure is stable for offset diagnosis	= TRUE -		
					Fuel tank ventilation adaption factor	<= 5 -		
					(Integrated mass flow for release of offset check tank pressure sensor	>= 34.987 g		
					Engine not stopped after first start) (	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(Condition refueling is detected	= FALSE -		
					(Condition refueling possible	= FALSE -		
					OR			
					Difference between unfiltered fuel volume and stopped fuel level	<= 16 l		
					)			
					)			
					OR			
					(Condition refueling bit valid	= FALSE -		
					(Condition refueling possible	= TRUE -		
					OR			
					Refuel indication is active	= TRUE -		
					Difference between unfiltered fuel volume and stopped fuel level	> 16 l		
					)			
					)			
					Internal error flag CCV error	= FALSE -		
					(Difference between filtered tank pressure for offset diagnosis and filtered tank pressure due to no mass flow	>= 0 -		
					)			
					)			
					)			
					CPV plausibility check is successful	= TRUE -		
					(			
					(			
					(Absolute vehicle acceleration for offset-diagnosis tank pressure sensor	<= 1.997 m/s^2		
					Canister vent valve (CVV) commanded open	= TRUE -		
					Low manifold ambient pressure	<= 0.703125		
					Internal error flag CCV error	= FALSE -		
					)			
					for time	>= 2.5 sec		
					)			
					Timer for calculation of reference tank pressure	>= 3 sec		
					(Counter CPV-plausibility-checks	< 5 -		
					(CPV active for plausibility check	= FALSE -		
					Pressure from open CPV	= TRUE -		
					max. deviation 1. reference value to 2. reference value tank pressure	<= 0.050049 kPa		
					minimum change for pressure because of CPV open and close	>= 0.050049 kPa		
					)			
					)			
					)			
					No pending or confirmed DTCs	= See sheet inhibit tables -		
					Basic enable conditions met	= See sheet enable tables -		
		Difference between Max and Min purge mass flow for incremental check of tank pressure sensor greater than a calibrated threshold	Difference between Max and Min purge mass flow for incremental check of tank pressure sensor and Difference between Max and Min fuel tank pressure during incremental check of tank pressure sensor	>= 0.416666667 g/sec < 0 kPa	Condition start increment check of tank pressure sensor	= TRUE -	continuous	2 Trips
					(			
					Vehicle speed	>= 0 mph		
					(Ambient air temperature	<= 49.96 deg C		
					Ambient air temperature	>= -7.04 deg C		
					)			
					(			
					Ambient pressure	>= 70 kPa		
					(Condition maximum fuel level for diagnostic function	= FALSE -		
					(			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Fuel level	< 64 l		
					)			
					Condition minimum fuel level for diagnostic function	= FALSE -		
					(			
					Fuel level	< 7.7 l		
					)			
					)			
					EVAP purge flow	> 0 -		
					Manifold ambient pressure	<= 0.804688 kPa		
					(	<= 1.300049 kPa		
					Measured tank pressure			
					Measured tank pressure	>= -1.199951 kPa		
					)			
					No pending or confirmed DTCs	= See sheet inhibit tables -		
					Basic enable conditions met	= See sheet enable tables -		
	P0454	Tank pressure difference in tank leak diagnosis greater than a calibrated threshold for a calibrated period of time	Tank pressure difference in tank leak diagnosis	>= 1 kPa	(	= TRUE -		
					Canister vent valve (CVV) commanded open		20 sec continuous	2 Trips
					for time	>= 4 sec		
					)			
					Vehicle idle speed control condition	= TRUE -		
					(			
					(	>= 0		
					Engine speed deviation			
					OR			
					Vehicle is in idle condition which is the following conditions for time	>= 0.5 sec		
					(			
					(			
					Difference between propulsion torque of cruise control and driver torque propulsion after step limitation	< 0.5 Nm		
					OR			
					Coordinated status of acceleration request	= FALSE -		
					)			
					Difference between minimum wheel torque with internal combustion engine firing and driver torque value after limitation	>= 0 Nm		
					)			
					)			
					Overrun fuel cutoff is released	= FALSE -		
					)			
					(	<= 49.96 deg C		
					Ambient air temperature			
					Ambient air temperature	>= -7.04 deg C		
					)			
					Vehicle speed	<= 3.107520199 mph		
					No pending or confirmed DTCs	= See sheet inhibit tables -		
					Basic enable conditions met	= See sheet enable tables -		
Fuel Tank Pressure Sensor (S1 CAN)	U18A2	Detects when the time since the last message from the Fuel Pump Driver Control Module for the frame FTZM_Information_1_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Fuel Pump Driver Control Module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON	= TRUE -	1 sec continuous	2 Trips
				-	Basic enable conditions met	= see sheet enable tables -		
		Detects when the time since the last message from the Fuel Pump Driver Control Module for the frame FTZM_Information_11_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Fuel Pump Driver Control Module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON	= TRUE -	1 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
		Detects when the time since the last message from the Fuel Pump Driver Control Module for the frame FTZM_Information_2_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Fuel Pump Driver Control Module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON	= TRUE -	1 sec continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Basic enable conditions met	= see sheet enable tables -		
		Detects when the time since the last message from the Fuel Pump Driver Control Module for the frame FTZM_Information_3_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Fuel Pump Driver Control Module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON	= TRUE -	1 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
		Detects when the time since the last message from the Fuel Pump Driver Control Module for the frame FTZM_Information_4_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Fuel Pump Driver Control Module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON	= TRUE -	1 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
		Detects when the time since the last message from the Fuel Pump Driver Control Module for the frame FTZM_Information_5_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Fuel Pump Driver Control Module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON	= TRUE -	1 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
		Detects when the time since the last message from the Fuel Pump Driver Control Module for the frame FTZM_Information_7_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Fuel Pump Driver Control Module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON	= TRUE -	1 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
		Detects when the time since the last message from the Fuel Pump Driver Control Module for the frame FTZM_Information_8_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Fuel Pump Driver Control Module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON	= TRUE -	1 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
		Detects when the time since the last message from the Fuel Pump Driver Control Module for the frame FTZM_Information_9_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Fuel Pump Driver Control Module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON	= TRUE -	1 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
Fuel Level Sensor 1 (S1 CAN)	P0463	Detects Fuel Level Sensor of primary tank Signal range check - High	Raw voltage value from the fuel level sensor of primary tank	> 2.801 V	Ignition is ON	= TRUE -	2 sec continuous	1 Trip
			Same as:		No pending or confirmed DTCs	= See sheet inhibit tables -		
			Primary tank fuel level value	> 95.1 %	Basic enable conditions met	= see sheet enable tables -		
	P0462	Detects Fuel Level Sensor of primary tank Signal range check - Low	Raw voltage value from the fuel level sensor of primary tank	< 0.475 V	Ignition is ON	= TRUE -	2 sec continuous	1 Trip
			Same as:		No pending or confirmed DTCs	= See sheet inhibit tables -		
			Primary tank fuel level value	< 8.38 %	Basic enable conditions met	= see sheet enable tables -		
	P0461	Detects Fuel Level Primary Sender (sensor 1) Performance - sensor stuck	(Consumed fuel volume during test of primary sender	>= 9 l	Engine state: engine running	= TRUE -	continuous	1 Trip
			AND		for time	0.2 sec		
			Delta between maximum and minimum sensed fuel level from primary sender during test)	< 3 l	Current fuel level zone is 3 or 4 as given by			
					Fuel level in primary tank	< 33.4 l		
			OR					
			Distance traveled while in fuel level zone 2	>= 290000 m	Current fuel level zone is 2, as given by			
					Fuel level in primary tank	>= 33.4 l		
					Fuel level in secondary tank	<= 3.5 l		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No pending or confirmed DTCs	= See sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P1434	Detects difference between period or pulse width of commanded and reference fuel levels	Absolute difference between the Reference Voltage Pulse Width Command value and Sensed Fuel Level Sensor Reference Voltage Pulse Width vale	> 0.025 sec	Ignition is ON	= TRUE -	40 events continuous	2 Trips
			OR		No alive rolling count (ARC) or checksum fault is pending for the serial data message that communicates the sensed fuel level sensor reference voltage period and pulse width values	= TRUE -		
			Absolute difference between the Reference Voltage Period Command value and the Sensed Fuel Level Sensor Reference Voltage Period value	> 0.025 sec	Measured fuel level sensor reference voltage period OR pulse are available	= TRUE -		
					Basic enable conditions met	= see sheet enable tables -		
Fuel Level Sensor 2 (S1 CAN)	P2068	Detects Fuel Level Sensor of secondary tank Signal range check - High	Raw voltage value from the fuel level sensor of secondary tank	> 2.801 V	Ignition is ON	= TRUE -	2 sec continuous	1 Trip
			Same as:		No pending or confirmed DTCs	= See sheet inhibit tables -		
			Primary tank fuel level value	> 95.1 %	Basic enable conditions met	= see sheet enable tables -		
	P2067	Detects Fuel Level Sensor of secondary tank Signal range check - Low	Raw voltage value from the fuel level sensor of secondary tank	< 0.475 V	Ignition is ON	= TRUE -	2 sec continuous	1 Trip
			Same as:		No pending or confirmed DTCs	= See sheet inhibit tables -		
			Primary tank fuel level value	< 8.38 %	Basic enable conditions met	= see sheet enable tables -		
	P2066	Detects Fuel Level Secondary Sender (sensor 2) Performance - sensor stuck	Consumed fuel volume during test of secondary sender	>= 9 l	Engine state: engine running	= TRUE -	continuous	1 Trip
			AND		for time	0.2 sec		
			Delta between maximum and minimum sensed fuel level from secondary sender during test	< 3 l	Current fuel level zone is 1 or 3 as given by			
					Fuel level in secondary tank	>= 3.5 l		
			OR					
			Distance traveled while in fuel level zone 2	>= 290000 m	Current fuel level zone is 2, as given by			
					Fuel level in primary tank	>= 33.4 l		
					Fuel level in secondary tank	<= 3.5 l		
					No pending or confirmed DTCs	= See sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P143E	Detects difference between period or pulse width of commanded and reference fuel levels	Absolute difference between the Reference Voltage Pulse Width Command value and Sensed Fuel Level Sensor Reference Voltage Pulse Width vale	> 0.001 sec	Ignition is ON	= TRUE -	40 events continuous	2 Trips
			OR		No alive rolling count (ARC) or checksum fault is pending for the serial data message that communicates the sensed fuel level sensor reference voltage period and pulse width values	= TRUE -		
			Absolute difference between the Reference Voltage Period Command value and the Sensed Fuel Level Sensor Reference Voltage Period value	> 0.025 sec	Measured fuel level sensor reference voltage period OR pulse are available	= TRUE -		
					Basic enable conditions met	= see sheet enable tables -		
Fuel Pressure Sensor	P018D	Detects Fuel Pressure Sensor Signal range check - High	Average raw voltage value of low pressure fuel pressure sensor	> 4.75 V	Ignition ON	= TRUE -	1 sec continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Same as: Low fuel pressure value	> 843 kPa	Basic enable conditions met	= see sheet enable tables -		
	P018C	Detects Fuel Pressure Sensor Signal range check - Low	Average raw voltage value of low pressure fuel pressure sensor Same as: Low pressure fuel value	< 0.25 V < 7.05 kPa	Ignition ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	2 Trips
Fuel Pressure Sensor	P018B	Filtered governor low pressure output of fuel system is greater than calibrated threshold for calibrated period of time	Filtered governor low pressure output of fuel system	> 250 kPa	Electrical fuel pump operational mode is in closed loop control (Fuel flow demand of electrical fuel pump Engine is running state Pre-Supply pump is ON) No pending or confirmed DTCs Basic enable conditions met	= TRUE - >= 0.1 l/h = TRUE - = TRUE - = see sheet inhibit tables - = see sheet enable tables -	15 sec continuous	2 Trips
	P018B	Filtered governor low pressure output of fuel system is lesser than calibrated threshold for calibrated period of time	Filtered governor low pressure output of fuel system	< -250 kPa	Electrical fuel pump operational mode is in closed loop control (Fuel flow demand of electrical fuel pump Engine is running state Pre-Supply pump is ON) No pending or confirmed DTCs Basic enable conditions met	= TRUE - >= 0.1 l/h = TRUE - = TRUE - = see sheet inhibit tables - = see sheet enable tables -	15 sec continuous	2 Trips
	P018B	Low pressure fuel system controller deviation is greater than a calibrated threshold for a calibrated period of time	Raw fuel pressure deviation in the low pressure fuel system for time when the above condition is true then Difference of raw low pressure governor maximum set point and minimum set point for a time	> 20 kPa >= 10 sec < 4 kPa >= 14 sec	Fuel pressure sensor signal is valid means (sensor raw voltage sensor raw voltage) Engine run time Electrical fuel pump operational mode is in closed loop control Fuel flow demand of electrical fuel pump Fuel flow demand of electrical fuel pump Fuel level No pending or confirmed DTCs Basic enable conditions met	= TRUE - < 4.75 V > 0.25 V >= 15 sec = TRUE - >= 1.0 l/h <= 100 l/h >= 2 l = see sheet inhibit tables = see sheet enable tables	0.1 sec contiuous	2 Trips
Camshaft Position Sensor - Intake B1	P0343	Camshaft sensor signal circuit high - Detects no signal error - high level at the inlet camshaft sensor at bank 1 by monitoring camshaft revolutions when there is no new edges detected and the signal level during transition to no signal state is high	Crankshaft signals Camshaft signal level when there is a transition to no signal state	>= 8 revs = permanently high -	Ignition ON Crankshaft signal with gap is detected Back rotating engine is not detected No pending or confirmed DTCs Basic enable conditions met	= TRUE - = TRUE - = TRUE - = See sheet inhibit tables - = See sheet enable tables -	continuous	2 Trips
	P0342	Camshaft sensor signal circuit low - Detects no signal error - low level at the inlet camshaft sensor at bank 1 by monitoring camshaft revolutions when there is no new edges detected and the signal level during transition to no signal state is low	Crankshaft signals Camshaft signal level when there is a transition to no signal state	>= 8 revs = permanently low -	Ignition ON Crankshaft signal with gap is detected Back rotating engine is not detected No pending or confirmed DTCs Basic enable conditions met	= TRUE - = TRUE - = TRUE - = See sheet inhibit tables - = See sheet enable tables -	continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
Camshaft Position Sensor - Intake B1	P0341	Camshaft sensor signal rationality check - Detection of implausible crankshaft sensor operation by detecting incorrect camshaft sensor signal patterns - inlet camshaft sensor bank 1	(Length of the acquired camshaft segment is wrong	=	TRUE	-	Ignition ON	=	TRUE	-	continuous	2 Trips
			OR No matching of camshaft signal table and reference table found because of disturbances	=	TRUE	-	Crankshaft signal with gap is detected	=	TRUE	-		
							Back rotating engine is not detected	=	TRUE	-		
			OR				No pending or confirmed DTCs	=	See sheet inhibit tables	-		
			Sequence of entries in the signal table does not match with the reference table	=	TRUE	-	Basic enable conditions met	=	See sheet enable tables	-		
			OR Number of erroneous edge positions has exceeded the maximum tolerance)	=	TRUE	-						
			AND Defect counter	>=	20	revs						
Camshaft Position Sensor - Intake B2	P0348	Camshaft sensor signal circuit high - Detects no signal error - high level at the inlet camshaft sensor at bank 2 by monitoring camshaft revolutions when there is no new edges detected and the signal level during transition to no signal state is high	Crankshaft signals	>=	8	revs	Ignition ON	=	TRUE	-	continuous	2 Trips
			Camshaft signal level when there is a transition to no signal state	=	permanently high	-	Crankshaft signal with gap is detected	=	TRUE	-		
							Back rotating engine is not detected	=	TRUE	-		
							No pending or confirmed DTCs	=	See sheet inhibit tables	-		
							Basic enable conditions met	=	See sheet enable tables	-		
	P0347	Camshaft sensor signal circuit low - Detects no signal error - low level at the inlet camshaft sensor at bank 2 by monitoring camshaft revolutions when there is no new edges detected and the signal level during transition to no signal state is low	Crankshaft signals	>=	8	revs	Ignition ON	=	TRUE	-	continuous	2 Trips
			Camshaft signal level when there is a transition to no signal state	=	permanently low	-	Crankshaft signal with gap is detected	=	TRUE	-		
							Back rotating engine is not detected	=	TRUE	-		
							No pending or confirmed DTCs	=	See sheet inhibit tables	-		
							Basic enable conditions met	=	See sheet enable tables	-		
	P0346	Camshaft sensor signal rationality check - Detection of implausible crankshaft sensor operation by detecting incorrect camshaft sensor signal patterns - inlet camshaft sensor bank 2	(Length of the acquired camshaft segment is wrong	=	TRUE	-	Ignition ON	=	TRUE	-	continuous	2 Trips
			OR No matching of camshaft signal table and reference table found because of disturbances	=	TRUE	-	Crankshaft signal with gap is detected	=	TRUE	-		
							Back rotating engine is not detected	=	TRUE	-		
			OR				No pending or confirmed DTCs	=	See sheet inhibit tables	-		
			Sequence of entries in the signal table does not match with the reference table	=	TRUE	-	Basic enable conditions met	=	See sheet enable tables	-		
			OR Number of erroneous edge positions has exceeded the maximum tolerance)	=	TRUE	-						
			AND Defect counter	>=	20	revs						
Camshaft Position Sensor - Exhaust B1	P0368	Camshaft sensor signal circuit high - Detects no signal error - high level at the outlet camshaft sensor at bank 1 by monitoring camshaft revolutions when there is no new edges detected and the signal level during transition to no signal state is high	Crankshaft signals	>=	8	revs	Ignition ON	=	TRUE	-	continuous	2 Trips
			Camshaft signal level when there is a transition to no signal state	=	permanently high	-	Crankshaft signal with gap is detected	=	TRUE	-		
							Back rotating engine is not detected	=	TRUE	-		
							No pending or confirmed DTCs	=	See sheet inhibit tables	-		
							Basic enable conditions met	=	See sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	P0367	Camshaft sensor signal circuit low - Detects no signal error - low level at the outlet camshaft sensor at bank 1 by monitoring camshaft revolutions when there is no new edges detected and the signal level during transition to no signal state is low	Crankshaft signals	>= 8 revs	Ignition ON	= TRUE -	continuous	2 Trips
			Camshaft signal level when there is a transition to no signal state	= 0 -	Crankshaft signal with gap is detected	= TRUE -		
					Back rotating engine is not detected	= TRUE -		
					No pending or confirmed DTCs	= See sheet inhibit tables -		
					Basic enable conditions met	= See sheet enable tables -		
	P0366	Camshaft sensor signal rationality check - Detection of implausible crankshaft sensor operation by detecting incorrect camshaft sensor signal patterns - outlet camshaft sensor bank 1	(Length of the acquired camshaft segment is wrong	= TRUE -	Ignition ON	= TRUE -	continuous	2 Trips
			OR		Crankshaft signal with gap is detected	= TRUE -		
			No matching of camshaft signal table and reference table found because of disturbances	= TRUE -	Back rotating engine is not detected	= TRUE -		
			OR		No pending or confirmed DTCs	= See sheet inhibit tables -		
			Sequence of entries in the signal table does not match with the reference table	= TRUE -	Basic enable conditions met	= See sheet enable tables -		
			OR					
			Number of erroneous edge positions has exceeded the maximum tolerance	= TRUE -				
			)					
			AND					
			Counter for signal disturbance error after pattern matching	>= 20 revs				
Camshaft Position Sensor - Exhaust B2	P0393	Camshaft sensor signal circuit high - Detects no signal error - high level at the outlet camshaft sensor at bank 2 by monitoring camshaft revolutions when there is no new edges detected and the signal level during transition to no signal state is high	Crankshaft signals	>= 8 revs	Ignition ON	= TRUE -	continuous	2 Trips
			Camshaft signal level when there is a transition to no signal state	= permanently high -	Crankshaft signal with gap is detected	= TRUE -		
					Back rotating engine is not detected	= TRUE -		
					No pending or confirmed DTCs	= See sheet inhibit tables -		
					Basic enable conditions met	= See sheet enable tables -		
	P0392	Camshaft sensor signal circuit low - Detects no signal error - low level at the outlet camshaft sensor at bank 2 by monitoring camshaft revolutions when there is no new edges detected and the signal level during transition to no signal state is low	Crankshaft signals	>= 8 revs	Ignition ON	= TRUE -	continuous	2 Trips
			Camshaft signal level when there is a transition to no signal state	= permanently low -	Crankshaft signal with gap is detected	= TRUE -		
					Back rotating engine is not detected	= TRUE -		
					No pending or confirmed DTCs	= See sheet inhibit tables -		
					Basic enable conditions met	= See sheet enable tables -		
	P0391	Camshaft sensor signal rationality check - Detection of implausible crankshaft sensor operation by detecting incorrect camshaft sensor signal patterns - outlet camshaft sensor bank 2	(Length of the acquired camshaft segment is wrong	= TRUE -	Ignition ON	= TRUE -	continuous	2 Trips
			OR		Crankshaft signal with gap is detected	= TRUE -		
			No matching of camshaft signal table and reference table found because of disturbances	= TRUE -	Back rotating engine is not detected	= TRUE -		
			OR		No pending or confirmed DTCs	= See sheet inhibit tables -		
			Sequence of entries in the signal table does not match with the reference table	= TRUE -	Basic enable conditions met	= See sheet enable tables -		
			OR					
			Number of erroneous edge positions has exceeded the maximum tolerance	= TRUE -				
			)					
			AND					
			Defect counter	>= 20 revs				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position Sensor	P0335	Crankshaft signal rationality check - monitoring of crankshaft missing signal against camshaft signal	Crankshaft signal is not available	= TRUE -	Engine speed based on camshaft is above the lower plausible limit	= FALSE -	3 camshaft revolutions continuous	1 Second
					Engine speed based on camshaft is below the higher plausible limit	= FALSE -		
					Engine speed based on camshaft is below maximum engine speed	= FALSE -		
					Camshaft signal is valid	= TRUE -		
					(			
					(			
					(			
					Vehicle speed	< 0.62150404 mph		
					Vehicle speed	> 15.53760099 mph		
					)			
					OR			
					(			
					Engine speed	> 550 rpm		
					)			
					)			
					(			
					(			
					Engine speed	> 550 rpm		
					Synchronization check is completed	= TRUE -		
					)			
					OR			
					(			
					Engine speed	= 0 rpm		
					OR			
					Engine is ready and waiting for engine speed	= TRUE -		
					)			
					)			
					)			
					OR			
					Starter is active and starter signal is available	=		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
Crankshaft Position Sensor	P0336	**Path 1:** Crankshaft signal rationality check - detection of implausible crankshaft sensor operation by detecting incorrect crank sensor signal patterns.	Gap found in crankshaft signal	= FALSE -	(		20 events continuous	1 Second
			Crankshaft signal disturbance is found	= TRUE -	(			
			Engine is in backup crankshaft mode	= TRUE -	(			
					Vehicle speed	> 0.62150404 mph		
					Vehicle speed	< 15.53760099 mph		
					)			
					OR			
					(			
					Engine speed	> 550 rpm		
					)			
					)			
					(			
					(			
					Engine speed	> 550 rpm		
					Synchronization check is completed	= TRUE -		
					)			
					OR			
					(			
					Engine speed	= 0 rpm		
					OR			
					Engine is ready and waiting for engine speed	= TRUE -		
					)			
					)			
					)			
					OR			
					Starter is active and starter signal is available	=		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
		Path 2: Crankshaft signal rationality check - Range check of DGI pulse width	Error detected in the range of pulse width from DGI sensor	= TRUE -	Ignition is ON	= TRUE -	10 events	1 Second
					Basic enable conditions met	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
	P034A	Wrong engine stop position detected. After camshaft/crankshaft synchronization a too large of angle difference was detected at the following crankshaft gap.	Absolute value of difference between angle set by engine stop position detection and angle at crankshaft gap	>=	20.0	degrees	Ignition is ON	=	TRUE	-	10	events	continuous	2 Trips
			Absolute value of difference between angle set by engine stop position detection and angle at crankshaft gap	<=	360 - A	degrees	Basic enable conditions met	=	see sheet enable tables	-				
			where A is threshold for angle of re-synchronization after start by engine stop position for the error entry of DGI	=	20.0	degrees								
	P034B	Crankshaft signal rationality check - Detection of reverse rotation	Engine is rotating in reverse direction	=	TRUE	-	Engine speed based on a camshaft-revolution	>	2000	rpm	10	events	continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
Crankshaft to Intanke Camshaft Correlation - B1	P0016	Rationality check: Crankshaft position - intake camshaft position allocation Bank 1	(Average of angular offset between camshaft and crankshaft	>	4.5044	degrees	Number of camshaft revolutions	>=	10		2	camshaft revs		2 Trips
			OR Average of angular offset between camshaft and crankshaft)	<	-14.502	degrees	Back rotating engine	=	FALSE	-				
							NOTE: Pulse length indicates the direction of rotation: 45µs forward rotating shaft, 90µs backward rotating shaft							
							Four crankshaft revolutions are complete without any error on crankshaft or camshaft signal and no sync lost	=	TRUE	-				
							Monitoring is calibrated as active	=	TRUE	-				
							No signal loss failure or signal disturbance is stored for the camshaft in question	=	TRUE	-				
							Intake camshaft: Edge adaptation request	=	TRUE	-				
Crankshaft to Intake Camshaft Correlation - B2	P0018	Rationality check: Crankshaft position - intake camshaft position allocation Bank 2	(Average of angular offset between camshaft and crankshaft	>	4.5044	degrees	Number of camshaft revolutions	>=	10		2	camshaft revs		2 Trips
			OR Average of angular offset between camshaft and crankshaft)	<	-14.502	degrees	Back rotating engine	=	FALSE	-				
							NOTE: Pulse length indicates the direction of rotation: 45µs forward rotating shaft, 90µs backward rotating shaft							
							Four crankshaft revolutions are complete without any error on crankshaft or camshaft signal and no sync lost	=	TRUE	-				
							Monitoring is calibrated as active	=	TRUE	-				
							No signal loss failure or signal disturbance is stored for the camshaft in question	=	TRUE	-				
							Intake camshaft: Edge adaptation request	=	TRUE	-				
Crankshaft to Exhaust Camshaft Correlation - B1	P0017	Rationality check: Crankshaft position - exhaust camshaft position allocation Bank 1	(Average of angular offset between camshaft and crankshaft	>	4.5044	degrees	Number of camshaft revolutions	>=	10		2	camshaft revs		2 Trips
			OR Average of angular offset between camshaft and crankshaft)	<	-14.502	degrees	Back rotating engine	=	FALSE	-				
							NOTE: Pulse length indicates the direction of rotation: 45µs forward rotating shaft, 90µs backward rotating shaft							
							Four crankshaft revolutions are complete without any error on crankshaft or camshaft signal and no sync lost	=	TRUE	-				
							Monitoring is calibrated as active	=	TRUE	-				
							No signal loss failure or signal disturbance is stored for the camshaft in question	=	TRUE	-				
							Exhaust camshaft: Edge adaptation request	=	TRUE	-				
Crankshaft to Exhaust Camshaft Correlation - B2	P0019	Rationality check: Crankshaft position - exhaust camshaft position allocation Bank 2	(Average of angular offset between camshaft and crankshaft	>	4.5044	degrees	Number of camshaft revolutions	>=	10		2	camshaft revs		2 Trips
			OR Average of angular offset between camshaft and crankshaft)	<	-14.502	degrees	Back rotating engine	=	FALSE	-				
							NOTE: Pulse length indicates the direction of rotation: 45µs forward rotating shaft, 90µs backward rotating shaft							

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Four crankshaft revolutions are complete without any error on crankshaft or camshaft signal and no sync lost Monitoring is calibrated as active No signal loss failure or signal disturbance is stored for the camshaft in question Exhaust camshaft: Edge adaptation request	= TRUE - = TRUE - = TRUE - = TRUE -		
Hood Switch Position Sensor	P257F	Diagnosis of Engine Hood Switch Sensor for Out of Range Check - High	Percentage of Reference voltage of Engine Hood Switch Sensor	> 67.8397 %	Ignition is on No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	1 sec Continuous	2 Trips
	P257E	Diagnosis of Engine Hood Switch Sensor for Out of Range Check - Low	Percentage of Reference voltage of Engine Hood Switch Sensor	< 17.2043 %	Ignition is on No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	1 sec Continuous	2 Trips
Hood Switch Position Sensor	P257D	Detects if percentage of reference voltage of Engine Hood Switch Sensor is in between the ranges for closed and open Hood positions.	Percentage of Reference voltage of Engine Hood Switch Sensor Percentage of Reference voltage of Engine Hood Switch Sensor	> 43.4018 % < 45.7478 %	Ignition is on No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	1 sec Continuous	2 Trips
Ignition Coil Supply Voltage Feedback - B1	P135A	Diagnoses Ignition Coil External Fuse open circuit Bank 1	Voltage at ignition coil side of fuse	= 0 V	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	40 events continuous	1 Trip
Ignition Coil Supply Voltage Feedback - B2	P135B	Diagnoses Ignition Coil External Fuse open circuit Bank 2	Voltage at ignition coil side of fuse	= 0 V	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	40 events continuous	1 Trip
Knock Sensor 1 B1	P0328	Knock sensor 1 short circuit to battery	Filtered knock sensor output short circuit to battery diagnosis	> 4.7 V = 0.5	Engine speed	> 500 rpm	3 events	
	P0327	Knock sensor 1 short circuit to ground	Filtered knock sensor output short circuit to ground diagnosis	< 0.2 V = 0.5	Engine speed	> 500 rpm	3 events	
	P0325	Knock sensor 1 open circuit	Integration result for open load detection open load diagnosis	> 25000 0.5	Knock sensor PWM duty cycle applied Engine speed Engine speed Engine load Engine load SCG & SCB diagnostic enabled	> 50 % > 500 rpm < 5000 rpm > 0 % < 1535.977 % = TRUE -	3 events	
	P0326	Knock sensor 1 reference signal rationality check	Normalized reference level of knock control (see Look-Up-Table #P0326-1)	> 0.525 to 1.35 V*ms	Engine coolant temperature at engine start	> 49.96 deg C	multiple	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required		MIL Illum.
			Debounce counter for knock sensor diagnosis	>	30	Counts	Knock control active	=	TRUE	-			
							(						
							(Relative charge of air in the cylinder	>=	40.008	%			
							OR						
							(						
							Engine load dynamic for knock detection active (*)	=	FALSE	-			
							maintained active for time	>=	0.4	sec			
							)						
							)						
							Engine Speed	>	520	rpm			
							Engine start is finished (*)	=	TRUE	-			
							for						
							number of combustions to deactivate knock control after start end	>	20	Counts			
							Fuel Cut off	=	FALSE	-			
							)						
							GDI mode stratified is active	=	FALSE	-			
							)						
							for time	>	0	sec			
							)						
							Enable knock sensor diagnosis	=	TRUE	-			
							(						
							Knock control synchronization error at phase error	=	FALSE	-			
							OR						
							State of EPM operation mode should not have valid crankshaft signal present	=	FALSE	-			
							)						
							Engine load dynamic for knock detection active	=	FALSE	-			
							(						
							Intake manifold pressure (see Look-Up Table #P0326-2)	>=	10 to 24	kPa			
							Delay for dynamic detection	=	20	-			
							Engine in idle condition (*))	=	FALSE	-			
							maintained active for time	>=	0.8	sec			
							Engine speed dynamic for knock detection active	=	FALSE	-			
							(						
							Engine speed gradient averaged during one working cycle	>=	1000	rpm/s			
							for time	>	0.25	sec			
							)						
							Engine Speed	>	500	rpm			
							No pending or confirmed DTCs	=	see sheet inhibit tables	-			
							Basic enable conditions met	=	see sheet enable tables	-			
Knock Sensor 2 B1	P032D	Knock sensor 3 short circuit to battery	Filtered knock sensor output	>	4.7	V	Engine speed	>	500	rpm	3	events	
			short circuit to battery diagnosis	=	0.5								
	P032C	Knock sensor 3 short circuit to ground	Filtered knock sensor output	<	0.2	V	Engine speed	>	500	rpm	3	events	
			short circuit to ground diagnosis	=	0.5								
	P032A	Knock sensor 3 open circuit	Integration result for open load detection	>	25000		Knock sensor PWM duty cycle applied	>	50	%	3	events	
			open load diagnosis	=	0.5		Engine speed	>	500	rpm			
							Engine speed	<	5000	rpm			
							Engine load	>	0	%			
							Engine load	<	1535.977	%			
							SCG & SCB diagnostic enabled	=	TRUE	-			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required		MIL Illum.
	P032B	Knock sensor 3 reference signal rationality check	Normalized reference level of knock control (see Look-Up-Table #P0326-1)	>	0.525 to 1.35	V*ms	Engine coolant temperature at engine start	>	49.96	deg C		multiple	2 Trips
			Debounce counter for knock sensor diagnosis	>	30	Counts	Knock control active	=	TRUE	-			
							(						
							(						
							(						
							(	>=	40.008	%			
							Relative charge of air in the cylinder						
							OR						
							(						
							Engine load dynamic for knock detection active (*)	=	FALSE	-			
							maintained active for time	>=	0.4	sec			
							)						
							)						
							Engine Speed	>	520	rpm			
							Engine start is finished (*)	=	TRUE	-			
							for						
							number of combustions to deactivate knock control after start end	>	20	Counts			
							Fuel Cut off	=	FALSE	-			
							)						
							GDI mode stratified is active	=	FALSE	-			
							)						
							for time	>	0	sec			
							)						
							Enable knock sensor diagnosis	=	TRUE	-			
							(						
							Knock control synchronization error at phase error	=	FALSE	-			
							OR						
							State of EPM operation mode should not have valid crankshaft signal present	=	FALSE	-			
							)						
							Engine load dynamic for knock detection active	=	FALSE	-			
							(						
							Intake manifold pressure (see Look-Up Table #P0326-2)	>=	10 to 24	kPa			
							Delay for dynamic detection	=	20	-			
							Engine in idle condition (*)	=	FALSE	-			
							)						
							maintained active for time	>=	0.8	sec			
							Engine speed dynamic for knock detection active	=	FALSE	-			
							(						
							Engine speed gradient averaged during one working cycle	>=	1000	rpm/sec			
							for time	>	0.25	sec			
							)						
							Engine Speed	>	500	rpm			
							No pending or confirmed DTCs	=	see sheet inhibit tables	-			
							Basic enable conditions met	=	see sheet enable tables	-			
Knock Sensor 1 B2	P0333	Knock sensor 2 short circuit to battery	Filtered knock sensor output	>	4.7	V	Engine speed	>	500	rpm	3	events	
			short circuit to battery diagnosis	=	0.5								
	P0332	Knock sensor 2 short circuit to ground	Filtered knock sensor output	<	0.2	V	Engine speed	>	500	rpm	3	events	
			short circuit to ground diagnosis	=	0.5								
	P0330	Knock sensor 2 open circuit	Integration result for open load detection	>	25000		Knock sensor PWM duty cycle applied	>	50	%	3	events	
			open load diagnosis	=	0.5		Engine speed	>	500	rpm			
							Engine speed	<	5000	rpm			
							Engine load	>	0	%			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required		MIL Illum.
							Engine load	<	1535.977	%			
							SCG & SCB diagnostic enabled	=	TRUE	-			
	P0331	Knock sensor 2 reference signal rationality check	Normalized reference level of knock control (see Look-Up-Table #P0326-1)	>	0.525 to 1.35	V*ms	Engine coolant temperature at engine start	>	49.96	deg C		multiple	2 Trips
			Debounce counter for knock sensor diagnosis	>	30	Counts	Knock control active	=	TRUE	-			
							(						
							(						
							(						
							(	>=	40.008	%			
							Relative charge of air in the cylinder						
							OR						
							(						
							Engine load dynamic for knock detection active (*)	=	FALSE	-			
							maintained active for time	>=	0.4	sec			
							)						
							)						
							Engine Speed	>	520	rpm			
							Engine start is finished (*)	=	TRUE	-			
							for						
							number of combustions to deactivate knock control after start end	>	20	Counts			
							Fuel Cut off	=	FALSE	-			
							)						
							GDI mode stratified is active	=	FALSE	-			
							)						
							for time	>	0	sec			
							)						
							Enable knock sensor diagnosis	=	TRUE	-			
							(						
							Knock control synchronization error at phase error	=	FALSE	-			
							OR						
							State of EPM operation mode should not have valid crankshaft signal present	=	FALSE	-			
							)						
							Engine load dynamic for knock detection active	=	FALSE	-			
							(						
							Intake manifold pressure (see Look-Up Table #P0326-2)	>=	10 to 24	kPa			
							Delay for dynamic detection	=	20	-			
							Engine in idle condition (*))	=	FALSE	-			
							maintained active for time	>=	0.8	sec			
							Engine speed dynamic for knock detection active	=	FALSE	-			
							(						
							Engine speed gradient averaged during one working cycle	>=	1000	rpm/s			
							for time	>	0.25	sec			
							)						
							Engine Speed	>	500	rpm			
							No pending or confirmed DTCs	=	see sheet inhibit tables	-			
							Basic enable conditions met	=	see sheet enable tables	-			
Knock Sensor 2 B2	P033D	Knock sensor 3 short circuit to battery	Filtered knock sensor output	>	4.7	V	Engine speed	>	500	rpm	3	events	
			short circuit to battery diagnosis	=	0.5								
	P033C	Knock sensor 3 short circuit to ground	Filtered knock sensor output	<	0.2	V	Engine speed	>	500	rpm	3	events	
			short circuit to ground diagnosis	=	0.5								
	P033A	Knock sensor 3 open circuit	Integration result for open load detection	>	25000		Knock sensor PWM duty cycle applied	>	50	%	3	events	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			open load diagnosis	=	0.5		Engine speed	>	500	rpm		
							Engine speed	<	5000	rpm		
							Engine load	>	0	%		
							Engine load	<	1535.977	%		
							SCG & SCB diagnostic enabled	=	TRUE	-		
	P033B	Knock sensor 4 reference signal rationality check	Normalized reference level of knock control (see Look-Up-Table #P0326-1)	>	0.525 to 1.35	V*ms	Engine coolant temperature at engine start	>	49.96	deg C	multiple	2 Trips
			Debounce counter for knock sensor diagnosis	>	30	Counts	Knock control active	=	TRUE	-		
							((((Relative charge of air in the cylinder	>=	40.008	%		
							OR (Engine load dynamic for knock detection active (*)	=	FALSE	-		
							maintained active for time	>=	0.4	sec		
							)) Engine Speed	>	520	rpm		
							Engine start is finished (*)	=	TRUE	-		
							for number of combustions to deactivate knock control after start end	>	20	Counts		
							Fuel Cut off	=	FALSE	-		
							) GDI mode stratified is active	=	FALSE	-		
							) for time	>	0	sec		
							) Enable knock sensor diagnosis	=	TRUE	-		
							(Knock control synchronization error at phase error	=	FALSE	-		
							OR State of EPM operation mode should not have valid crankshaft signal present	=	FALSE	-		
							) Engine load dynamic for knock detection active	=	FALSE	-		
							(Intake manifold pressure (see Look-Up Table #P0326-2)	>=	10 to 24	kPa		
							Delay for dynamic detection	=	20	-		
							Engine in idle condition (*)	=	FALSE	-		
							) maintained active for time	>=	0.8	sec		
							Engine speed dynamic for knock detection active	=	FALSE	-		
							(Engine speed gradient averaged during one working cycle	>=	1000	rpm/sec		
							for time	>	0.25	sec		
							) Engine Speed	>	500	rpm		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
							Basic enable conditions met	=	see sheet enable tables	-		
Diagnosis knock detection signal evaluation	P06B6	**Path 1:** Monitoring of the number of measurement values	Absolute difference of estimated and measured sampled signals in the measuring window	>	30	counts	**General release conditions for knock sensor line diagnostics:** Knock sensor diagnosis is active				continuous	2 Trips
			for number of counts (signal evaluation errors (combustion) within obersavtion period)	>	48	counts	Engine coolant temperature at engine start	>	49.96	deg C		
			Observation period	=	800	combustion strokes	Knock control active					
							((Relative charge of air in the cylinder	>=	40.008	%		
							OR (Additional load dynamics retard exceeded: Intake manifold pressure (see Look-Up Table #P0326-2)	>=	10 to 24	kPa		
							Delay for dynamic detection	=	0.02	sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Idle speed from driver sight	=	FALSE	-		
							)					
							for a time	<=	0.4	sec		
							)					
							Engine Speed	>	520	rpm		
							End of engine start is reached	=	TRUE	-		
							for a number of combustions to deactivate knock control after start end	>=	20	Counts		
							Fuel Cut off	=	FALSE	-		
							GDI mode stratified is active	=	FALSE	-		
							)					
							for time	>	0	sec		
							Enable knock sensor diagnosis:					
							Knock control synchronisation error at phase error	=	FALSE	-		
							No valid crankshaft signal present (backup using camshaft signal)	=	FALSE	-		
							No load dynamics for knock detection active:					
							(					
							Intake manifold pressure (see Look-Up Table #P0326-2)	<	10 to 24	kPa		
							Delay for dynamic detection	=	0.02	sec		
							Idle speed from driver sight	=	TRUE	-		
							)					
							for time	>	0.8	sec		
							No speed dynamics for knock detection active:					
							Absolute value of engine speed gradient during one working cycle	<	1000	1/min/s		
							Engine speed	>=	500	rpm		
							Signal evaluation combustion released, which is the following conditions:					
							Absolute value of engine speed gradient calculated over current crankshaft segment	<	1000	rpm/s		
							Estimated number of measuring values in the measuring window	<=	200	counts		
							Synchronisation based on engine shut off position or full synchro information	=	TRUE	-		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
							Basic enabling conditions are met	=	see sheet enable tables	-		
		Path 2: Monitoring of position and length of the measurement window	Number of signal evaluation errors (position and length of the measuring window) within obersavtion period	>	2	counts	**General release conditions for knock sensor line diagnostics:**					
							Knock sensor diagnosis is active					
			Observation period	=	3	sec	Engine coolant temperature at engine start	>	49.96	deg C		
							Knock control active					
							(					
							(					
							Relative charge of air in the cylinder	>=	40.008	%		
							OR					
							(					
							Additional load dynamics retard exceeded:					
							Intake manifold pressure (see Look-Up Table #P0326-2)	>=	10 to 24	kPa		
							Delay for dynamic detection	=	0.02	sec		
							Idle speed from driver sight	=	FALSE	-		
							)					
							for a time	<=	0.4	sec		
							)					
							Engine Speed	>	520	rpm		
							End of engine start is reached	=	TRUE	-		
							for a number of combustions to deactivate knock control after start end	>=	20	Counts		
							Fuel Cut off	=	FALSE	-		
							GDI mode stratified is active	=	FALSE	-		
							)					
							for time	>	0	sec		
							Enable knock sensor diagnosis:					
							Knock control synchronisation error at phase error	=	FALSE	-		
							No valid crankshaft signal present (backup using camshaft signal)	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No load dynamics for knock detection active:			
					(			
					Intake manifold pressure (see Look-Up Table #P0326-2)	< 10 to 24 kPa		
					Delay for dynamic detection	= 0.02 sec		
					Idle speed from driver sight	= TRUE -		
					)			
					for time	> 0.8 sec		
					No speed dynamics for knock detection active:			
					Absolute value of engine speed gradient during one working cycle	< 1000 1/min/s		
					Engine speed	>= 500 rpm		
					Signal evaluation measuring window released, which is the following conditions:			
					ECU Sub-State in DRIVE (*)	= TRUE -		
					Engine speed	> 1000 rpm		
					and			
					Synchronisation completed	= TRUE -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		
FTZM Module System Voltage	P129C	Monitoring of fuel pump driver control module system for voltage high fault	Fuel Tank Zone Module(FTZM) sensed battery voltage	> 16.02 V	Ignition ON	= TRUE -	5 sec Continuous	2 Trips
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		
	P129B	Monitoring of fuel pump driver control module system for voltage low fault	Fuel Tank Zone Module(FTZM) sensed battery voltage	< 10.02 V	Ignition ON	= TRUE -	5 sec Continuous	2 Trips
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		
	P1002	Monitoring of fuel pump driver control module system voltage for its performance fault	Absolute difference between battery voltage and Fuel Tank Zone Module(FTZM) sensed battery voltage	> 3 V	Ignition ON	= TRUE -	5 sec Continuous	2 Trips
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		
FTZM Internal Performance	P1005	Monitoring of FTZM fuel pump driver contol module for too many unexpected resets	Fuel Pump driver contol module too many resets is detected	= TRUE -	Ignition ON	= TRUE -	0.5 sec Continuous	2 Trips
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		
	P1255	Monitoring of FTZM fuel pump output for over temperature fault	Fuel Tank Zone Module(FTZM) over temperature is detected	= TRUE -	Ignition ON	= TRUE -	0.5 sec Continuous	2 Trips
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		
	P102C	Monitoring of FTZM fuel pump output for phase to phase short circuit fault	Fuel Tank Zone Module(FTZM) fuel pump output is shorted between phase to phase	= TRUE -	Ignition ON	= TRUE -	0.5 sec Continuous	2 Trips
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
FTZM gnition On/Start Switch Circuit	P1007	Monitoring of the FTZM Run/Crank signal for a stuck high condition	FTZM detects that the run/crank signal is stuck high (e.g. 12V)	=	TRUE	-	Ignition ON	=	FALSE	-	40	counts	Continuous	2 Trips
							ECM and CAN bus awake for transmission (meaning CAN awaken by BCM or ECM)	=	TRUE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enabling conditions are met	=	see sheet enable tables	-				
	P129D	Monitoring of the FTZM Run/Crank signal for a stuck high condition	FTZM detects that the run/crank signal is stuck low (e.g. 0V)	=	TRUE	-	Ignition ON	=	TRUE	-	40	counts	Continuous	2 Trips
							ECM and CAN bus awake for transmission (meaning CAN awaken by BCM or ECM)	=	TRUE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enabling conditions are met	=	see sheet enable tables	-				
Injection Valve Flyback Voltage - Cyl. 1	P02EE	Plausibility check of injector ADC signal buffer	(				Ignition is ON	=	TRUE	-	20	events	continuous	2 Trips
			ADC buffer signal from beginning of Controlled Valve Operation signal evaluation	<=	15000	-	No pending or confirmed DTCs	=	see sheet inhibit tables	-				
			OR				Basic enable conditions met	=	see sheet enable tables	-				
			ADC buffer signal from end of Controlled Valve Operation signal evaluation	>=	5000	-								
			)											
Injection Valve Flyback Voltage - Cyl. 1	P02EF	Plausibility check of injector ADC signal buffer	(				Ignition is ON	=	TRUE	-	20	events	continuous	2 Trips
			ADC buffer signal from beginning of Controlled Valve Operation signal evaluation	<=	15000	-	No pending or confirmed DTCs	=	see sheet inhibit tables	-				
			OR				Basic enable conditions met	=	see sheet enable tables	-				
			ADC buffer signal from end of Controlled Valve Operation signal evaluation	>=	5000	-								
			)											
Injection Valve Flyback Voltage - Cyl. 1	P02F0	Plausibility check of injector ADC signal buffer	(				Ignition is ON	=	TRUE	-	20	events	continuous	2 Trips
			ADC buffer signal from beginning of Controlled Valve Operation signal evaluation	<=	15000	-	No pending or confirmed DTCs	=	see sheet inhibit tables	-				
			OR				Basic enable conditions met	=	see sheet enable tables	-				
			ADC buffer signal from end of Controlled Valve Operation signal evaluation	>=	5000	-								
			)											
Injection Valve Flyback Voltage - Cyl. 1	P02F1	Plausibility check of injector ADC signal buffer	(				Ignition is ON	=	TRUE	-	20	events	continuous	2 Trips
			ADC buffer signal from beginning of Controlled Valve Operation signal evaluation	<=	15000	-	No pending or confirmed DTCs	=	see sheet inhibit tables	-				
			OR				Basic enable conditions met	=	see sheet enable tables	-				
			ADC buffer signal from end of Controlled Valve Operation signal evaluation	>=	5000	-								
			)											
Injection Valve Flyback Voltage - Cyl. 1	P02F2	Plausibility check of injector ADC signal buffer	(				Ignition is ON	=	TRUE	-	20	events	continuous	2 Trips
			ADC buffer signal from beginning of Controlled Valve Operation signal evaluation	<=	15000	-	No pending or confirmed DTCs	=	see sheet inhibit tables	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR ADC buffer signal from end of Controlled Valve Operation signal evaluation)	 >= 5000 -	Basic enable conditions met	= see sheet enable tables -		
Injection Valve Flyback Voltage - Cyl. 1	P02F3	Plausibility check of injector ADC signal buffer	(ADC buffer signal from beginning of Controlled Valve Operation signal evaluation OR ADC buffer signal from end of Controlled Valve Operation signal evaluation)	 <= 15000 - >= 5000 -	Ignition is ON No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	20 events continuous	2 Trips
Injection Valve Flyback Voltage - Cyl. 1	P02F4	Plausibility check of injector ADC signal buffer	(ADC buffer signal from beginning of Controlled Valve Operation signal evaluation OR ADC buffer signal from end of Controlled Valve Operation signal evaluation)	 <= 15000 - >= 5000 -	Ignition is ON No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	20 events continuous	2 Trips
Injection Valve Flyback Voltage - Cyl. 1	P02F5	Plausibility check of injector ADC signal buffer	(ADC buffer signal from beginning of Controlled Valve Operation signal evaluation OR ADC buffer signal from end of Controlled Valve Operation signal evaluation)	 <= 15000 - >= 5000 -	Ignition is ON No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	20 events continuous	2 Trips
Engine Oil Temperature Sensor	P0198	Diagnosis of engine oil temperature sensor circuit - High	Raw voltage of the oil temperature sensor Fail mV corresponds with oil temperature	> 4.973 V > -46.4 deg C	Ignition is ON	= TRUE -	2 sec continuous	2 Trips
	P0197	Diagnosis of engine oil temperature sensor circuit - Low	Raw voltage of the oil temperature sensor Fail mV corresponds with oil temperature	< 0.334 V < 150 deg C	Ignition is ON	= TRUE -	2 sec continuous	2 Trips
	P0196	Plausibility check of engine oil temperature sensor during cold start - High	Difference between the provided temperature sensors' mean reference value and the measured oil temperature sensor value	> 14.96 deg C	Ignition is on for time Engine running (Engine is synchronized for time) [Engine off time (Engine off timer is state 1 exact time OR Engine off timer is state 2 minimum off time)] for time (Block heater is activated Diagnosis is inhibited by other temperature sensor errors) for time No pending or confirmed DTCs Basic enable conditions met	= TRUE - >= 1 sec = TRUE - = TRUE - = 1 sec >= 28800 sec = TRUE - = TRUE - >= 3 sec = FALSE - = FALSE - >= 0 sec = see sheet inhibit tables - = see sheet enable tables -	Once per driving cycle	2 Trip

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
		Plausibility check of engine oil temperature sensor during cold start - Low	Difference between the measured oil temperature sensor value and the provided temperature sensors' mean reference value	>	14.96	deg C	Ignition is on for time Engine running (Engine is synchronized for time) [Engine off time (Engine off timer is state 1 exact time OR Engine off timer is state 2 minimum off time)] for time (Block heater is activated Diagnosis is inhibited by other temperature sensor errors) for time No pending or confirmed DTCs Basic enable conditions met	= >= = = = >= = = >= = = >= = =	TRUE 1 TRUE TRUE 1 28800 TRUE TRUE 3 FALSE FALSE 0 see sheet inhibit tables see sheet enable tables	- sec - - sec sec - - sec - - sec - -			Once per driving cycle	2 Trip
		Detects if the difference between measured oil temperature at main gallery and modelled oil temperature at oil gallery is greater than a calibrated threshold for a calibrated amount of time	Difference of measured oil temperature at the main gallery and modelled oil temperature value at oil gallery	>	26.96	deg C	Engine is running Blockheater is detected Oil temperature model value at oil gallery Engine speed for time No pending or confirmed DTC's Basic enable conditions met	= = >= >= >= = =	TRUE FALSE -48.04 0 3 see sheet inhibit tables see sheet enable tables	- - deg C rpm sec - -	10	sec	continuous	2 Trips
		Detects if the difference between modelled oil temperature at oil gallery and measured oil temperature at main gallery is greater than a calibrated threshold for a calibrated amount of time	Difference of modelled oil temperature value at oil gallery and measured oil temperature at main gallery	>	29.96	deg C	Engine is running Blockheater is detected Oil temperature model value at oil gallery Engine speed for time No pending or confirmed DTC's Basic enable conditions met	= = >= >= >= = =	TRUE FALSE -48.04 0 3 see sheet inhibit tables see sheet enable tables	- - deg C rpm sec - -	10	sec	continuous	2 Trips
	P0199	Diagnosis of Oil Temperature Sensor circuit - Loose connection check	Absolute difference between raw voltage and filtered raw voltage of oil temperature sensor at the main gallery Raw voltage oil temperature sensor filter rate	>= =	0.45 2.0	V sec	Ignition is ON Engine Oil Temperature Sensor "A" Circuit Low Engine Oil Temperature Sensor "A" Circuit High Basic enable conditions met	= = = =	TRUE FALSE FALSE see sheet enable tables	- - - -	20	sec	continuous	2 Trips
Engine Oil Pressure Sensor	P0523	Monitoring of Engine Oil Pressure Sensor for Signal range check - High	Engine oil pressure sensor voltage Same as: Engine Oil Pressure	> >	4.5 0 to 1049.8	V kPa	Ignition is ON No pending or confirmed DTCs Basic enable conditions met	= = =	TRUE see sheet inhibit tables see sheet enable tables	-	1	sec		2 Trips
	P0522	Monitoring of Engine Oil Pressure Sensor for Signal range check - Low/Open	Engine oil pressure sensor voltage Same as: Engine Oil Pressure	< <	0.25 0 to 1049.8	V kPa	Ignition is ON No pending or confirmed DTCs Basic enable conditions met	= = =	TRUE see sheet inhibit tables see sheet enable tables	- - -	1	sec		2 Trips
	P0521	Error: oil pressure sensor is not plausible	**Fail Case #1 Engine Running:** Relative Oil Pressure	 >	 500	 kPa	**Fail Case #1 Engine Running Enable Conditions:** Engine speed Oil temperature in the oil sump The high-side switch must be the Closed oil pressure control	 < > =	 770 54.96 TRUE	 rpm deg C -	3	sec		2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Status CrCtl request exceeds driver's request Status of forward drive request by driver request No active faults associated with the oil pressure sensor (P0522 & P0523)	<= 0 <= 0 = TRUE -		
			OR Relative Oil Pressure	< 50 kPa	Engine speed Time after engine start No active faults associated with the oil pressure sensor (P0522 & P0523) and the camshaft sensor (P0321 & P0322) Basic enable conditions met	> 1520 rpm > 4.96 sec = TRUE - = see sheet enable tables -		
			Fail Case #2 After Run: Absolute value of the Relative Oil Pressure	> 80 kPa	**Fail Case #2 Engine Off Enable Conditions:** (Current system / ECU substate is in POSTDRIVE Time since the status SYC_POSTDRIVE was reached) Oil temperature in the oil sump No active faults associated with the oil pressure sensor (P0522 & P0523) Basic enable conditions met	= TRUE - > 10 sec > 54.96 deg C = TRUE - = see sheet enable tables -	3 sec	2 Trips
			Fail Case #3 Before Engine Start: Absolute value of the Relative Oil Pressure	> 80 kPa	**Fail Case #3 Engine Off Enable Conditions:** Engine off time Engine speed Oil temperature in the oil sump Motor status is cranking No active faults associated with the oil pressure sensor (P0522 & P0523) Basic enable conditions met	> 10 sec = 0 rpm > 54.96 deg C = TRUE - = TRUE - = see sheet enable tables -	3 sec	2 Trips
Throttle / Accelerator Pedal - Signal 1	P2123	Circuit continuity - circuit high	Accelerator pedal position sensor 1 voltage	>= 4.775 V	Ignition is ON No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	0.2 sec Continuous	1 Trip
	P2122	Circuit continuity - circuit low	Accelerator pedal position sensor 1 voltage	<= 0.28 V	Ignition is ON No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	0.2 sec Continuous	1 Trip
	P2138	Synchronization check	Absolute difference between accelerator pedal position sensor 1 voltage (a) and sensor 2 voltage (b) (see Look-Up-Table #P2138-1) where (a) Maximum Value between accelerator pedal position sensor 1 voltage divided by (d) and (c) (b) Maximum value between accelerator pedal position sensor 2 voltage and (c) (c) Minimum voltage to enable synchronization check (d) Factor between sensor values	> 0.12 to 0.18 V = Max(sensor 1 raw voltage/d,c) V = Max(sensor 2 raw voltage,c) V = 0.424 V = 2 factor	Ignition is ON No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	0.25 sec Continuous	2 Trips
Throttle / Accelerator Pedal - Signal 2	P2128	Circuit continuity - circuit high	Accelerator pedal position sensor 2 voltage	>= 4.775 V	Ignition is ON No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	0.2 sec Continuous	1 Trip
	P2127	Circuit continuity - circuit low	Accelerator pedal position sensor 2 voltage	<= 0.28 V	Ignition is ON No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	0.2 sec Continuous	1 Trip

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
Throttle Position Sensor - Sensor 1 B1	P0123	Diagnosis of Throttle Position Sensor1 Bank1 for Signal Range Check-High	Raw voltage value of Throttle Position Sensor1 Bank1	>	4.805	V	ECU is in DRIVE state	=	TRUE	-	0.14	sec	continuous	1 Trip
							OR							
							ECU is in POSTDRIVE state	=	TRUE	-				
							Request safety fuel cut off SKA bank 1, following condition:	=	FALSE	-				
							(							
							Request reversible safety fuel cut off SKA bank 1, which has following condition:	=	FALSE	-				
							(							
							(							
							Battery voltage for throttle valve operation	=	TRUE	-				
							OR							
							Engine speed	>	1000	rpm				
							)							
							Limp home position not reached bank 1	=	FALSE	-				
							)							
							Irreversible safety fuel cut off SKA bank 1	=	FALSE	-				
							)							
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P0122	Diagnosis of Throttle Position Sensor1 Bank1 for Signal Range Check-Low	Raw voltage value of Throttle Position Sensor1 Bank1	<	0.195	V	ECU is in DRIVE state	=	TRUE	-	0.14	sec	continuous	1 Trip
							OR							
							ECU is in POSTDRIVE state	=	TRUE	-				
							Request safety fuel cut off SKA bank 1, following condition:	=	FALSE	-				
							(							
							Request reversible safety fuel cut off SKA bank 1, which has following condition:	=	FALSE	-				
							(							
							(							
							Battery voltage for throttle valve operation sufficient bank 1	=	TRUE	-				
							OR							
							Engine speed	>	1000	rpm				
							)							
							Limp home position not reached bank 1	=	FALSE	-				
							)							
							Irreversible safety fuel cut off SKA bank 1	=	FALSE	-				
							)							
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P0121	Synchronization check for Throttle Position Sensor1 Bank1 - rationality check against modelled air charge value	(				(	=	TRUE	-			continuous	1 Trip
							ECU is in DRIVE state							
		Deviation of relative actual angle from Throttle Position Sensors	(	>	5 to 6.25	%	OR							
			Absolute difference between relative actual angle calculated based on voltages from sensor 1 and sensor 2 (see Look-Up-Table #P0121-1)											
			)											
			for time	>=	0.14	sec	ECU is in POSTDRIVE state	=	TRUE	-				
							)							
			(	>	9.0234	%	Request safety fuel cut off SKA bank 1, following condition:	=	FALSE	-				
			Absolute difference between relative actual angle calculated based on voltage from sensor 1 and relative air charge signal				(							
			)											
			for time	>=	0.28	sec	(							
			)				Request reversible safety fuel cut off SKA bank 1, which has following condition:	=	FALSE	-				
			OR				(							
			(				Battery voltage for throttle valve operation sufficient bank 1	=	TRUE	-				
		Deviation of relative actual angle from Throttle Position Sensors wrt relative air charge signal	(	>	0	%	OR							
			Absolute difference between relative actual angle calculated based on voltage from sensor 1 and sensor 2 and relative air charge signal											
			)											
			for time	>=	0.36	sec	Engine speed	>	1000	rpm				
			)				)							
			OR				Limp home position not reached bank 1	=	FALSE	-				
		Error in the main charge sensor	Main charge sensor error, following conditions:	=	TRUE	-	)							
			(				Irreversible safety fuel cut off SKA bank 1	=	FALSE	-				
			Condition for error of main filling sensor	=	TRUE	-	)							

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(		Flag for throttle angle calculated from main charge sensor is unthrottled, following condition:	= FALSE -		
			Validity of the pressure sensor of the intake manifold bank 1	= FALSE -	(			
			Condition for HFM error (without debounce)	= TRUE -	Difference between throttle angle calculated from unthrottled mass flow of main charging sensor and throttle valve angle at which the 95 charge is through minimum tolerance for bank1	< 0 %		
			(		)			
			Flag Variant Diagnosis Error bank 1	= TRUE -	No pending or confirmed DTCs	= see sheet inhibit tables -		
			OR		Basic enable conditions met	= see sheet enable tables -		
			Error flag of the signal variation check of the HFM sensor (Bank 2)	= TRUE -				
			OR					
			Flag plausible diagnosis error	= TRUE -				
			OR					
			Flag to display a physical HFM range error bank 1	= TRUE -				
			OR					
			Flag to display a physical HFM range error bank 2	= TRUE -				
			OR					
			(					
			Validity flag of the measured air mass flow sensor signal for bank 1	= TRUE -				
			OR					
			Validity flag of the measured air mass flow sensor signal for bank 2	= TRUE -				
			)					
			Release of the HFM diagnosis of the electrical signal	= TRUE -				
			)					
			)					
			for time	>= 0.14 sec				
			)					
Throttle Position Sensor - Sensor 1 B1	U0606	Diagnosis of Throttle Position Sensor 1 Bank 1 for SENT data - Communication Check	Communication error from the SENT Channel of Throttle Position Sensor 1 Bank 1, following conditions:	= TRUE -	(ECU is in DRIVE state	= TRUE -	0.12 sec continuous	1 Trip
			(		OR			
			No signal on the line	= TRUE -	ECU is in POSTDRIVE state	= TRUE -		
					)			
			OR		Request safety fuel cut off SKA bank 1, following condition:	= FALSE -		
			Pulse length of SENT message is out of range	= TRUE -	(			
					(			
			OR		Request reversible safety fuel cut off SKA bank 1, which has following condition:	= FALSE -		
			Calibration pulse of SENT message is out of range	= TRUE -	(			
			)		Battery voltage for throttle valve operation sufficient bank 1	= TRUE -		
					OR			
					Engine speed	> 1000 rpm		
					)			
					Limp home position not reached bank 1	= FALSE -		
					)			
					Irreversible safety fuel cut off SKA bank 1	= FALSE -		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	U136C	Invalid data from SENT device	No valid data from the SENT Channel of Throttle Position Sensor 1 Bank 1, following conditions:	= TRUE -	(ECU is in DRIVE state	= TRUE -	0.12 sec continuous	1 Trip
			(		OR			
			Error in the monitoring status of SENT driver Bank 1	= TRUE -	ECU is in POSTDRIVE state	= TRUE -		
			)		)			
					Request safety fuel cut off SKA bank 1, following condition:	= FALSE -		
					(			
					(			
					Request reversible safety fuel cut off SKA bank 1, which has following condition:	= FALSE -		
					(			
					Battery voltage for throttle valve operation sufficient bank 1	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR			
					Engine speed	> 1000 rpm		
					)			
					Limp home position not reached bank 1	= FALSE -		
					)			
					Irreversible safety fuel cut off SKA bank 1	= FALSE -		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
Throttle Position Sensor - Sensor 2 B1	P0223	Diagnosis of Throttle Position Sensor2 Bank1 for Signal Range Check-High	Raw voltage value of Throttle Position Sensor2 Bank1	> 4.805 V	ECU is in DRIVE state	= TRUE -	0.14 sec continuous	1 Trip
					OR			
					ECU is in POSTDRIVE state	= TRUE -		
					Request safety fuel cut off SKA bank 1, following condition:	= FALSE -		
					(			
					Request reversible safety fuel cut off SKA bank 1, which has following condition:	= FALSE -		
					(			
					(			
					Battery voltage for throttle valve operation sufficient bank 1	= TRUE -		
					OR			
					Engine speed	> 1000 rpm		
					)			
					Limp home position not reached bank 1	= FALSE -		
					)			
					Irreversible safety fuel cut off SKA bank 1	= FALSE -		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P0222	Diagnosis of Throttle Position Sensor2 Bank1 for Signal Range Check-Low	Raw voltage value of Throttle Position Sensor2 Bank1	< 0.195 V	ECU is in DRIVE state	= TRUE -	0.14 sec continuous	1 Trip
					OR			
					ECU is in POSTDRIVE state	= TRUE -		
					Request safety fuel cut off SKA bank 1, following condition:	= FALSE -		
					(			
					Request reversible safety fuel cut off SKA bank 1, which has following condition:	= FALSE -		
					(			
					(			
					Battery voltage for throttle valve operation sufficient bank 1	= TRUE -		
					OR			
					Engine speed	> 1000 rpm		
					)			
					Limp home position not reached bank 1	= FALSE -		
					)			
					Irreversible safety fuel cut off SKA bank 1	= FALSE -		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P0221	Synchronization check for Throttle Position Sensor2 Bank1 - rationality check against modelled air charge value Deviation of relative actual angle from Throttle Position Sensors	(		(			
					ECU is in DRIVE state	= TRUE -	continuous	1 Trip
			(		OR			
			Absolute difference between relative actual angle calculated based on voltage from sensor 1 and relative actual angle calculated based on voltage from sensor 2 (see Look-Up-Table #P0121-1)	> 5 to 6.25 %				
			Absolute difference between relative actual throttle angle calculated based on voltage from sensor 2 and throttle angle calculated from the main charge sensor (intake manifold pressure sensor	> 9.0234 %	ECU is in POSTDRIVE state	= TRUE -		
			)		)			
			for time	>= 0.28 sec	Request safety fuel cut off SKA bank 1, following condition:	= FALSE -		
					(			
			)		(			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
			OR				Request reversible safety fuel cut off SKA bank 1, which has following condition:	=	FALSE	-				
		Deviation of relative actual angle from Throttle Position Sensors wrt relative air charge signal	Absolute difference between relative actual angle calculated based on voltage from sensor 1 and sensor 2 and relative air charge signal	<	0	%	(							
			for time	>=	0.36	sec	Battery voltage for throttle valve operation sufficient bank 1	=	TRUE	-				
			OR				OR							
		Error in the main charge sensor	Main charge sensor error, following conditions:	=	TRUE	-	Engine speed	>	1000	rpm				
			(				)							
			Condition for error of main filling sensor	=	TRUE	-	Limp home position not reached bank 1	=	FALSE	-				
			(				)							
			Validity of the pressure sensor of the intake manifold bank 1	=	FALSE	-	Irreversible safety fuel cut off SKA bank 1	=	FALSE	-				
			Condition for HFM error (without debounce)	=	TRUE	-	)							
			(				Flag for throttle angle calculated from main charge sensor is unthrottled, following condition:	=	FALSE	-				
			Flag Variant Diagnosis Error bank 1	=	TRUE	-	(							
			OR				Difference between throttle angle calculated from unthrottled mass flow of main charging sensor and throttle valve angle at which the 95 charge is through minimum tolerance for bank1	<	0	%				
			Error flag of the signal variation check of the HFM sensor (Bank 2)	=	TRUE	-	)							
			OR				No pending or confirmed DTCs	=	see sheet inhibit tables	-				
			Flag plausible diagnosis error	=	TRUE	-	Basic enable conditions met	=	see sheet enable tables	-				
			OR											
			Flag to display a physical HFM range error bank 1	=	TRUE	-								
			OR											
			Flag to display a physical HFM range error bank 2	=	TRUE	-								
			OR											
			(											
			Validity flag of the measured air mass flow sensor signal for bank 1	=	TRUE	-								
			OR											
			Validity flag of the measured air mass flow sensor signal for bank 2	=	TRUE	-								
			)											
			Release of the HFM diagnosis of the electrical signal	=	TRUE	-								
			)											
			)											
			for time	>=	0.14	sec								
			)											
Throttle Position Sensor - Sensor 2 B1	U0607	Diagnosis of Throttle Position Sensor 2 Bank 1 for SENT data - Communication Check	Communication error from the SENT Channel of Throttle Position Sensor 2 Bank 1, following conditions:	=	TRUE	-	(ECU is in DRIVE state	=	TRUE	-	0.12	sec	continuous	1 Trip
			(				OR							
			No signal on the line	=	TRUE	-	ECU is in POSTDRIVE state	=	TRUE	-				
							)							
			OR				Request safety fuel cut off SKA bank 1, following condition:	=	FALSE	-				
			Pulse length of SENT message is out of range	=	TRUE	-	(							
							(							
			OR				Request reversible safety fuel cut off SKA bank 1, which has following condition:	=	FALSE	-				
			Calibration pulse of SENT message is out of range	=	TRUE	-	(							
			)				Battery voltage for throttle valve operation sufficient bank 1	=	TRUE	-				
							OR							
							Engine speed	>	1000	rpm				
							)							
							Limp home position not reached bank 1	=	FALSE	-				
							)							
							Irreversible safety fuel cut off SKA bank 1	=	FALSE	-				
							)							
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	U136C	Invalid data from SENT device	No valid data from the SENT Channel of Throttle Position Sensor 2 Bank 1, following conditions:	=	TRUE	-	(ECU is in DRIVE state	=	TRUE	-	0.12	sec	continuous	1 Trip
			(				OR							

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Error in the monitoring status of SENT driver Bank 1)	= TRUE -	ECU is in POSTDRIVE state) Request safety fuel cut off SKA bank 1, following condition: ((Request reversible safety fuel cut off SKA bank 1, which has following condition: (Battery voltage for throttle valve operation sufficient bank 1 OR Engine speed) Limp home position not reached bank 1) Irreversible safety fuel cut off SKA bank 1) No pending or confirmed DTCs Basic enable conditions met	= TRUE - = FALSE - = FALSE - = TRUE - > 1000 rpm = FALSE - = FALSE - = see sheet inhibit tables - = see sheet enable tables -		
Throttle Position Sensor - Sensor 1 B2	P0228	Diagnosis of Throttle Position Sensor1 Bank2 for Signal Range Check-High	Raw voltage value of Throttle Position Sensor1 Bank2	> 4.805 V	ECU is in DRIVE state OR ECU is in POSTDRIVE state Request safety fuel cut off SKA bank 2, following condition: (Irreversible safety fuel cut off SKA bank 2 Request reversible safety fuel cut off SKA bank 2, following conditions: ((Battery voltage for throttle valve operation sufficient bank 2 OR Engine speed) Limp home position not reached bank 2)) No pending or confirmed DTCs Basic enable conditions met	= TRUE - = TRUE - = FALSE - = FALSE - = FALSE - = TRUE - > 1000 rpm = FALSE - = see sheet inhibit tables - = see sheet enable tables -	0.14 sec continuous	1 Trip
	P0227	Diagnosis of Throttle Position Sensor1 Bank2 for Signal Range Check-Low	Raw voltage value of Throttle Position Sensor1 Bank2	< 0.195 V	ECU is in DRIVE state OR ECU is in POSTDRIVE state Request safety fuel cut off SKA bank 2, following condition: (Irreversible safety fuel cut off SKA bank 2 Request reversible safety fuel cut off SKA bank 2, following conditions: ((Battery voltage for throttle valve operation sufficient bank 2 OR Engine speed) Limp home position not reached bank 2)) No pending or confirmed DTCs Basic enable conditions met	= TRUE - = TRUE - = FALSE - = FALSE - = FALSE - = TRUE - > 1000 rpm = FALSE - = see sheet inhibit tables - = see sheet enable tables -	0.14 sec continuous	1 Trip
	P0226	Synchronization check for Throttle Position Sensor1 Bank2 - rationality check against modelled air charge value Deviation of relative actual angle from Throttle Position Sensors	(Absolute difference between relative actual angle calculated based on voltages from sensor 1 and sensor 2 (see Look-Up-Table #P0226-1) for time	> 5 to 6.25 % >= 0.14 sec	(ECU is in DRIVE state OR ECU is in POSTDRIVE state)	= TRUE - = TRUE -	continuous	1 Trip

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
			Absolute difference between relative actual angle calculated based on voltage from sensor 1 and relative air charge signal	>	9.0234	%	Request safety fuel cut off SKA bank 2, following condition:	=	FALSE	-				
			for time	>=	0.28	sec	(							
			)				Irreversible safety fuel cut off SKA bank 2 and	=	FALSE	-				
			OR											
			(				Request reversible safety fuel cut off SKA bank 2, following conditions:	=	FALSE	-				
		Deviation of relative actual angle from Throttle Position Sensors wrt relative air charge signal	Absolute difference between relative actual angle calculated based on voltage from sensor 1 and sensor 2 and relative air charge signal	>	0	%	(							
			for time	>=	0.36	sec	(							
			)				Battery voltage for throttle valve operation sufficient bank 2	=	TRUE	-				
			OR				)							
		Error in the main charge sensor	Error main charge sensor, following conditions:	=	TRUE	-	Limp home position not reached bank 2	=	FALSE	-				
			(				Flag for throttle angle calculated from main charge sensor is unthrottled, following condition:	=	FALSE	-				
			Condition for error of main filling sensor	=	TRUE	-	(							
			(				Difference between throttle angle calculated from unthrottled mass flow of main charging sensor and throttle valve angle at which the 95 charge is through minimum tolerance for bank1	<	0	%				
			Validity of the pressure sensor of the intake manifold bank 1	=	FALSE	-	)							
			Condition for HFM error (without debounce)	=	TRUE	-	)							
			(				)							
			Flag Variant Diagnosis Error bank 1	=	TRUE	-	No pending or confirmed DTCs	=	see sheet inhibit tables	-				
			OR				Basic enable conditions met	=	see sheet enable tables	-				
			Error flag of the signal variation check of the HFM sensor (Bank 2)	=	TRUE	-								
			OR											
			Flag plausible diagnosis error	=	TRUE	-								
			OR											
			Flag to display a physical HFM range error bank 1	=	TRUE	-								
			OR											
			Flag to display a physical HFM range error bank 2	=	TRUE	-								
			OR											
			(											
			Validity flag of the measured air mass flow sensor signal for bank 1	=	TRUE	-								
			OR											
			Validity flag of the measured air mass flow sensor signal for bank 2	=	TRUE	-								
			)											
			Release of the HFM diagnosis of the electrical signal	=	TRUE	-								
			)											
			)											
			for time	>=	0.14	sec								
			)											
Throttle Position Sensor - Sensor 1 B2	U0608	Diagnosis of Throttle Position Sensor 1 Bank 2 for SENT data - Communication Check	Communication error from the SENT Channel of Throttle Position Sensor 1 Bank 2, following conditions:	=	TRUE	-	(ECU is in DRIVE state	=	TRUE	-	0.12	sec	continuous	1 Trip
			(				OR							
			No signal on the line	=	TRUE	-	ECU is in POSTDRIVE state	=	TRUE	-				
							)							
			OR				Request safety fuel cut off SKA bank 2, following condition:	=	FALSE	-				
			Pulse length of SENT message is out of range	=	TRUE	-	(							
							Irreversible safety fuel cut off SKA bank 2	=	FALSE	-				
			OR				Request reversible safety fuel cut off SKA bank 2, following conditions:	=	FALSE	-				
			Calibration pulse of SENT message is out of range	=	TRUE	-	(							
			)				(							
							Battery voltage for throttle valve operation sufficient bank 2	=	TRUE	-				
							)							
							Limp home position not reached bank 2	=	FALSE	-				
							)							
							)							
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
	U136E	Invalid data from SENT device	No valid data from the SENT Channel of Throttle Position Sensor 1 Bank 2, following conditions:				(				0.12	sec	continuous	1 Trip
			(											
				=	TRUE	-	ECU is in DRIVE state	=	TRUE	-				
							OR							
			Error in the monitoring status of SENT driver Bank 2	=	TRUE	-	ECU is in POSTDRIVE state	=	TRUE	-				
			)				)							
							Request safety fuel cut off SKA bank 2, following condition:	=	FALSE	-				
							(							
							Irreversible safety fuel cut off SKA bank 2	=	FALSE	-				
							and							
							Request reversible safety fuel cut off SKA bank 2, following conditions:	=	FALSE	-				
							(							
							(							
							Battery voltage for throttle valve operation sufficient bank 2	=	TRUE	-				
							)							
							Limp home position not reached bank 2	=	FALSE	-				
							)							
							)							
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
Throttle Position Sensor - Sensor 2 B2	P212D	Diagnosis of Throttle Position Sensor2 Bank2 for Signal Range Check-High	Raw voltage value of Throttle Position Sensor2 Bank2	>	4.805	V	ECU is in DRIVE state	=	TRUE	-	0.14	sec	continuous	1 Trip
							OR							
							ECU is in POSTDRIVE state	=	TRUE	-				
							Request safety fuel cut off SKA bank 2, following condition:	=	FALSE	-				
							(							
							Irreversible safety fuel cut off SKA bank 2	=	FALSE	-				
							Request reversible safety fuel cut off SKA bank 2, following conditions:	=	FALSE	-				
							(							
							(							
							Battery voltage for throttle valve operation	=	TRUE	-				
							OR							
							Engine speed	>	1000	rpm				
							)							
							Limp home position not reached bank 2	=	FALSE	-				
							)							
							)							
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P212C	Diagnosis of Throttle Position Sensor2 Bank2 for Signal Range Check-Low	Raw voltage value of Throttle Position Sensor2 Bank2	<	0.195	V	ECU is in DRIVE state	=	TRUE	-	0.14	sec	continuous	1 Trip
							OR							
							ECU is in POSTDRIVE state	=	TRUE	-				
							Request safety fuel cut off SKA bank 2, following condition:	=	FALSE	-				
							(							
							Irreversible safety fuel cut off SKA bank 2	=	FALSE	-				
							Request reversible safety fuel cut off SKA bank 2, following conditions:	=	FALSE	-				
							(							
							(							
							Battery voltage for throttle valve operation sufficient bank 2	=	TRUE	-				
							OR							
							Engine speed	>	1000	rpm				
							)							
							Limp home position not reached bank 2	=	FALSE	-				
							)							
							)							
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P212B	Synchronization check for Throttle Position Sensor2 Bank2 - rationality check against modelled air charge value	(				(						continuous	1 Trip
							ECU is in DRIVE state	=	TRUE	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Deviation of relative actual angle from Throttle Position Sensors	(Absolute difference between relative actual angle calculated based on voltage from sensor 1 and relative actual angle calculated based on voltage from sensor 2 (see Look-Up-Table #P0226-1)	>	5 to 6.25	%	OR					
			Absolute difference between relative actual throttle angle calculated based on voltage from sensor 2 and throttle angle calculated from the main charge sensor (intake manifold pressure sensor	>	9.0234	%	ECU is in POSTDRIVE state	=	TRUE	-		
							)					
			)									
			for time	>=	0.28	sec	Request safety fuel cut off SKA bank 2, following condition:	=	FALSE	-		
			)				(					
			OR				Irreversible safety fuel cut off SKA bank 2	=	FALSE	-		
		Deviation of relative actual angle from Throttle Position Sensors wrt relative air charge signal	Absolute difference between relative actual angle calculated based on voltage from sensor 1 and sensor 2 and relative air charge signal	<	0	%	Request reversible safety fuel cut off SKA bank 2, following conditions:	=	FALSE	-		
			for time	>=	0.36	sec	(					
			OR				(					
		Error in the main charge sensor	Error main charge sensor, following conditions:	=	TRUE	-	Battery voltage for throttle valve operation sufficient bank 2	=	TRUE	-		
			(				)					
			Condition for error of main filling sensor	=	TRUE	-	Limp home position not reached bank 2	=	FALSE	-		
			(				Flag for throttle angle calculated from main charge sensor is unthrottled, following condition:	=	FALSE	-		
			Validity of the pressure sensor of the intake manifold bank 1	=	FALSE	-	(					
			Condition for HFM error (without debounce)	=	TRUE	-	Difference between throttle angle calculated from unthrottled mass flow of main charging sensor and throttle valve angle at which the 95 charge is through minimum tolerance for bank1	<	0	%		
			(				)					
			Flag Variant Diagnosis Error bank 1	=	TRUE	-	)					
			OR				)					
			Error flag of the signal variation check of the HFM sensor (Bank 2)	=	TRUE	-	No pending or confirmed DTCs	=	see sheet inhibit tables	-		
			OR				Basic enable conditions met	=	see sheet enable tables	-		
			Flag plausible diagnosis error	=	TRUE	-						
			OR									
			Flag to display a physical HFM range error bank 1	=	TRUE	-						
			OR									
			Flag to display a physical HFM range error bank 2	=	TRUE	-						
			OR									
			(									
			Validity flag of the measured air mass flow sensor signal for bank 1	=	TRUE	-						
			OR									
			Validity flag of the measured air mass flow sensor signal for bank 2	=	TRUE	-						
			)									
			Release of the HFM diagnosis of the electrical signal	=	TRUE	-						
			)									
			)									
			for time	>=	0.14	sec						
			)									
Throttle Position Sensor - Sensor 2 B2	U0688	Diagnosis of Throttle Position Sensor 2 Bank 2 for SENT data - Communication Check	Communication error from the SENT Channel of Throttle Position Sensor 2 Bank 2, following conditions:	=	TRUE	-	(ECU is in DRIVE state	=	TRUE	-	0.12 sec continuous	1 Trip
			(				OR					
			No signal on the line	=	TRUE	-	ECU is in POSTDRIVE state	=	TRUE	-		
							)					
			OR				Request safety fuel cut off SKA bank 2, following condition:	=	FALSE	-		
			Pulse length of SENT message is out of range	=	TRUE	-	(					
							Irreversible safety fuel cut off SKA bank 2	=	FALSE	-		
			OR				Request reversible safety fuel cut off SKA bank 2, following conditions:	=	FALSE	-		
			Calibration pulse of SENT message is out of range	=	TRUE	-	(					
			)				(					
							Battery voltage for throttle valve operation sufficient bank 2	=	TRUE	-		
							)					
							Limp home position not reached bank 2	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					))			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	U136F	Invalid data from SENT device	No valid data from the SENT Channel of Throttle Position Sensor 2 Bank 2, following conditions: (	= TRUE -	(ECU is in DRIVE state OR	= TRUE -	0.12 sec continuous	1 Trip
			Error in the monitoring status of SENT driver Bank 2)	= TRUE -	ECU is in POSTDRIVE state)	= TRUE -		
					Request safety fuel cut off SKA bank 2, following condition: (	= FALSE -		
					Irreversible safety fuel cut off SKA bank 2 and	= FALSE -		
					Request reversible safety fuel cut off SKA bank 2, following conditions: ((	= FALSE -		
					Battery voltage for throttle valve operation sufficient bank 2)	= TRUE -		
					Limp home position not reached bank 2))	= FALSE -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
Turbocharger Wastegate Feedback Position Sensor - B1	P2AB9	Detects if the turbine bypass valve 1 position sensor raw voltage is greater than maximum mechanical threshold and lesser than range check upper limit	Raw voltage of position sensor	> 4.0726 V	There is no ADC and no sensor supply error	= TRUE -	1.5 sec continuous	2 Trips
			Raw voltage of position sensor	< 5 V	No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P2AB8	Detects if the turbine bypass valve 1 position sensor raw voltage is lesser than minimum mechanical threshold and greater than range check lower limit	Raw voltage of position sensor	> 0 V	There is no ADC and no sensor supply error	= TRUE -	1.5 sec continuous	2 Trips
			Raw voltage of position sensor	< 0.244 V	No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
Turbocharger Wastegate Feedback Position Sensor - B1	P2B81	Monitoring of SENT signal for communication errors	(		No communication error	= TRUE -	0.5 sec continuous	2 Trips
			Raw data value received via SENT interface OR	> 65535 -	No data error No pending or confirmed DTCs	= TRUE - = see sheet inhibit tables -		
			Raw data value received via SENT interface) OR	< 0 -	Basic enable conditions met	= see sheet enable tables -		
			Status and communication nibble for channel 1 validity is set OR	= TRUE -				
			Status and communication nibble for channel 2 validity is set OR	= TRUE -				
			Channel message is lost	= TRUE -				
Turbocharger Wastegate Feedback Position Sensor - B1	U0644	Lost SENT communication	(	-	Ignition is ON	= TRUE -	continuous	2 Trips
			No signal on the line (RBA_SENTIF_ERROR_NOSIG) OR	= TRUE - -	Basic enable conditions met	= see sheet enable tables -		
			Sensor line is at low level (RBA_SENTIF_INFO_LINE_LOW) OR	= TRUE - -				
			Sensor line is at high level (RBA_SENTIF_INFO_LINE_HIGH)	= TRUE -				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
			)			-								
	U1376	Fast SENT channel data validation	(				A valid signal is on the line (RBA SENTIF ERROR NOSIG)	=	TRUE	-			continuous	2 Trips
			SENT Cyclic Redundancy Check (CRC) has detected an error (RBA_SENTIF_ERROR_CRC)	=	TRUE	-	Sensor line is not at low level (RBA_SENTIF_INFO_LINE_LOW)	=	TRUE	-				
			OR				Sensor line is not at high level (RBA SENTIF INFO LINE HIGH)	=	TRUE	-				
			Pulse length is out of permitted range (RBA SENTIF ERROR RANGE)	=	TRUE	-	Basic enable conditions met	=	see sheet enable tables	-				
			OR											
			Short frame: means too few nibbles received than configured (RBA SENTIF ERROR MISSING NIBBLE)	=	TRUE	-								
			OR											
			Long frame: means too many nibbles received than configured (RBA SENTIF ERROR TOOMANY NIBBLES)	=	TRUE	-								
			OR											
			Calibration pulse is out of range (RBA SENTIF ERROR CAL PULSE RANGE)	=	TRUE	-								
			OR											
			Deviation of calibration pulse is greater than 1/64 of the previous length (RBA_SENTIF_ERROR_CAL_SUCCESSIVE_DEVIATION)	=	TRUE	-								
			OR											
			Data counter pattern not detected (RBA SENTIF ERROR FAST DATA CTR)	=	TRUE	-								
			OR											
			The inverted value of the first nibble of the Fast Frame is not equal to the fifth nibble of the Fast Frame (RBA_SENTIF_ERROR_FAST_DATA_INV_MSN0)	=	TRUE	-								
			OR											
			Message lost due to HW (Hardware) overrun / overwritten (RBA SENTIF ERROR HW OVERRUN)	=	TRUE	-								
			)											
Turbocharger Wastegate Feedback Position Sensor - B2	P2ABC	Detects if the turbine bypass valve 2 position sensor raw voltage is greater than maximum mechanical threshold and lesser than range check upper limit	Raw voltage of position sensor	>	4.0726	V	There is no ADC and no sensor supply error	=	TRUE	-	1.5	sec	continuous	2 Trips
			Raw voltage of position sensor	<	5	V	No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P2ABB	Detects if the turbine bypass valve 2 position sensor raw voltage is lesser than minimum mechanical threshold and greater than range check lower limit	Raw voltage of position sensor	>	0	V	There is no ADC and no sensor supply error	=	TRUE	-	1.5	sec	continuous	2 Trips
			Raw voltage of position sensor	<	0.244	V	No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
Turbocharger Wastegate Feedback Position Sensor - B2	P2B82	Monitoring of SENT signal for communication errors	(				No communication error	=	TRUE	-	0.5	sec	continuous	2 Trips
			Raw data value received via SENT interface	>	65535	-	No data error	=	TRUE	-				
			OR				No pending or confirmed DTCs	=	see sheet inhibit tables	-				
			Raw data value received via SENT interface	<	0	-	Basic enable conditions met	=	see sheet enable tables	-				
			)											
			OR											
			Status and communication nibble for channel 1 validity is set	=	TRUE	-								
			OR											
			Status and communication nibble for channel 2 validity is set	=	TRUE	-								
			OR											
			Channel message is lost	=	TRUE	-								
Turbocharger Wastegate Feedback Position Sensor - B2	U0674	Lost SENT communication	(			-	Ignition is ON	=	TRUE	-			continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
			No signal on the line (RBA_SENTIF_ERROR_NOSIG)	=	TRUE	-	Basic enable conditions met	=	see sheet enable tables	-				
			OR			-								
			Sensor line is at low level (RBA_SENTIF_INFO_LINE_LOW)	=	TRUE	-								
			OR			-								
			Sensor line is at high level (RBA_SENTIF_INFO_LINE_HIGH)	=	TRUE	-								
			)			-								
	U1377	Fast SENT channel data validation	(				A valid signal is on the line (RBA_SENTIF_ERROR_NOSIG)	=	TRUE	-			continuous	2 Trips
			SENT Cyclic Redundancy Check (CRC) has detected an error (RBA_SENTIF_ERROR_CRC)	=	TRUE	-	Sensor line is not at low level (RBA_SENTIF_INFO_LINE_LOW)	=	TRUE	-				
			OR				Sensor line is not at high level (RBA_SENTIF_INFO_LINE_HIGH)	=	TRUE	-				
			Pulse length is out of permitted range (RBA_SENTIF_ERROR_RANGE)	=	TRUE	-	Basic enable conditions met	=	see sheet enable tables	-				
			OR											
			Short frame: means too few nibbles received than configured (RBA_SENTIF_ERROR_MISSING_NIBBLE)	=	TRUE	-								
			OR											
			Long frame: means too many nibbles received than configured (RBA_SENTIF_ERROR_TOOMANY_NIBBLES)	=	TRUE	-								
			OR											
			Calibration pulse is out of range (RBA_SENTIF_ERROR_CAL_PULSE_RANGE)	=	TRUE	-								
			OR											
			Deviation of calibration pulse is greater than 1/64 of the previous length (RBA_SENTIF_ERROR_CAL_SUCCESSIVE_DEVIATION)	=	TRUE	-								
			OR											
			Data counter pattern not detected (RBA_SENTIF_ERROR_FAST_DATA_CTR)	=	TRUE	-								
			OR											
			The inverted value of the first nibble of the Fast Frame is not equal to the fifth nibble of the Fast Frame (RBA_SENTIF_ERROR_FAST_DATA_INV_MSN0)	=	TRUE	-								
			OR											
			Message lost due to HW (Hardware) overrun / overwritten (RBA_SENTIF_ERROR_HW_OVERRUN)	=	TRUE	-								
			)											
Manifold Absolute Pressure Sensor - B1	P0108	Monitoring of Intake manifold pressure sensor bank1 for Signal range check-High	Raw voltage from Intake manifold pressure sensor bank1	>	4.749968	V	No pending or confirmed DTCs	=	see sheet inhibit tables	-	1.5	sec	continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
	P0107	Monitoring of Intake manifold pressure sensor bank1 for Signal range check-Low	Raw voltage from Intake manifold pressure sensor bank1	<	0.250002	V	No pending or confirmed DTCs	=	see sheet inhibit tables	-	1.5	sec	continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
	P0106	**Path 1:** Rationality check against reference pressure - high	Difference between raw pressure during initialization before engine start - Bank 1 and maximal reference pressure for delta pressure sensor diagnoses	>	A+B	kPa	(Engine speed	=	0	rpm	5	sec	once per driving cycle	2 Trips
			where A: Tolerance manifold pressure sensor to ambient pressure during start		20.8047	kPa	ECU is in drive-state)	=	TRUE	-				
			B: Delta Intake manifold pressure to ambient pressure during start		0	kPa	For number of events	>=	2	counts				
							Condition manifold pressure sensor reference for delta pressure sensor	=	FALSE	-				
							Unfiltered raw voltage of manifold pressure sensor	<	0.250002	V				
							Unfiltered raw voltage of manifold pressure sensor	>	4.749968	V				
							No pending or confirmed DTCs	=	See sheet inhibit tables	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
							Basic enable conditions met	=	See sheet enable tables	-				
		Path 2: Rationality check against reference pressure - low	Difference between of raw pressure during initialization before engine start - Bank 1 and minimal reference pressure for delta pressure sensor diagnoses	<	A-B	kPa	(Engine speed	=	0	rpm	5	sec	once per driving cycle	2 Trips
			where A: Tolerance manifold pressure sensor to ambient pressure during start		20.8047	kPa	ECU is in drive-state)	=	TRUE	-				
			B: Delta Intake manifold pressure to ambient pressure during start		0	kPa	For number of events	>=	2	counts				
							Condition manifold pressure sensor reference for delta pressure sensor	=	FALSE	-				
							Unfiltered raw voltage of manifold pressure sensor	<	0.250002	V				
							Unfiltered raw voltage of manifold pressure sensor	>	4.749968	V				
							No pending or confirmed DTCs	=	See sheet inhibit tables	-				
							Basic enable conditions met	=	See sheet enable tables	-				
		Path 3: Rationality check high - comparison of measured intake manifold pressure with modelled intake manifold pressure	Difference between maximum intake manifold pressure and maximum modeled manifold pressure	>	22.7	kPa	Engine speed	>=	0	rpm	1.0	sec	continuous	2 Trips
							Model-based manifold pressure diagnosis released from icing detection (sensor not frozen), which is the following condition:	=	TRUE	-				
							Difference between maximum and minimum manifold pressure from sensor signal wobble check	>=	10	kPa				
							((Raw voltage of manifold pressure sensor	>	0.250002	V				
							Raw voltage of manifold pressure sensor	<	4.749968	V				
							) for time	>=	0.2	sec				
							(Inflow into the MAP sensor is valid	=	TRUE	-				
							Outflow from the MAP sensor is valid	=	TRUE	-				
							) for time	>=	0.14	sec				
							Request safety fuel cut off (*)	=	FALSE	-				
							Suspicion of a throttle valve sensor failure (*))	=	FALSE	-				
							No pending or confirmed DTCs	=	See sheet inhibit tables	-				
							Basic enable conditions met	=	See sheet enable tables	-				
		Path 4: Rationality check low - comparison of measured intake manifold pressure with modelled intake manifold pressure	Difference between minimum modeled manifold pressure and minimum intake manifold pressure	>	13.5	kPa	Engine speed	>=	0	rpm	1.0	sec	continuous	2 Trips
							Model-based manifold pressure diagnosis released from icing detection (sensor not frozen), which is the following condition:	=	TRUE	-				
							Difference between current maximum and minimum manifold pressure from sensor signal wobble check	>=	10	kPa				
							((Raw voltage of manifold pressure sensor	>	0.250002	V				
							Raw voltage of manifold pressure sensor	<	4.749968	V				
							) for time	>=	0.2	sec				
							(Inflow into the MAP sensor is valid	=	TRUE	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Outflow from the MAP sensor is valid	=	TRUE	-		
							) for time	>=	0.14	sec		
							Request safety fuel cut off (*)	=	FALSE	-		
							Suspicion of a throttle valve sensor failure (*))	=	FALSE	-		
							No pending or confirmed DTCs	=	See sheet inhibit tables	-		
							Basic enable conditions met	=	See sheet enable tables	-		
		Path 5: Rationality check low during startup- Raw pressure is less than maximum value of minimum ambient pressure and difference of ambient pressure, offset voltage and tolerance	Raw pressure before engine start in the intake manifold	<	max[a,(b-c)-d]	kPa	Time counter for valid raw pressure after engine start	<	0	sec	1.0 sec once per driving cycle	2 Trips
			where (a) minimum ambient pressure for intake manifold pressure diagnosis (b) Ambient pressure		0	kPa	Engine speed	<	300	rpm		
							Engine speed calculated in 10ms	<=	0	rpm		
							(Raw voltage of manifold pressure sensor	>	0.250002	V		
			(d) tolerances between pressure raw value before engine start in the intake manifold and ambient pressure		255.9961	kPa	Raw voltage of manifold pressure sensor	<	4.749968	V		
							) for time	>=	0.2	sec		
							Counter for number of raw values for averaging	>	5	counts		
							Calculation of raw-pressure during initialization is finished for bank 1	=	FALSE	-		
							Engine speed	>=	400	rpm		
							Difference between raw pressure before engine start in the intake manifold and absolute intake manifold pressure	<	30	kPa		
							(Inflow into the MAP sensor is valid	=	TRUE	-		
							Outflow from the MAP sensor is valid	=	TRUE	-		
							) for time	>=	0.14	sec		
							Request safety fuel cut off (*)	=	FALSE	-		
							Suspicion of a throttle valve sensor failure (*))	=	FALSE	-		
							No pending or confirmed DTCs	=	See sheet inhibit tables	-		
							Basic enable conditions met	=	See sheet enable tables	-		
		Path 6: Signal variation check: checks if the sensor is frozen, by comparing the difference of maximum and minimum manifold pressure against calibration threshold for sensor signal wobble check	Difference between maximum and minimum manifold pressure from sensor signal wobble check	<	10	kPa	(Engine coolant downstream temperature during the first engine start of the driving cycle.	>	-7.5	deg C	continuous	2 Trips
							OR (Engine coolant temperature	>	30	deg C		
							for time)	>=	100	sec		
							((Raw voltage of manifold pressure sensor	>	0.250002	V		
							Raw voltage of manifold pressure sensor	<	4.749968	V		
							) for time	>=	0.2	sec		
							(Inflow into the MAP sensor is valid	=	TRUE	-		
							Outflow from the MAP sensor is valid	=	TRUE	-		
							) for time	>=	0.14	sec		
							Request safety fuel cut off (*)	=	FALSE	-		
							Suspicion of a throttle valve sensor failure (*))	=	FALSE	-		
							(Engine speed	>	1300	rpm		
							Minimum throttle valve position (Bank 1))	<	10.0098	%		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					Engine speed	< 2000 rpm		
					Maximum throttle valve position (Bank 1)	> 25 %		
					)			
					)			
					for time	>= 1 sec		
					No pending or confirmed DTCs	= See sheet inhibit tables -		
					Basic enable conditions met	= See sheet enable tables -		
Manifold Absolute Pressure Sensor - B2	P2A0D	Monitoring of Intake manifold pressure sensor bank2 for Signal range check-High	Raw voltage from Intake manifold pressure sensor bank2	> 4.749968 V	No pending or confirmed DTCs	= see sheet inhibit tables -	1.5 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	P2A0C	Monitoring of Intake manifold pressure sensor bank2 for Signal range check-Low	Raw voltage from Intake manifold pressure sensor bank2	< 0.250002 V	No pending or confirmed DTCs	= see sheet inhibit tables -	1.5 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	P2A0B	**Path 1:** Rationality check against reference pressure - high	Difference between raw manifold pressure during pressure for delta pressure sensor diagnoses	> A+B kPa	(Engine speed	= 0 rpm	5 sec once per driving cycle	2 Trips
			where A: Tolerance manifold pressure sensor to ambient pressure during start	20.8047 kPa	ECU is in drive-state)	= TRUE -		
			B: Delta Intake manifold pressure to ambient pressure during start	0 kPa	For number of events	>= 2 events		
					Condition manifold pressure sensor reference for delta pressure sensor	= FALSE -		
					Unfiltered raw voltage of manifold pressure sensor Bank 2	< 0.250002 V		
					Unfiltered raw voltage of manifold pressure sensor Bank 2	> 4.749968 V		
					No pending or confirmed DTCs	= See sheet inhibit tables -		
					Basic enable conditions met	= See sheet enable tables -		
		Path 2: Rationality check against reference pressure - low	Difference between raw manifold pressure during pressure for delta pressure sensor diagnoses	< A-B kPa	(Engine speed	= 0 rpm	5 sec once per driving cycle	2 Trips
			where A: Tolerance manifold pressure sensor to ambient pressure during start	20.8047 kPa	ECU is in drive-state)	= TRUE -		
			B: Delta Intake manifold pressure to ambient pressure during start	0 kPa	for number of events	>= 2 events		
					Condition manifold pressure sensor reference for delta pressure sensor	= FALSE -		
					Unfiltered raw voltage of manifold pressure sensor Bank 2	< 0.250002 V		
					Unfiltered raw voltage of manifold pressure sensor Bank 2	> 4.749968 V		
					No pending or confirmed DTCs	= See sheet inhibit tables -		
					Basic enable conditions met	= See sheet enable tables -		
		Path 3: Rationality check - comparison of measured intake manifold pressure with modelled intake manifold pressure	Difference between maximum intake manifold pressure and maximum modeled manifold pressure	> 22.7 kPa	Model-based manifold pressure diagnosis released from icing detection (sensor not frozen), which is the following condition:	= TRUE -	1.0 sec continuous	2 Trips
					Difference between current minimum and its maximum manifold pressure from sensor signal wobble check	>= 10 kPa		
					(maximum voltage threshold for electrical diagnosis	> 4.749968 V		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for time) (Inflow into the MAP sensor is valid Outflow from the MAP sensor is valid) for time Request safety fuel cut off (*) Suspicion of a throttle valve sensor failure (*) No pending or confirmed DTCs Basic enable conditions met	>= 0.2 sec = TRUE - = TRUE - >= 0.14 sec = FALSE - = FALSE - = See sheet enable tables - = See sheet enable tables -		
		Path 4: Rationality check - comparison of measured intake manifold pressure with modelled intake manifold pressure	Difference between minimum intake manifold pressure and minimum modeled manifold pressure	> 13.5 kPa	Model-based manifold pressure diagnosis released from icing detection (sensor not frozen), which is the following condition: Difference between current minimum and its maximum manifold pressure from sensor signal wobble check (maximum voltage threshold for electrical diagnosis for time) (Inflow into the MAP sensor is valid Outflow from the MAP sensor is valid) for time Request safety fuel cut off (*) Suspicion of a throttle valve sensor failure (*) No pending or confirmed DTCs (se inhibit conditions table) Basic enable conditions met	= TRUE - >= 10 kPa > 4.749968 V >= 0.2 sec = TRUE - = TRUE - >= 0.14 sec = FALSE - = FALSE - = See sheet enable tables - = See sheet enable tables -	1.0 sec continuous	2 Trips
		Path 5: Signal variation check: checks if the sensor is frozen, by comparing the difference of maximum and minimum manifold pressure against calibration threshold for sensor signal wobble check	Difference between maximum and minimum manifold pressure from sensor signal wobble check bank 2	< 10 kPa	(Engine coolant downstream temperature during the first engine start of the driving cycle. OR (Engine coolant temperature for time) ((Raw voltage of manifold pressure sensor Bank2 Raw voltage of manifold pressure sensor Bank2) for time (Inflow into the MAP sensor is valid Outflow from the MAP sensor is valid) for time Request safety fuel cut off (*) Suspicion of a throttle valve sensor failure (*)) (Engine Speed Minimum throttle valve position (Bank 2)) (Engine Speed Maximum throttle valve position (Bank 2)))	> -7.5 deg C > 30 deg C >= 100 sec > 0.250002 V < 4.749968 V >= 0.2 sec = TRUE - = TRUE - >= 0.14 sec = = > 1300 rpm < 10.0098 % < 2000 rpm > 25 %	continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for time	>= 1 sec		
					No pending or confirmed DTCs	= See sheet inhibit tables -		
					Basic enable conditions met	= See sheet enable tables -		
Boost Pressure Sensor - B1	P0238	Monitoring of Throttle valve upstream pressure sensor Bank 1 for Signal range check - High	Raw voltage from Throttle valve upstream pressure sensor Bank 1	> 4.749968 V	Engine speed	>= 400 rpm	1.5 sec continuous	2 Trips
					Engine in state of synchronization	= TRUE -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P0237	Monitoring of Throttle valve upstream pressure sensor Bank 1 for Signal range check - Low	Raw voltage from Throttle valve upstream pressure sensor Bank 1	< 0.250002 V	Engine speed	>= 400 rpm	1.5 sec continuous	2 Trips
					Engine in state of synchronization	= TRUE -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
Boost Pressure Sensor - B1	P0236	**Path 1 :** Rationality check against maximum ambient pressure based threshold	Case 1: Engine NOT running for time	>= A*B sec	(		2 sec continuous	2 Trip
			Difference between raw upstream throttle valve pressure and ambient pressure	> C+D kPa	Engine speed	< 1000 rpm		
				sec	Throttle actuator position	< 8.0078 %		
			Case 2: Engine NOT running for time	< A*B sec	)			
			Difference between raw upstream throttle valve pressure and ambient pressure	> C+E kPa	for time	>= 2.6 sec		
					Valid pressure sensor signal upstream of throttle valve	= TRUE -		
			Where: (A) Time delay for ambient pressure in manifold	= 3 sec	for time	>= 0.2 sec		
			(B) constant	= 0.95 -	(			
			(C) Upper tolerance value of upstream throttle valve pressure	= 13.4531 kPa	Raw voltage (unfiltered) of throttle valve pressure sensor	<= 4.749968 V		
			(D) Ambient pressure including an offset for robustness	= 1.9648 kPa	Raw voltage (unfiltered) of throttle valve pressure sensor	>= 0.250002 V		
			(E) Difference between modelled and measured upstream throttle valve pressure values	= 1.9883 kPa	)			
					Suspicion of a throttle valve sensor failure (*)	= FALSE -		
					Request safety fuel cut off (*)	= FALSE -		
					(Max range error of pressure upstream throttle **When:**	= FALSE -		
					Pressure upstream throttle valve raw)	< 511.9922 kPa		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P0236	**Path 2 :** Rationality check during startup against maximum ambient pressure based threshold	Difference between raw throttle valve pressure Bank 1 and the maximum reference pressure for delta pressure sensor diagnosis	> 14.625 kPa	(		2 sec continuous	2 Trip
					Raw voltage (unfiltered) of throttle valve pressure sensor	<= 4.749968 V		
					Raw voltage (unfiltered) of throttle valve pressure sensor	>= 0.250002 V		
					)			
					for time	>= 0.2 sec		
					Engine not running	= TRUE -		
					for time	>= 5 sec		
					ECU in drive state	= TRUE -		
					(Max range error of pressure upstream throttle **When:**	= FALSE -		
					Pressure upstream throttle valve raw)	< 511.9922 kPa		
					No pending or confirmed DTCs	= see sheet inhibit tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
							Basic enable conditions met	=	see sheet enable tables	-				
	P0236	**Path 3 :** Rationality check against minimum ambient pressure based threshold	Case 1: Engine NOT running for time	>=	A*B	sec	(				2	sec	continuous	2 Trip
			(Difference between raw upstream throttle valve pressure and ambient pressure	<	C+D	kPa	Engine speed	<	1000	rpm				
			for time)	>=	1	sec	Throttle actuator position	<	8.0078	%				
			Case 2: Engine NOT running for time	<	A*B	sec	)							
			(Difference between raw upstream throttle valve pressure and ambient pressure	<	C+E	kPa	for time	>=	2.6	sec				
			for time)	>=	1	sec	Valid pressure sensor signal upstream of throttle valve	=	TRUE	-				
			Where: (A) Time delay for ambient pressure in manifold	=	3	sec	for time	>=	0.2	sec				
			(B) constant	=	0.95	-	(							
			(C) Upper tolerance value of upstream throttle valve pressure	=	13.4531	kPa	Raw voltage (unfiltered) of throttle valve pressure sensor	<=	4.749968	V				
			(D) Ambient pressure including an offset for robustness	=	1.9648	kPa	Raw voltage (unfiltered) of throttle valve pressure sensor	>=	0.250002	V				
			(E) Maximum pressure loss at air filter	=	2.1211	kPa	)							
							Suspicion of a throttle valve sensor failure (*)	=	FALSE	-				
							Request safety fuel cut off (*)	=	FALSE	-				
							(Max range error of pressure upstream throttle **When:**	=	FALSE	-				
							Pressure upstream throttle valve raw)	<	511.9922	kPa				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P0236	**Path 4 :** Rationality check during startup against minimum ambient pressure based threshold	Difference between raw throttle valve pressure Bank 1 and the minimum reference pressure for delta pressure sensor diagnosis	<	14.625	kPa	(				2	sec	continuous	2 Trip
							Raw voltage (unfiltered) of throttle valve pressure sensor	<=	4.749968	V				
							Raw voltage (unfiltered) of throttle valve pressure sensor	>=	0.250002	V				
							)							
							for time	>=	0.2	sec				
							Engine not running	=	TRUE	-				
							for time	>=	5	sec				
							ECU in drive state	=	TRUE	-				
							(Max range error of pressure upstream throttle **When:**	=	FALSE	-				
							Pressure upstream throttle valve raw)	<	511.9922	kPa				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
Boost Pressure Sensor - B2	P0242	Monitoring of Throttle valve upstream pressure sensor Bank 2 for Signal range check - High	Raw voltage from Throttle valve upstream pressure sensor Bank 2	>	4.749968	V	Engine speed	>=	400	rpm	1.5	sec	continuous	2 Trips
							Engine in state of synchronization	=	TRUE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P0241	Monitoring of Throttle valve upstream pressure sensor Bank 2 for Signal range check - Low	Raw voltage from Throttle valve upstream pressure sensor Bank 2	<	0.250002	V	Engine speed	>=	400	rpm	1.5	sec	continuous	2 Trips
							Engine in state of synchronization	=	TRUE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
Boost Pressure Sensor - B2	P0240	**Path 1 :** Rationality check against maximum ambient pressure based threshold	Case 1: Engine NOT running for time	>=	A*B	sec	(				2	sec	continuous	2 Trip
			Difference between raw upstream throttle valve pressure and ambient pressure	>	C+D	kPa	Engine speed	<	1000	rpm				
						sec	Throttle actuator position	<	8.0078	%				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Case 2: Engine NOT running for time	< A*B sec	)			
			Difference between raw upstream throttle valve pressure and ambient pressure	> C+E kPa	for time	>= 2.6 sec		
					Valid pressure sensor signal upstream of throttle valve	= TRUE -		
			Where:	= 3 sec	for time	>= 0.2 sec		
			(A) Time delay for ambient pressure in manifold					
			(B) constant	= 0.95 -	(			
			(C) Upper tolerance value of upstream throttle valve pressure	= 13.4531 kPa	Raw voltage (unfiltered) of throttle valve pressure sensor for Bank 2	<= 4.749968 V		
			(D) Ambient pressure including an offset for robustness	= 1.9648 kPa	Raw voltage (unfiltered) of throttle valve pressure sensor for Bank 2	>= 0.250002 V		
			(E) Difference between modelled and measured upstream throttle valve pressure values	= 1.9883 kPa	)			
					Suspicion of a throttle valve sensor failure Bank 2	= FALSE -		
					Request safety fuel cut off	= FALSE -		
					(Max range error of pressure upstream throttle	FALSE -		
					When:			
					Pressure upstream throttle valve raw)	< 511.9922 kPa		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P0240	**Path 2 :** Rationality check during startup against maximum ambient pressure based threshold	Difference between throttle valve pressure Bank 2 and the maximum reference pressure for delta pressure sensor diagnosis	> 14.625 kPa	(		2 sec once per driving cycle	2 Trip
					Raw voltage (unfiltered) of throttle valve pressure sensor for Bank 2	<= 4.749968 V		
					Raw voltage (unfiltered) of throttle valve pressure sensor for Bank 2	>= 0.250002 V		
					)			
					for time	>= 0.2 sec		
					Engine not running	= TRUE -		
					for time	>= 5 sec		
					ECU in drive state	= TRUE -		
					(Max range error of pressure upstream throttle	FALSE -		
					When:			
					Pressure upstream throttle valve raw)	< 511.9922 kPa		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P0240	**Path 3 :** Rationality check against minimum ambient pressure based threshold	Case 1: Engine NOT running for time	>= A*B sec	(		2 sec continuous	2 Trip
			(Difference between raw upstream throttle valve pressure and ambient pressure	< C+D kPa	Engine speed	< 1000 rpm		
			for time)	>= 1 sec	Throttle actuator position	< 8.0078 %		
			Case 2: Engine NOT running for time	< A*B sec	)			
			(Difference between raw upstream throttle valve pressure and ambient pressure	< C+E kPa	for time	>= 2.6 sec		
			for time)	>= 1 sec	Valid pressure sensor signal upstream of throttle valve	= TRUE -		
			Where:	= 3 sec	for time	>= 0.2 sec		
			(A) Time delay for ambient pressure in manifold					
			(B) constant	= 0.95 -	(			
			(C) Upper tolerance value of upstream throttle valve pressure	= 13.4531 kPa	Raw voltage (unfiltered) of throttle valve pressure sensor for Bank 2	<= 4.749968 V		
			(D) Ambient pressure including an offset for robustness	= 1.9648 kPa	Raw voltage (unfiltered) of throttle valve pressure sensor for Bank 2	>= 0.250002 V		
			(E) Maximum pressure loss at air filter	= 2.1211 kPa	)			
					Suspicion of a throttle valve sensor failure	= FALSE -		
					Request safety fuel cut off	= FALSE -		
					(Max range error of pressure upstream throttle	= FALSE -		
					When:			
					Pressure upstream throttle valve raw)	< 511.9922 kPa		
					No pending or confirmed DTCs	= see sheet inhibit tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
							Basic enable conditions met	=	see sheet enable tables	-				
	P0240	**Path 4 :** Rationality check during startup against minimum ambient pressure based threshold	Difference between raw throttle valve pressure Bank 2 and the minimum reference pressure for delta pressure sensor diagnosis	<	14.625	kPa	(				2	sec	continuous	2 Trip
							Raw voltage (unfiltered) of throttle valve pressure sensor	<=	4.749968	V				
							Raw voltage (unfiltered) of throttle valve pressure sensor	>=	0.250002	V				
							)							
							for time	>=	0.2	sec				
							Engine not running	=	TRUE	-				
							for time	>=	5	sec				
							ECU in drive state	=	TRUE	-				
							(Max range error of pressure upstream throttle	=	FALSE	-				
							When:							
							Pressure upstream throttle valve raw)	<	511.9922	kPa				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
Engine Off Timer	P262B	**Path 1:** Too Slow Monitor : Engine off time is too short in considering ECT change	Calculated engine off time (see Look-Up-Table #P262B-1)	<	0 to 420	min	Ratio of current cool down compared to last ignition-off event	>=	0.85	-	1			2 Trips
							Ratio of current cool down compared to last ignition-off event	<=	1	-				
							Engine coolant temperature prior to shutdown in previous driving cycle	>=	57.96	deg C				
							Possible cool down of the coolant temperature during shutdown since previous driving cycle	>=	20	deg C				
							Cool down of the engine coolant temperature during shutdown since previous driving cycle	>=	20	deg C				
							Accumulated ecu-on-time since last ignition-off event (see Look-Up-Table #P262B-2)	<=	120 to 9600	sec				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Path 2: Too Fast Monitor : Engine off time is too long in considering ECT change	Calculated engine off time (see Look-Up-Table #P262B-3)	>	60 to 2000	min	Ratio of current cool down compared to last ignition-off event	>=	0.399902	-				2 Trips
							Ratio of current cool down compared to last ignition-off event	<=	0.700195	-				
							Engine coolant temperature prior to shutdown in previous driving cycle	>=	57.96	deg C				
							Possible cool down of the coolant temperature during shutdown since previous driving cycle	>=	20	deg C				
							Cool down of the engine coolant temperature during shutdown since previous driving cycle	<=	100	deg C				
							Accumulated ecu-on-time since last ignition-off event (see Look-Up-Table #P262B-4)	<=	120 to 9600	sec				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P262B	**Path 3:** Rationality check of control module power off timer	At least one bit of the counter value in the counter device RAM doesn't change it's value OR	=	TRUE	-	Ignition is ON	=	TRUE	-				2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
			Communication error is reported by counter device OR	=	TRUE	-								
			Difference between counter steps compared to ECU system time is out of tolerance	=	TRUE	-								

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
ECM Internal Failures	P062B	**Path 1:** Electrical failure with high pressure injection valve powerstage for bank 1	Electrical fault is detected for the control bank 1 (	=	TRUE	-	Diagnosis inhibited by statistical function	=	FALSE	-	3	sec	continuous	2 Trips
			Number of misfire counter for cylinder 0	>	75	-	Engine speed	<	6000	rpm				
			Number of misfire counter for cylinder 4	>	75	-	Engine speed	>	1520	rpm				
			)				relative air charge	<	100.008	%				
			and				Half engine mode active	=	FALSE	-				
			Rail pressure control minimum error is set	=	TRUE	-	for time	>=	0.5	sec				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Path 2: Electrical failure with high pressure injection valve powerstage for bank 2	Electrical fault is detected for the control bank 2 (	=	TRUE	-	Diagnosis inhibited by statistical function	=	FALSE	-	3	sec		
			Number of misfire counter for cylinder 1	>	75	-	Engine speed	<	6000	rpm				
			Number of misfire counter for cylinder 5	>	75	-	Engine speed	>	1520	rpm				
			)				relative air charge	<	100.008	%				
			and				Half engine mode active	=	FALSE	-				
			Rail pressure control minimum error is set	=	TRUE	-	for time	>=	0.5	sec				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Path 3: Electrical failure with high pressure injection valve powerstage for bank 3	Electrical fault is detected for the control bank 3 (	=	TRUE	-	Diagnosis inhibited by statistical function	=	FALSE	-	3	sec		
			Number of misfire counter for cylinder 2	>	75	-	Engine speed	<	6000	rpm				
			Number of misfire counter for cylinder 6	>	75	-	Engine speed	>	1520	rpm				
			)				relative air charge	<	100.008	%				
			and				Half engine mode active	=	FALSE	-				
			Rail pressure control minimum error is set	=	TRUE	-	for time	>=	0.5	sec				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Path 4: Electrical failure with high pressure injection valve powerstage for bank 4	Electrical fault is detected for the control bank 3 (	=	TRUE	-	Diagnosis inhibited by statistical function	=	FALSE	-	3	sec		
			Number of misfire counter for cylinder 3	>	75	-	Engine speed	<	6000	rpm				
			Number of misfire counter for cylinder 7	>	75	-	Engine speed	>	1520	rpm				
			)				relative air charge	<	100.008	%				
			and				Half engine mode active	=	FALSE	-				
			Rail pressure control minimum error is set	=	TRUE	-	for time	>=	0.5	sec				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Path 5: Detects if the booster voltage of Dc-Dc convertor is too low	Output voltage of DcDc converter	<=	20	V	Battery voltage	>=	10.9	V	2	events	continuous	2 Trips
							Battery voltage	<=	6553.5	V				
							Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
		Path 6: Error check in CVO diagnosis for all cylinders	Number of tested cylinders against min or max error for Controlled Valve Operation diagnosis and	>=	8	-	Ignition is ON	=	TRUE	-			continuous	1 Trips
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
			Number of cylinders in error state due to minimum or maximum error in Controlled Valve Operation diagnose	>=	8	-	Basic enable conditions met	=	see sheet enable tables	-				
	P0606	Detects error of ignition power stage diagnosis ASIC Bank 1	Device information error from the powerstage ASIC	=	TRUE	-	12V system voltage	>	10.9	V	20	events	continuous	1 Trip
							12V system voltage	<	655.34	V				
							Engine synchronization (*)	=	TRUE	-				
							Engine speed	>	1400	rpm				
							Difference between new and old ignition counter ensuring that all cylinder were fired at least once	>	9	counts				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Basic enable conditions met	= see sheet enable tables -		
	P0606	Detects error of ignition power stage diagnosis ASIC Bank 2	Device information error from the powerstage ASIC	= TRUE -	12V system voltage 12V system voltage Engine synchronization (*) Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	> 10.9 V < 655.34 V = TRUE - > 1400 rpm > 9 counts = see sheet enable tables -	20 events continuous	1 Trip
	P0606	Detects when the last activity detected for the LIN Communication Hardware has been greater than the limit for a calibrated period of time	Time since last activity detected for the LIN Communication Hardware is greater than limit	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.02 sec continuous	1 Trip
	P0606	Detects when the last activity detected for the CAN Communication Hardware has been greater than the limit for a calibrated period of time	Time since last activity detected for the CAN Communication Hardware is greater than limit	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.02 sec continuous	1 Trip
	P0606	Internal monitoring of main processor controller: Monitoring of hardware error management	Error management module (EMM) / Safety management unit (SMU) reports alarm	= TRUE -	Ignition is on Basic enable conditions met	= TRUE - = TRUE -	continuous	1 Trip
	P06D1	Detects commmunication error with ignition power stage diagnosis ASIC Bank 1	SPI information error from the powerstage ASIC	= TRUE -	12V system voltage 12V system voltage Engine synchronization (*) Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	> 10.9 V < 655.34 V = TRUE - > 1400 rpm > 9 counts = see sheet enable tables -	20 events continuous	2 Trips
	P06D1	Detects commmunication error with ignition power stage diagnosis ASIC Bank 2	SPI information error from the powerstage ASIC	= TRUE -	12V system voltage 12V system voltage Engine synchronization (*) Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	> 10.9 V < 655.34 V = TRUE - > 1400 rpm > 9 counts = see sheet enable tables -	20 events continuous	2 Trips
	P060B	Function monitoring - Pedal potentiometer signal 2 voltage check - The measured ADC voltage pulled to low level is compared with a threshold.	Measured voltage at the ADC for the acceleration pedal signal 2	>= 0.215 V	Ignition is on AD-input to low-level (Short Circuit to Ground) Basic enable conditions met	= TRUE - = TRUE - = TRUE -	0.1 sec continuous	1 Trip
	P060B	Function monitoring - Test voltage range check - The measured ADC test voltage channel voltage is compared with thresholds.	Measured voltage at the ADC test voltage input OR Measured voltage at the ADC test voltage input	> 4.8291 V < 4.7266 V	Ignition is on Basic enable conditions met	= TRUE - = TRUE -	0.15 sec continuous	1 Trip
	P060A	**Path 1:** CAN and Flexray shut-off path test	Detects if CAN and Flexray transmission is diabled in case of an error	= TRUE -	Shut-Off path test is completed Ignition ON Basic enable conditions met	= TRUE - = TRUE - = see sheet enable tables -	once per driving cycle	1 Trip

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Path 2: Power stage shut-off path test	Detects if power stages is disabled in case of an errror	= TRUE -	Shut-Off path test is completed	= TRUE -		
			OR		Ignition ON	= TRUE -		
			The entire power stage shut-off path test has not been completed	= TRUE -	Basic enable conditions met	= see sheet enable tables -		
			for time	> A * 2.2ms				
			where A - Maximum number of repetitions of shut-off path test	= 450 -				
	P060D	**Path 1:** Detects if the absolute difference between the accelerator pedal signal 1 voltage and the accelerator pedal signal 2 voltage exceeds with a threshold (part pedal).	(		Ignition ON	= TRUE -	0.026 sec continuous	1 Trip
			Absolute difference of accelerator pedal position sensor voltages, calculated by the following formula: | max[(a);(b)] - max[(b);(c)] I	> 0.3606 V	(		0.026 sec	
					maximum value between the accelerator pedal position sensor 1 raw voltage (from ADC) and the voltage threshold for start of plausibility check of the accelerator signal OR	<= 4.061 V		
			where: (a) Accelerator pedal position sensor 1 current voltage (from ADC)	= measured parameter -	maximum value between the voltage threshold for start of plausibility check of the accelerator signal and the accelerator pedal position sensor 2 raw voltage (from ADC)	<= 4.061 V		
			(b) Voltage threshold for start of plausibility check of the accelerator signal	= 0.848 V	)			
			(c) Accelerator pedal position sensor 2 current voltage (from ADC)	= measured parameter -	Null load test impulse check in ADC monitoring is not active	= TRUE -		
			)		Basic enable conditions met	= TRUE -		
					No accelerator pedal fault	= TRUE -		
		Path 2: Detects if the absolute difference between the accelerator pedal signal 1 voltage and the accelerator pedal signal 2 voltage exceeds with a threshold (full pedal).	(		Ignition ON	= TRUE -	0.026 sec continuous	1 Trip
			Absolute difference of accelerator pedal position sensor voltages, calculated by the following formula: | max[(a);(b)] - max[(b);(c)] I	> 0.3606 V	(		0.026 sec	
					maximum value between the accelerator pedal position sensor 1 raw voltage (from ADC) and the voltage threshold for start of plausibility check of the accelerator signal	> 4.061 V		
			where:		maximum value between the voltage threshold for start of plausibility check of the accelerator signal and the accelerator pedal position sensor 2 raw voltage (from ADC)	> 4.061 V		
			(a) Accelerator pedal position sensor 1 current voltage (from ADC)	= measured parameter -	)			
			(b) Voltage threshold for start of plausibility check of the accelerator signal	= 0.848 V	Null load test impulse check in ADC monitoring is not active	= TRUE -		
			(c) Accelerator pedal position sensor 2 current voltage (from ADC)	= measured parameter -	Basic enable conditions met	= TRUE -		
			)		No accelerator pedal fault	= TRUE -		
		Path 3: For accelerator pedal sensor 1 and 2 separately, detects if the learned normalized accelerator pedal voltage of Level 2 is greater than the learned normalized accelerator pedal voltage of Level 1.	Difference between the minimum learned normalized accelerator pedal voltage L2 and the minimum learned normalized pedal voltage L1 - accelerator pedal sensor 1, calculated by the following formula:	> 0 -	Igntion ON	= TRUE -	continuous	1 Trip
			(d) > (e)		Basic enable conditions met	= TRUE -		
			where					
			(d) Minimum learned normalized pedal voltage L2 - accelerator pedal sensor 1	= measured parameter -				
			(e) Minimum learned normalized pedal voltage L1 - accelerator pedal sensor 1	= measured parameter -				
			OR					
			Difference between the minimum learned normalized accelerator pedal voltage L2 and the minimum learned normalized pedal voltage L1 - accelerator pedal sensor 2, calculated by the following formula:	> 0 -				
			(f) > (g)					
			where					
			(f) Minimum learned normalized pedal voltage L2 - accelerator pedal sensor 2	= measured parameter -				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
			(g) Minimum learned normalized pedal voltage L1 - accelerator pedal sensor 2	=	measured parameter	-								
	P061C	Engine speed plausibility check - The difference between calculated (function monitoring) and measured engine speed is greater than a calibrated threshold for a calibrated period of time	Difference between calculated engine speed from function monitoring and measured engine speed	>=	320	rpm	Engine synchronization is active	=	TRUE	-	0.08	sec	continuous	1 Trip
							Engine speed signal is valid (angle counter difference >=0)	=	TRUE	-				
							Synchronization is not lost	=	TRUE	-				
							Calculated high resolution engine speed in function monitoring	>=	520	rpm				
							Basic enable conditions met	=	TRUE	-				
		Detects if minimum engine speed is reached and debounced for a calibrated period of time	Engine speed gradient	>=	520	rpm	Engine synchronization is active	=	TRUE	-				
			Debounce time for engine speed gradient in function monitoring	>=	0.52	sec	Engine speed signal is not valid (angle counter difference < 0)	=	TRUE	-				
							Synchronization is not lost	=	TRUE	-				
							Basic enable conditions met	=	TRUE	-				
	P0607	**Path 1:** Monitoring ABE activation	ABE line active	=	TRUE	-	Shut-off path test active	=	FALSE	-	0.05	sec	continuous	1 Trip
							ECU is in DRIVE state	=	TRUE	-				
							(							
							Battery voltage	>	8	V				
							)							
							For time	>=	0.1	sec				
							Basic enable conditions met	=	see sheet enable tables	-				
		Path 2: Monitoring shut-off by query-response communication	WDA line active	=	TRUE	-	Shut-off path test active	=	FALSE	-	0.05	sec	continuous	1 Trip
							ECU is in DRIVE state	=	TRUE	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Path 3: Monitoring shut-off by error pin activation	Error pin line active	=	TRUE	-	Shut-off path test active	=	FALSE	-	0.05	sec	continuous	1 Trip
							ECU is in DRIVE state	=	TRUE	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Path 4: Monitoring ABE activation at overvoltage detection	ABE line active	=	TRUE	-	Shut-off path test active	=	FALSE	-	0.05	sec	continuous	1 Trip
			Latching of overvoltage detection is activated	=	TRUE	-	ECU is in DRIVE state	=	TRUE	-				
							Basic enable conditions met	=	see sheet enable tables	-				
Control Module Long Term Memory Reset	P0603	Detects KeepAlive error during runtime at an external device	Any of the peripheral monitoring function reports a keep alive error such as memory errors, incorrect init state, unexpected resets of the external device during runtime	=	TRUE	-	Ignition is ON	=	TRUE	-			Continuous	1 Trip
							Basic enable conditions met	=	see sheet enable tables	-				
	P0603	Detects KeepAlive error during initialization phase at an external device	Any of the peripheral monitoring function reports a keep alive error such as memory errors, incorrect init state, unexpected resets of the external device during initialization phase	=	TRUE	-	Ignition is ON	=	TRUE	-			Once in a Driving Cycle	1 Trip
							Basic enable conditions met	=	see sheet enable tables	-				
	P0604	Read diagnosis for non volatile memory	A memory block could not be read successfully	=	TRUE	-	Ignition is ON	=	TRUE	-				1 Trip
							Basic enabling conditions are met	=	see sheet enable tables	-				
		Write diagnosis for non volatile memory	A memory block could not be stored successfully	=	TRUE	-	Ignition is ON	=	TRUE	-				
							Basic enabling conditions are met	=	see sheet enable tables	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
	P30D6	Digital output communication loss/errors. Irregular operation of the SPI for Throttle actuator motor control circuit Bank 1	SPI error read out from power stage diagnoctics of Throttle actuator motor control circuit Bank 1	=	TRUE	-	(ECU is in DRIVE state	=	TRUE	-			continuous	2 Trips
							OR							
							ECU is in POSTDRIVE state	=	TRUE	-				
							)							
							The powerstage of the actuator is switched	=	TRUE	-				
							(							
							State of the thottle valve powerstage bank 1	>	0	-				
							)							
							Release of adaptation	=	FALSE	-				
							Actual position is valid	=	TRUE	-				
							Request safety fuel cut off SKA bank 1, following condition:	=	FALSE	-				
							(							
							Request reversible safety fuel cut off SKA bank 1, which has following condition:	=	FALSE	-				
							(							
							Battery voltage for throttle valve operation sufficient bank 1	>	7.5	V				
							OR							
							Engine speed	>	1000	rpm				
							)							
							Limp home position not reached bank 1	=	FALSE	-				
							)							
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P30D7	Digital output communication loss/errors. Irregular operation of the SPI for Throttle actuator motor control circuit Bank 2	SPI error read out from power stage diagnoctics of Throttle actuator motor control circuit Bank 2	=	TRUE	-	(ECU is in DRIVE state	=	TRUE	-			continuous	2 Trips
							OR							
							ECU is in POSTDRIVE state	=	TRUE	-				
							)							
							The powerstage of the actuator is switched on, following conditions:	=	TRUE	-				
							(							
							State of the thottle valve powerstage bank 2	>	0	-				
							)							
							Release of adaptation	=	FALSE	-				
							Actual position is valid	=	TRUE	-				
							Request safety fuel cut off SKA bank 2, following condition:	=	FALSE	-				
							(							
							Request reversible safety fuel cut off SKA bank 2, which has following condition:	=	FALSE	-				
							(							
							Battery voltage for throttle valve operation sufficient bank 2	>	7.5	V				
							OR							
							Engine speed	>	1000	rpm				
							)							
							Limp home position not reached bank 2	=	FALSE	-				
							)							
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P16F3	**Path 1:** Relative air charge range check in function monitoring	Absolute deviation of predicted relative air charge from calculated relative air charge	>	11.3	%	Ignition is ON	=	TRUE	-	0.52	sec	continuous	1 Trip
			for time	>=	0.36	sec	Engine Speed	>=	1200	rpm				
							Injection cut off (ICO) is not requested from function monitoring	=	TRUE	-				
							Injection cut off (ICO) is not requested	=	TRUE	-				
							System voltage exceeds 8V	=	TRUE	-				
							Limp home mode is not requested from function monitoring	=	TRUE	-				
							No loss of Synchronisation during function monitoring	=	TRUE	-				
							(							
							ECU is not in pre-drive	=	TRUE	-				
							OR							
							ECU is not in post-drive	=	TRUE	-				
							)							
							Air-Fuel check is disabled for function monitoring	=	FALSE	-				
							Basic enable conditions met	=	TRUE	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
		Path 2: Complementary Error in Half Engine Mode status transmitted by Function Monitoring	(				Engine speed	>=	1200	rpm	1.04	sec	continuous	1 Trip
			Synchronisation of half engine mode in injection, air charge and ignition	=	TRUE	-	(							
			Data redundancy to indicate CDA is active	!=	170	-	Injection cut off (ICO) is not requested from Level 1 monitoring	=	TRUE	-				
			)				Injection cut off (ICO) is not requested from Level 2 monitoring	=	TRUE	-				
			OR				Battery voltage is in desired range and undervoltage shut-off is not active	=	TRUE	-				
			(				Limp home mode is not requested from function monitoring	=	TRUE	-				
			Synchronisation of half engine mode in injection, air charge and ignition	=	FALSE	-	No loss of Synchronisation during function monitoring	=	TRUE	-				
			Data redundancy to indicate CDA is active	!=	55	-	)							
			)				(							
							ECU is not in pre-drive state	=	TRUE	-				
							OR							
							ECU is not in post-drive state	=	TRUE	-				
							)							
							Air-Fuel check is disabled for function monitoring	=	FALSE	-				
							Basic enable conditions met	=	TRUE	-				
		Path 3: Plausibility check w.r.t Ignition condition for cylinder deactivation in function monitoring of Half Engine Mode (HEM)	(				Engine speed	>=	1200	rpm	1.04	sec	continuous	1 Trip
			Synchronisation of half engine mode in injection, air charge and ignition	=	TRUE	-	and							
			Cylinder with combustion in HEM	=	FALSE	-	(							
			)				Injection cut off (ICO) is not requested from Level 1 monitoring	=	TRUE	-				
			for time	>=	0.32	sec	Injection cut off (ICO) is not requested from Level 2 monitoring	=	TRUE	-				
							Battery voltage is in desired range and undervoltage shut-off is not active	=	TRUE	-				
							Limp home mode is not requested from function monitoring	=	TRUE	-				
							No loss of Synchronisation during function monitoring	=	TRUE	-				
							)							
							(							
							ECU is not in pre-drive state	=	TRUE	-				
							OR							
							ECU is not in post-drive state	=	TRUE	-				
							)							
							Air-Fuel check is disabled for function monitoring	=	FALSE	-				
							Basic enable conditions met	=	TRUE	-				
		Path 4: Ignition check for cylinder deactivation in function monitoring of Half Engine Mode (HEM)	(				Engine speed	>=	1200	rpm	1.04	sec	continuous	1 Trip
			Synchronisation of half engine mode in injection, air charge and ignition	=	TRUE	-	and							
			Cylinder with combustion in HEM	=	TRUE	-	(							
			)				Injection cut off (ICO) is not requested from Level 1 monitoring	=	TRUE	-				
			for time	>=	0.08	sec	Injection cut off (ICO) is not requested from Level 2 monitoring	=	TRUE	-				
							Battery voltage is in desired range and undervoltage shut-off is not active	=	TRUE	-				
							Limp home mode is not requested from function monitoring	=	TRUE	-				
							No loss of Synchronisation during function monitoring	=	TRUE	-				
							)							
							(							
							ECU is not in pre-drive state	=	TRUE	-				
							OR							
							ECU is not in post-drive state	=	TRUE	-				
							)							
							Air-Fuel check is disabled for function monitoring	=	FALSE	-				
							Basic enable conditions met	=	TRUE	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
		Path 5: Injection check in cylinder deactivation in function monitoring of Half Engine Mode (HEM)	Synchronisation of half engine mode in injection, air charge and ignition	=	TRUE	-	Engine speed	>=	1200	rpm	1.04	sec	continuous	1 Trip
			for time	>=	0.16	sec	(							
							Injection cut off (ICO) is not requested from Level 1 monitoring	=	TRUE	-				
							Injection cut off (ICO) is not requested from Level 2 monitoring	=	TRUE	-				
							Battery voltage is in desired range and undervoltage shut-off is not active	=	TRUE	-				
							Limp home mode is not requested from function monitoring	=	TRUE	-				
							No loss of Synchronisation during function monitoring	=	TRUE	-				
							)							
							(							
							ECU is not in pre-drive state	=	TRUE	-				
							OR							
							ECU is not in post-drive state	=	TRUE	-				
							)							
							Air-Fuel check is disabled for function monitoring	=	FALSE	-				
							Basic enable conditions met	=	TRUE	-				
		Path 6: Cylinder individual fuel correction rationality check in function monitoring.	(				Ignition is ON	=	TRUE	-	4.16	sec	continuous	1 Trip
			Cylinder individual fuel correction	>	(a*b) + c	%	Engine Speed	>=	1200	rpm				
			where				Injection cut off (ICO) is not requested	=	TRUE	-				
			a : Relative fuel mass for individual cylinder		Measured parameter	%	Injection cut off (ICO) is not requested from function monitoring	=	TRUE	-				
			b : Factor maximum tolerance in check of cylinder-individual fuel in function monitoring		1.101563	-	System voltage exceeds 8V	=	TRUE	-				
			c : Offset tolerance in check of cylinder-individual fuel in function monitoring		10.5	%	Limp home mode is not requested from function monitoring	=	TRUE	-				
			)				No loss of Synchronisation during function monitoring	=	TRUE	-				
			OR				(							
			(				ECU is not in pre-drive state	=	TRUE	-				
			Cylinder individual fuel correction	<	(a*b) - c	%	OR							
			where				ECU is not in post-drive state	=	TRUE	-				
			a : Relative fuel mass for individual cylinder		Measured parameter	%	)							
			b : Factor maximum tolerance in check of cylinder-individual fuel in function monitoring		0.898438	-	Air-Fuel check is disabled for function monitoring	=	FALSE	-				
			c : Offset tolerance in check of cylinder-individual fuel in function monitoring		10.5	%	Basic enable conditions met	=	see sheet enable tables	-				
			)											
		Path 7: The complement check of cylinder counter for homogeneous injection, stratified injection and calculation of post injection at dynamic load.	The complement of cylinder counter is not equal to the redundant counter for homogenous injection in function monitoring	=	TRUE	-	Ignition is ON	=	TRUE	-	4.16	sec	continuous	1 Trip
			OR				Engine Speed	>=	1200	rpm				
			The complement of cylinder counter is not equal to the redundant counter for stratified injection in function monitoring	=	TRUE	-	Injection cut off (ICO) is not requested	=	TRUE	-				
			OR				Injection cut off (ICO) is not requested from function monitoring	=	TRUE	-				
			The complement of cylinder counter is not equal to the redundant counter for calculation of post-injection at dynamic load in function monitoring	=	TRUE	-	System voltage exceeds 8V	=	TRUE	-				
			OR				Limp home mode is not requested from function monitoring	=	TRUE	-				
			Cylinder counter for homogeneous injection	>=	8	-	No loss of Synchronisation during function monitoring	=	TRUE	-				
			OR				(							
			Cylinder counter for stratified injection	>=	8	-	ECU is not in pre-drive state	=	TRUE	-				
			OR				OR							
			Cylinder counter for calculation of post-injection at dynamic load	>=	8	-	ECU is not in post-drive state	=	TRUE	-				
							)							
							Air-Fuel check is disabled for function monitoring	=	FALSE	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Path 8: Plausibility check : Average value for cylinder individual fuel correction in function monitoring is greater than a calibrated threshold for a calibrated period of time	Average value for cylinder individual fuel correction in function monitoring	>	1.030029	-	Ignition is ON	=	TRUE	-	4.16	sec	continuous	1 Trip

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine Speed	>= 1200 rpm		
					Injection cut off (ICO) is not requested	= TRUE -		
					Injection cut off (ICO) is not requested from function monitoring	= TRUE -		
					System voltage exceeds 8V	= TRUE -		
					Limp home mode is not requested from function monitoring	= TRUE -		
					No loss of Synchronisation during function monitoring	= TRUE -		
					(			
					ECU is not in pre-drive state	= TRUE -		
					OR			
					ECU is not in post-drive state	= TRUE -		
					)			
					Air-Fuel check is disabled for function monitoring	= FALSE -		
					Basic enable conditions met	= see sheet enable tables -		
		Path 9: Detects plausibility check of air/fuel ratio in function monitoring: complement check	(		Engine Speed	>= 1200 rpm	0.52 sec continuous	1 Trip
			Complement of mode of operation in gasoline direct injection (GDI) for monitoring where: A: Mode of operation in gasoline direct injection (GDI) for monitoring)	!= A -	Injection cut off (ICO) is not requested	= TRUE -		
					Injection cut off (ICO) is not requested from function monitoring	= TRUE -		
					System voltage exceeds 8V	= TRUE -		
					Limp home mode is not requested from function monitoring	= TRUE -		
					No loss of Synchronisation during function monitoring	= TRUE -		
					(			
					ECU is not in pre-drive state	= TRUE -		
					ECU is not in post-drive state	= TRUE -		
					)			
					Air-Fuel check is disabled for function monitoring	= FALSE -		
					No pending or confirmed DTCs	= see sheet enable tables -		
					Basic enable conditions met	= see sheet inhibit tables -		
		Path 10: Checks the operation mode of ECU in function monitoring	(		Engine Speed	>= 1200 rpm	0.52 sec continuous	1 Trip
			Gasoline direct injection for monitoring is not in homogeneous operation mode	= TRUE -	Injection cut off (ICO) is not requested	= TRUE -		
			Gasoline direct injection (GDI) for monitoring is not in homogeneous split mode	= TRUE -	Injection cut off (ICO) is not requested from function monitoring	= TRUE -		
			Gasoline direct injection (GDI) for monitoring is not in homogeneous knock protection mode	= TRUE -	System voltage exceeds 8V	= TRUE -		
			)		Limp home mode is not requested from function monitoring	= TRUE -		
					No loss of Synchronisation during function monitoring	= TRUE -		
					(			
					ECU is not in pre-drive state	= TRUE -		
					ECU is not in post-drive state	= TRUE -		
					)			
					Air-Fuel check is disabled for function monitoring	= FALSE -		
					No pending or confirmed DTCs	= see sheet enable tables -		
					Basic enable conditions met	= see sheet inhibit tables -		
		Path 11: The Lambda setpoint is checked against the range of permissable values for bank 1 and bank 2 systems	Desired lambda limitation for Bank 1 for monitoring	< 0.67944 -	Engine Speed	>= 1200 rpm	0.52 sec continuous	1 Trip
			OR		Injection cut off (ICO) is not requested	= TRUE -		
			Desired lambda limitation for Bank 2 for monitoring	< 0.67944 -	Injection cut off (ICO) is not requested from function monitoring	= TRUE -		
			OR		System voltage exceeds 8V	= TRUE -		
			Desired lambda limitation for Bank 1 for monitoring	> 1.20044 -	Limp home mode is not requested from function monitoring	= TRUE -		
			OR		No loss of Synchronisation during function monitoring	= TRUE -		
			Desired lambda limitation for Bank 2 for monitoring	> 1.20044 -	(			
					ECU is not in pre-drive state	= TRUE -		
					ECU is not in post-drive state	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
							)							
							Air-Fuel check is disabled for function monitoring	=	FALSE	-				
							No pending or confirmed DTCs	=	see sheet enable tables	-				
							Basic enable conditions met	=	see sheet inhibit tables	-				
		Path 12: Ignition angle plausibility check in function monitoring	Ignition angle value	!=	A	degrees	Ignition is ON	=	TRUE	-	0.52	sec	continuous	1 Trip
			where: A: complement of "the complement of the ignition angle value"				Engine Speed	>=	1200	rpm				
							Injection cut off (ICO) is not requested	=	TRUE	-				
							Injection cut off (ICO) is not requested from function monitoring	=	TRUE	-				
							System voltage exceeds 8V	=	TRUE	-				
							Limp home mode is not requested from function monitoring	=	TRUE	-				
							No loss of Synchronisation during function monitoring	=	TRUE	-				
							(							
							ECU is not in pre-drive state	=	TRUE	-				
							OR							
							ECU is not in post-drive state	=	TRUE	-				
							)							
							Air-Fuel check is disabled for function monitoring	=	FALSE	-				
							Basic enable conditions met	=	see sheet inhibit tables	-				
		Path 13: Torque comparison - The difference between current torque in the function monitoring and the filtered relative permissible torque is compared with threshold.	(Difference between current torque and filtered relative permissible torque in function monitoring	>	0	%	Ignition is ON	=	TRUE	-	0.52	sec	continuous	1 Trip
			for time	>=	0.52	sec	Injection cut off (ICO) is not requested from function monitoring	=	TRUE	-				
			OR				Injection cut off (ICO) is not requested	=	TRUE	-				
			Error sum of the relative deviation from the permissable torque in function monitoring)	>	8	%*s	System voltage exceeds 8V	=	TRUE	-				
							Limp home mode is not requested from function monitoring	=	TRUE	-				
							No loss of Synchronisation during function monitoring	=	TRUE	-				
							(							
							ECU is not in pre-drive state	=	TRUE	-				
							OR							
							ECU is not in post-drive state	=	TRUE	-				
							)							
							Basic enable conditions met	=	see sheet inhibit tables	-				
		Path 14: The injection cut-off pattern total is evaluated by compared with the expected and actual injection cut-off pattern.	The complement of injection cut-off pattern total is not equal to the injection cut-off pattern	=	TRUE	-	Ignition is ON	=	TRUE	-	0.52	sec	continuous	1 Trip
							Engine Speed	>=	1200	rpm				
							Injection cut off (ICO) is not requested	=	TRUE	-				
							Injection cut off (ICO) is not requested from function monitoring	=	TRUE	-				
							System voltage exceeds 8V	=	TRUE	-				
							Limp home mode is not requested from function monitoring	=	TRUE	-				
							No loss of Synchronisation during function monitoring	=	TRUE	-				
							(							
							ECU is not in pre-drive state	=	TRUE	-				
							OR							
							ECU is not in post-drive state	=	TRUE	-				
							)							
							Air-Fuel check is disabled for function monitoring	=	FALSE	-				
							Basic enable conditions met	=	see sheet inhibit tables	-				
		Path 15: The complement check of driver injection demand for homogeneous injection, stratified injection and calculation of post injection at dynamic load.	The complement of driver injection demand is not equal to the redundant driver injection demand for homogenous injection in function monitoring	=	TRUE	-	Ignition is ON	=	TRUE	-	0.52	sec	continuous	1 Trip
			OR				and							

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
			The complement of driver injection demand is not equal to the redundant driver injection demand for stratified injection in function monitoring	=	TRUE	-	Engine Speed	>=	1200	rpm				
			OR				Injection cut off (ICO) is not requested	=	TRUE	-				
			The complement of driver injection demand is not equal to the redundant driver injection demand for calculation of post injection at dynamic in function monitoring	=	TRUE	-	Injection cut off (ICO) is not requested from function monitoring	=	TRUE	-				
							System voltage exceeds 8V	=	TRUE	-				
							Limp home mode is not requested from function monitoring	=	TRUE	-				
							No loss of Synchronisation during function monitoring	=	TRUE	-				
							(							
							ECU is not in pre-drive state	=	TRUE	-				
							OR							
							ECU is not in post-drive state	=	TRUE	-				
							)							
							Air-Fuel check is disabled for function monitoring	=	FALSE	-				
							Basic enable conditions met	=	see sheet inhibit tables	-				
		Path 16: The complement of injection mode timing check in function monitoring.	The complement of injection timing is not equal to the redundant injection timing in function monitoring	=	TRUE	-	Ignition is ON	=	TRUE	-	0.52	sec	continuous	1 Trip
							Engine Speed	>=	1200	rpm				
							Injection cut off (ICO) is not requested	=	TRUE	-				
							Injection cut off (ICO) is not requested from function monitoring	=	TRUE	-				
							System voltage exceeds 8V	=	TRUE	-				
							Limp home mode is not requested from function monitoring	=	TRUE	-				
							No loss of Synchronisation during function monitoring	=	TRUE	-				
							(							
							ECU is not in pre-drive state	=	TRUE	-				
							OR							
							ECU is not in post-drive state	=	TRUE	-				
							)							
							Air-Fuel check is disabled for function monitoring	=	FALSE	-				
							Basic enable conditions met	=	see sheet inhibit tables	-				
		Path 17: Complement check to ensure the stored injection cut off information for all cylinders for homogeneous injection, stratified injection and calculation of post injection at dynamic load.	Injection cut off mask is not equal to the injection cut off pattern total in the cylinder individual cut off array at the cylinder for homogeneous injection	=	TRUE	-	Ignition is ON	=	TRUE	-	0.52	sec	continuous	1 Trip
			OR				Engine Speed	>=	1200	rpm				
			Injection cut off pattern total is not equal to the complement of injection cut off pattern total in the cylinder individual cut off array at position of stratified injection	=	TRUE	-	Injection cut off (ICO) is not requested	=	TRUE	-				
			OR				Injection cut off (ICO) is not requested from function monitoring	=	TRUE	-				
			Injection cut off pattern total is not equal to the complement of injection cut off pattern total in the cylinder individual cut off array at position of calculation of post injection at dynamic load	=	TRUE	-	System voltage exceeds 8V	=	TRUE	-				
							Limp home mode is not requested from function monitoring	=	TRUE	-				
							No loss of Synchronisation during function monitoring	=	TRUE	-				
							(							
							ECU is not in pre-drive state	=	TRUE	-				
							OR							
							ECU is not in post-drive state	=	TRUE	-				
							)							
							Air-Fuel check is disabled for function monitoring	=	FALSE	-				
							Basic enable conditions met	=	see sheet inhibit tables	-				
		Path 18: Injection cut-off pattern total is checked against the injections currently demanded from the driver for homogeneous and calculation of post injection at dynamic load	(				All the partial injections are calculated in S0	=	TRUE	-	0.52	sec	continuous	1 Trip

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
			Driver injection demand for homogeneous injection mode	>	0	-	OR							
			(				All the partial injections are calculated in S0 and S1 (mixed timing)	=	TRUE	-				
			Injection is allowed	=	FALSE	-	Engine Speed	>=	1200	rpm				
			OR				Injection cut off (ICO) is not requested	=	TRUE	-				
			Injection cut-off pattern total is performed individually for homogeneous injection mode	=	TRUE	-	Injection cut off (ICO) is not requested from function monitoring	=	TRUE	-				
			)				System voltage exceeds 8V	=	TRUE	-				
			)				Limp home mode is not requested from function monitoring	=	TRUE	-				
			OR				No loss of Synchronisation during function monitoring	=	TRUE	-				
			(				(							
			Driver injection demand for calculation of post injection mode	>	0	-	ECU is not in pre-drive state	=	TRUE	-				
			(				OR							
			Injection is allowed	=	FALSE	-	ECU is not in post-drive state	=	TRUE	-				
			OR				)							
			Injection cut-off pattern total is performed individually for calculation of post injection mode	=	TRUE	-	Air-Fuel check is disabled for function monitoring	=	FALSE	-				
			)				Basic enable conditions met	=	see sheet inhibit tables	-				
			)											
		Path 19: Injection cut-off pattern total is checked against the injections currently demanded from the driver for stratified injection modes.	(				All the partial injections are calculated in S0 and S1	=	TRUE	-	0.52	sec	continuous	1 Trip
			Driver injection demand for stratified injection mode	>	0	-	Engine Speed	>=	1200	rpm				
			(				Injection cut off (ICO) is not requested	=	TRUE	-				
			Injection is allowed	=	FALSE	-	Injection cut off (ICO) is not requested from function monitoring	=	TRUE	-				
			OR				System voltage exceeds 8V	=	TRUE	-				
			Injection cut-off pattern total is performed individually for stratified injection mode	=	TRUE	-	Limp home mode is not requested from function monitoring	=	TRUE	-				
			)				No loss of Synchronisation during function monitoring	=	TRUE	-				
			)				(							
							ECU is not in pre-drive state	=	TRUE	-				
							OR							
							ECU is not in post-drive state	=	TRUE	-				
							)							
							Air-Fuel check is disabled for function monitoring	=	FALSE	-				
							Basic enable conditions met	=	see sheet inhibit tables	-				
		Path 20: Fault check of ECU signal input monitoring Air and fuel	Compliment of synchronous counter S0 is not equal to redundant synchronous counter S0 in function monitoring	=	TRUE	-	Ignition is ON	=	TRUE	-	0.52	sec	continuous	1 Trip
			OR				Engine Speed	>=	400	rpm				
			Compliment of synchronous counter S1 is not equal to redundant synchronous counter S1 in function monitoring	=	TRUE	-	Injection cut off (ICO) is not requested	=	TRUE	-				
			OR				Injection cut off (ICO) is not requested from function monitoring	=	TRUE	-				
			Difference between expected values for the number of calls of synchronous counter S0 frames in function monitoring based on the course of engine speed and previous synchronous counter S0	>	1	count	System voltage exceeds 8V	=	TRUE	-				
			OR				Limp home mode is not requested from function monitoring	=	TRUE	-				
			Difference between expected values for the number of calls of synchronous counter S1 frames in function monitoring based on the course of engine speed and previous synchronous counter S1	>	1	count	No loss of Synchronisation during function monitoring	=	TRUE	-				
							(							
							ECU is not in pre-drive state	=	TRUE	-				
							OR							
							ECU is not in post-drive state	=	TRUE	-				
							)							
							Air-Fuel check is disabled for function monitoring	=	FALSE	-				
							Basic enable conditions met	=	TRUE	-				
		Path 21: This function performs a plausibility check of the mixture control for GDI systems and safeguards the fuel mass.	Expected value for relative fuel mass in function monitoring (GDI)	>	(A*B) + C	%	Ignition is ON	=	TRUE	-	0.512	sec	continuous	1 Trip

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
			where				Engine Speed	>=	1200	rpm				
			A: Relative fuel mass				Injection cut off (ICO) is not requested	=	TRUE	-				
			B: Factor maximum tolerance in check of bank selective fuel in function monitoring (GDI)	=	1.101563	-	Injection cut off (ICO) is not requested from function monitoring	=	TRUE	-				
			C : Offset tolerance in check of fuel in function monitoring (GDI)	=	10.5	%	System voltage exceeds 8V	=	TRUE	-				
			OR				Limp home mode is not requested from function monitoring	=	TRUE	-				
			Expected value for relative fuel mass in function monitoring (GDI)	<	(A*B) - C	%	No loss of Synchronisation during function monitoring	=	TRUE	-				
			where				(							
			A: Relative fuel mass				ECU is not in pre-drive state	=	TRUE	-				
			B : Factor minimum tolerance in check of bank selective fuel in function monitoring (GDI)		0.898438	-	OR							
			C : Offset tolerance in check of fuel in function monitoring (GDI)		10.5	%	ECU is not in post-drive state	=	TRUE	-				
							)							
							Air-Fuel check is disabled for function monitoring	=	FALSE	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Path 22: Control fault check of mixture management for GDI.	After start adaption factor in function monitoring (see Look-Up-Table #1)	>	1.01563	deg C	Ignition is ON	=	TRUE	-	0.512	sec	continuous	1 Trip
			OR				Engine Speed	>=	1200	rpm				
			(				Injection cut off (ICO) is not requested	=	TRUE	-				
			Additive adaptive correction of the relative fuel amount on GDI path in function monitoring	>	7.078	%	Injection cut off (ICO) is not requested from function monitoring	=	TRUE	-				
			OR				System voltage exceeds 8V	=	TRUE	-				
			Additive adaptive correction of the relative fuel amount on GDI path bank 2 in function monitoring	>	7.078	%	Limp home mode is not requested from function monitoring	=	TRUE	-				
			)				No loss of Synchronisation during function monitoring	=	TRUE	-				
			OR				(							
			(				ECU is not in pre-drive state	=	TRUE	-				
			lambda collector output in function monitoring	>	1.28006	-	OR							
			OR				ECU is not in post-drive state	=	TRUE	-				
			lambda collector output bank 2 in function monitoring	>	1.28006	-	)							
			)				Air-Fuel check is disabled for function monitoring	=	FALSE	-				
			OR				Basic enable conditions met	=	see sheet enable tables	-				
			(											
			Fuel mixture adaption for GDI injection path in function monitoring	>	1.320068	-								
			OR											
			Fuel mixture adaption for GDI injection path bank 2 in function monitoring	>	1.320068	-								
			)											
			OR											
			(											
			(											
			Relative fuel part of the purge control in function monitoring	<	(a*b) - c									
			where:											
			a : Relative fuel mass on GDI in function monitoring											
			c : Factor tolerance in check of canister purge in function monitoring		-0.090942	-								
			d : Offset tolerance in check of canister purge in function monitoring		6	%								
			)											
			OR											
			(											
			Relative fuel part of the purge control bank 2 in function monitoring	<	(a*b) - c									
			where:											
			a : Relative fuel mass on GDI in function monitoring for Bank 2											
			b : Factor tolerance in check of canister purge in function monitoring		-0.090942	-								
			c : Offset tolerance in check of canister purge in function monitoring		6	%								
			)											
			)											
			OR											
			(											
			(											
			Engine Speed	>=	1400	rpm								

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Fuel evaporated mass of the engine oil in function monitoring	<	-0.094	%						
			)									
			OR									
			(									
			Engine Speed	<	1400	rpm						
			Fuel evaporated mass of the engine oil in function monitoring	<	-0.609	%						
			)									
			)									
			OR									
			The complement of cylinder individual Atkinson fuel amount is not equal to the redundant cylinder individual Atkinson fuel amount in function monitoring	=	TRUE	-						
			OR									
			Mixture adaption factor for Atkinson gasoline backflow in function monitoring	>	1.98999	-						
		Path 23: Monitoring of the electronic transmission range select (ETRS) system (with irreversible error reaction of Level 2)	Level 1 request to apply EPB invalid	=	TRUE	-	Ignition is ON	=	TRUE	-	0.04 sec continuous	1 Trip
			for counts	>=	50	-	(					
			means:				ECU is not in pre-drive state	=	TRUE	-		
			(				OR					
			Level 1 request to apply EPB	=	TRUE	-	ECU is not in post-drive state	=	TRUE	-		
			Vehicle speed	>=	3.11	mph	)					
			for counts	>=	5	-	Basic enable conditions met	=	see sheet enable tables	-		
			)									
			OR									
			Change of direction request from level 1 invalid	=	TRUE	-						
			for counts	>=	50	-						
			OR									
			Missed level 1 request to apply EPB	=	TRUE	-						
			for counts	>=	50	-						
			means:									
			(									
			Level 1 request to apply EPB		FALSE	-						
			Level 2 request to apply EPB		TRUE	-						
			)									
			OR									
			Park engagement and EPB engagement error set	=	TRUE	-						
			for counts	>=	50	-						
			means:									
			(									
			Valid park range request	=	TRUE	-						
			Park engaged by TCU	=	FALSE	-						
			Level 1 request to apply EPB	=	FALSE	-						
			)									
			for counts	>=	150	-						
			OR									
			Unintended vehicle movement despite park request	=	TRUE	-						
			for counts	>=	50	-						
			OR									
			Unintended leave of park state by the TCU despite park request	=	TRUE	-						
			for counts	>=	50	-						
			OR									
			'Shift away from park range' request from level 1 invalid	=	TRUE	-						
			for counts	>=	50	-						
		Path 24: Monitoring of the electronic transmission range select (ETRS) system (with reversible error reaction of Level 2)	Change of direction request from level 1 invalid	=	TRUE	-	Ignition is ON	=	TRUE	-	0.04 sec continuous	1 Trip
			OR				(					
			'Shift away from park range' request from level 1 invalid	=	TRUE	-	ECU is not in pre-drive state	=	TRUE	-		
							OR					
							ECU is not in post-drive state	=	TRUE	-		
							)					
							Basic enable conditions met	=	see sheet enable tables	-		
ECM Programing Errors	P0633	Security key not programmed	Immobilizer secret key is not programmed	=	TRUE	-	(				Execution Rate continuous	no MIL
							Ignition is ON	=	FALSE	-		
							OR			-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Starter control power mode is not in Power OFF mode) Immobilizer is deactivated Manufacturer Enable Counter used to automatically arm Seed & Key Basic enable conditions met	= TRUE - = FALSE - = 0 - = see sheet enable tables -		
	P1631	Incorrect password		= TRUE -	(Ignition is ON OR Starter control power mode is not in Power OFF mode) Immobilizer is deactivated Secret key is programmed Basic enable conditions met	 = FALSE - = TRUE - = FALSE - = TRUE - = see sheet enable tables -	Execution Rate continuous	no MIL
	P0513	Incorrect response from Immobiliser for the challenge send by ECM	An Incorrect response is received from Immobiliser for the challenge send by ECM	= TRUE -	(Ignition is ON OR Starter control power mode is not in Power OFF mode) Immobilizer is deactivated Secret key is programmed Basic enable conditions met	 = FALSE - - = TRUE - - = FALSE - = TRUE - = see sheet enable tables	Execution Rate continuous	no MIL
	P1649	Security Code not programmed	Immobilizer Security code is not programmed	= TRUE -	(Ignition is ON OR Starter control power mode is not in Power OFF mode) Immobilizer is deactivated Global A Immo 1=GlobalA environment Manufacturer Enable Counter used to automatically arm Seed & Key Basic enable conditions met	 = FALSE - = TRUE - = FALSE - = TRUE - = 0 - = see sheet enable tables -	Execution Rate continuous	no MIL
	P0602	Diagnosis of Code Variation of Start Calibration	Dataset is not valid	= TRUE -	Ignition is ON Counter for proc to be executed alternatively Basic enable conditions met	= TRUE - = FALSE - = see sheet enable tables -	once per driving cycle (during initialization)	1 Second
	P0630	Monitoring of Vehicle Identification Number	VIN Not programmed : VIN contains 0xFF in all the 17 bytes	= TRUE -	Ignition is ON VIN buffer is read successfully from EEP Counter for proc to be executed alternatively Basic enable conditions met	= TRUE - = TRUE - = FALSE - = see sheet enable tables -	continuous	1 Trip
ECM Ignition Accessory Input Pin	P2538	Monitoring of T15 handling with ACC-Pin and T15-Pin for Accessory Position Circuit High fault	Terminal 15 status Wake up status for accessory pin (Application Supervisor) CAN message: CAN status	= TRUE - > 0 - = CRANKREQUEST -	No pending or confirmed DTCs Basic enabling conditions are met	= see sheet enable tables - = see sheet inhibit tables -	1 sec once per driving cycle	2 Trips
	P2537	Monitoring of T15 handling with ACC-Pin and T15-Pin for Accessory Position Circuit Low fault	Terminal 15 status Wake up status for accessory pin (Application Supervisor) CAN message: CAN status	= TRUE - = 0 - = RUN -	No pending or confirmed DTCs Basic enabling conditions are met	= see sheet enable tables - = see sheet inhibit tables -	1 sec once per driving cycle	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
		Monitoring of the Accessory Position Circuit CAN Message	Terminal 15 status	=	TRUE	-	No pending or confirmed DTCs	=	see sheet enable tables	-	10	counts	once per driving cycle	2 Trips
			Wake up status for accessory pin (Application Supervisor)	=	0	-	Basic enabling conditions are met	=	see sheet inhibit tables	-				
			Counter for power mode diagnostics: message received	=	0	-								
ECM Ignition On/Start Input Pin	P2535	Monitoring of T15 handling with ACC-Pin and T15-Pin for Accessory Position Circuit Low fault	Terminal 15 status	=	TRUE	-	No pending or confirmed DTCs	=	see sheet enable tables	-	1	sec	once per driving cycle	1 Trip
			Wake up status for accessory pin (Application Supervisor)	=	0	-	Basic enabling conditions are met	=	see sheet inhibit tables	-				
			CAN message: CAN status	=	CRANKREQUEST	-								
	P2534	Monitoring of T15 handling with ACC-Pin and T15-Pin for Accessory Position Circuit Low fault	Terminal 15 status	=	FALSE	-	No pending or confirmed DTCs	=	see sheet enable tables	-	1	sec	once per driving cycle	1 Trip
			Wake up status for accessory pin (Application Supervisor)	>	0	-	Basic enabling conditions are met	=	see sheet inhibit tables	-				
			CAN message: CAN status	=	RUN	-								
Target Wheel Adaptation for Misfire Detection	P0315	Indicates that the engine has experienced a problem with the crankshaft position sensor and/or the crankshaft sensor wheel by monitoring the adapted crankshaft segment time value against a calibrated threshold	**Method 1**: Median segment time adaptation value from test frame	>	1.199951	degrees	Engine speed	>	1400	rpm			Every 11th segment time adaptation sample	1 Trip
			OR				Engine speed	<	3000	rpm				
			Method 1: Median segment time adaptation value in the alternative segment position (catalyst heating) from test frame	>	3.999939	degrees	Engine coolant temperature	>	39.96	deg C				
			where				Rough road detection is not active	=	TRUE	-				
			[One test frame defined by:				(means:							
			Segment time adaptation sample counts	=	11	-	Average wheel acceleration rear axle	<	0	m/(s^2)				
			(sample means:				OR							
			Current segment time adaptation value		measured parameter		Average wheel acceleration front axle)	<	0	m/(s^2)				
			(means:				Traction or electronic stability control torque intervention is not active	=	TRUE	-				
			Segment time ratio	=	[A]/[B]	-	Calculated EPM segment time is valid	=	TRUE	-				
			where				Half-engine mode transition is not active	=	TRUE	-				
			[A] Modelled segment time	=	measured parameter	µs	Half-engine mode state is not active	=	TRUE	-				
			[B] Measured segment time	=	measured parameter	µs	Overrun/fuel cut-off is active	=	TRUE	-				
			Filtered for				Segment time adaptation is not complete	=	TRUE	-				
			N camshaft revolutions				No pending or confirmed DTCs	=	see sheet inhibit tables	-				
			where				Basic enable conditions met	=	see sheet enable tables	-				
			(N	=	(ln([A]/[B]))/(ln[C])	Camshaft revolutions								
			where											
			[A] Filter factor lower limit	=	0.0500031	-								
			[B] Filter factor upper limit	=	0.1999969	-								
			[C] Filter factor slope)))]	=	0.8999939	-								
			for											
			Maximum adaptation value threshold exceedance counter	>=	1	events								
			Method 2: Difference between the maximum and minimum filtered ratios of the modelled to measured segment time during one sample	>	0.399933	degrees							Every segment time adaptation sample	1 Trip
			OR											
			Method 2: Difference between the maximum and minimum filtered ratios of the modelled to measured segment time in the alternative segment position (catalyst heating) during one sample		1.799927	degrees								
			where											
			(sample means:											
			Current segment time adaptation value		measured parameter	-								
			(means:											
			Segment time ratio	=	[A]/[B]	-								
			where											
			[A] Modelled segment time	=	measured parameter	µs								
			[B] Measured segment time	=	measured parameter	µs								
			Filtered for											

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			N camshaft revolutions					
			where					
			(N	= (ln([A]/[B]))/(ln[C]) Camshaft revolutions				
			where					
			[A] Filter factor lower limit	= 0.0500031 -				
			[B] Filter factor upper limit	= 0.1999969 -				
			[C] Filter factor slope)))]	= 0.8999939 -				
			for					
			Segment time ratio difference threshold exceedance counter	>= 3 events				
			Method 3: Difference between the maximum and minimum segment time adaptation values of the inner five adaptation samples	> 0.119934 degrees			Every 11th segment time adaptation sample	1 Trip
			OR					
			Method 3: Difference between the maximum and minimum segment time adaptation values of the inner five adaptation samples in the alternative segment position (catalyst heating)	> [A] x ([B] / [C]) -				
			where					
			[A] Maximum spread threshold of the inner five adaptation values in the standard segment position	0.119934 degrees				
			[B] Standard segment position length	90 degrees				
			[C] Alternative segment position length	18 degrees				
			and					
			(sample means:					
			Current segment time adaptation value	measured parameter -				
			(means:					
			Segment time ratio	= [A]/[B] -				
			where					
			[A] Modelled segment time	= measured parameter µs				
			[B] Measured segment time	= measured parameter µs				
			Filtered for					
			N camshaft revolutions					
			where					
			(N	= (ln([A]/[B]))/(ln[C]) Camshaft revolutions				
			where					
			[A] Filter factor lower limit	= 0.0500031 -				
			[B] Filter factor upper limit	= 0.1999969 -				
			[C] Filter factor slope)))]	= 0.8999939 -				
			for					
			Inner five segment time adaptation value difference threshold exceedance counter	>= 3 events				
High Speed CAN Bus	U0073	Diagnosis of Bus off error for High Speed CAN controller	Bus off error is detected at High Speed CAN controller	= TRUE -	Ignition is ON No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	2 sec continuous	1 Trips
High Speed CAN Bus	U0101	Detects when the time since the last message from the Transmission control module for the frame ETEI_Transmission_General_Status was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Transmission control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	1 Trip
	U0101	Detects when the time since the last message from the Transmission control module for the frame PPEI_Trans_General_Status_1_Rx was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Transmission control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	1 Trip
	U0101	Detects when the time since the last message from the Transmission control module for the frame PPEI_Trans_General_Status_2_Rx was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Transmission control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	1 Trip

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	U0101	Detects when the time since the last message from the Transmission control module for the frame PPEI_Trans_General_Status_3_Rx was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Transmission control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1.25 sec continuous	1 Trip
	U0101	Detects when the time since the last message from the Transmission control module for the frame PPEI_Trans_General_Status_4_HS was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Transmission control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	1 Trip
	U0101	Detects when the time since the last message from the Transmission control module for the frame PPEI_Transmission_Otpt_Rot_Stat was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Transmission control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	1 Trip
	U0101	Detects when the time since the last message from the Transmission control module for the frame PTEI_Hybrid_Trans_Status_2 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Transmission control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	1 Trip
	U0101	Detects when the time since the last message from the Transmission control module for the frame PTEI_Trans_General_Status_2 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Transmission control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	1 Trip
	U0101	Detects when the time since the last message from the Transmission control module for the frame PTEI_Trans_Ratio_Status was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Transmission control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	1 Trip
	U0101	Detects when the time since the last message from the Transmission control module for the frame PTEI_Transmission_Torque_Request was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Transmission control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	1 Trip
	U0102	Detects when the time since the last message from the Transfer Case Control Module for the frame PPEI_Secondary_Axle_Status was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Transfer Case Control Module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	2 Trips
	U0104	Detects when the time since the last message from the Cruise Control Module for the frame Adaptive_Cruise_Disp_Stat_HS was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Cruise Control Module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	no MIL
	U0104	Detects when the time since the last message from the Cruise Control Module for the frame PPEI_Adaptive_Cruise_Axl_Trq_Req was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Cruise Control Module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	no MIL

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
	U0129	Detects when the time since the last message from the Brake system control module "A" for the frame Antilock_Brake_and_TC_Status_HS was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Brake system control module "A" was received is greater than a supervision timeout value	=	TRUE	-	Ignition is ON	=	TRUE	-	1	sec	continuous	2 Trips
						-	Basic enable conditions met	=	see sheet enable tables	-				
	U0129	Detects when the time since the last message from the Brake system control module "A" for the frame Brake_Pedal_Driver_Status_HS was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Brake system control module "A" was received is greater than a supervision timeout value	=	TRUE	-	Ignition is ON	=	TRUE	-	1	sec	continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
	U0129	Detects when the time since the last message from the Brake system control module "A" for the frame Electric_Park_Brake_Status_HS was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Brake system control module "A" was received is greater than a supervision timeout value	=	TRUE	-	Ignition is ON	=	TRUE	-	1	sec	continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
	U0129	Detects when the time since the last message from the Brake system control module "A" for the frame PPEI_Chassis_Eng_Torque_Req_1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Brake system control module "A" was received is greater than a supervision timeout value	=	TRUE	-	Ignition is ON	=	TRUE	-	1	sec	continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
	U0129	Detects when the time since the last message from the Brake system control module "A" for the frame PPEI_Chassis_General_Status_1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Brake system control module "A" was received is greater than a supervision timeout value	=	TRUE	-	Ignition is ON	=	TRUE	-	1	sec	continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
	U0129	Detects when the time since the last message from the Brake system control module "A" for the frame PPEI_Chassis_General_Status_2 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Brake system control module "A" was received is greater than a supervision timeout value	=	TRUE	-	Ignition is ON	=	TRUE	-	1	sec	continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
	U0129	Detects when the time since the last message from the Brake system control module "A" for the frame PPEI_Driven_Whl_Rotational_Stat was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Brake system control module "A" was received is greater than a supervision timeout value	=	TRUE	-	Ignition is ON	=	TRUE	-	1	sec	continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
	U0129	Detects when the time since the last message from the Brake system control module "A" for the frame PPEI_Driver_Command_Brake_Status was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Brake system control module "A" was received is greater than a supervision timeout value	=	TRUE	-	Ignition is ON	=	TRUE	-	1	sec	continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				
	U0129	Detects when the time since the last message from the Brake system control module "A" for the frame PPEI_Long_Lat_Sensor_Data_HS was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Brake system control module "A" was received is greater than a supervision timeout value	=	TRUE	-	Ignition is ON	=	TRUE	-	1	sec	continuous	2 Trips
							Basic enable conditions met	=	see sheet enable tables	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	U0129	Detects when the time since the last message from the Brake system control module "A" for the frame PPEI_NonDrivn_Whl_Rotationl_Stat was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Brake system control module "A" was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	2 Trips
	U0140	Detects when the time since the last message from the Body control module for the frame Body_Information_2_HS was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Body control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	1 Trip
	U0140	Detects when the time since the last message from the Body control module for the frame Body_Information_4_HS was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Body control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	1 Trip
	U0140	Detects when the time since the last message from the Body control module for the frame Body_Information_HS was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Body control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	1 Trip
	U0140	Detects when the time since the last message from the Body control module for the frame Exterior_Lighting_HS was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Body control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	2.5 sec continuous	1 Trip
	U0140	Detects when the time since the last message from the Body control module for the frame Immobilizer_Identifier_HS was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Body control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	1 Trip
	U0140	Detects when the time since the last message from the Body control module for the frame Lighting_Customization_Rqst_1_HS was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Body control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	1 Trip
	U0140	Detects when the time since the last message from the Body control module for the frame PPEI_Brake_Apply_Status was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Body control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	1 Trip
	U0140	Detects when the time since the last message from the Body control module for the frame PPEI_Climate_System_Gen_Info2 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Body control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	2.5 sec continuous	1 Trip
	U0140	Detects when the time since the last message from the Body control module for the frame PPEI_Cruise_Control_Sw_Status was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Body control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	1 Trip

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	U0140	Detects when the time since the last message from the Body control module for the frame PPEI_Gateway_LS_General_Info was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Body control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	1 Trip
	U0140	Detects when the time since the last message from the Body control module for the frame PPEI_Platform_Configuration_Data was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Body control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	2.5 sec continuous	1 Trip
	U0140	Detects when the time since the last message from the Body control module for the frame PPEI_Platform_Eng_Cntrl_Req_2 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Body control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1.25 sec continuous	1 Trip
	U0140	Detects when the time since the last message from the Body control module for the frame PPEI_Platform_Eng_Cntrl_Requests was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Body control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	1 Trip
	U0140	Detects when the time since the last message from the Body control module for the frame PPEI_Platform_General_Status was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Body control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.3 sec continuous	1 Trip
	U0140	Detects when the time since the last message from the Body control module for the frame PPEI_Steering_Wheel_Angle was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Body control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	1 Trip
	U0140	Detects when the time since the last message from the Body control module for the frame PPEI_VIN_Digits_10_to_17 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Body control module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	2.5 sec continuous	1 Trip
	U0146	Detects when the time since the last message from the Gateway "A" for the frame PPEI_CGM_General_Status_2_HS was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Gateway "A" was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	2.5 sec continuous	2 Trips
	U0146	Detects when the time since the last message from the Gateway "A" for the frame PPEI_CGM_General_Status_HS was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Gateway "A" was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	2 Trips
	U023A	Detects when the time since the last message from the Image Processing Module "A" for the frame PPEI_Collision_Prep_Req_Status was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Image Processing Module "A" was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	no MIL

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Speed CAN Bus	U0402	Detects when wrong data length code received by the frame ETEI_Transmission_General_Status from Transmission Control Module	Wrong data length code received by the frame ETEI_Transmission_General_Status from Transmission Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
		Detects when wrong data length code received by the frame PPEI_Trans_General_Status_1_Rx from Transmission Control Module	Wrong data length code received by the frame PPEI_Trans_General_Status_1_Rx from Transmission Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
		Detects when wrong data length code received by the frame PPEI_Trans_General_Status_2_Rx from Transmission Control Module	Wrong data length code received by the frame PPEI_Trans_General_Status_2_Rx from Transmission Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
		Detects when wrong data length code received by the frame PPEI_Trans_General_Status_3_Rx from Transmission Control Module	Wrong data length code received by the frame PPEI_Trans_General_Status_3_Rx from Transmission Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
		Detects when wrong data length code received by the frame PPEI_Trans_General_Status_4_HS from Transmission Control Module	Wrong data length code received by the frame PPEI_Trans_General_Status_4_HS from Transmission Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
		Detects when wrong data length code received by the frame PPEI_Transmission_Otpt_Rot_Stat from Transmission Control Module	Wrong data length code received by the frame PPEI_Transmission_Otpt_Rot_Stat from Transmission Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
		Detects when wrong data length code received by the frame PTEI_Hybrid_Trans_Status_2 from Transmission Control Module	Wrong data length code received by the frame PTEI_Hybrid_Trans_Status_2 from Transmission Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
		Detects when wrong data length code received by the frame PTEI_Trans_General_Status_2 from Transmission Control Module	Wrong data length code received by the frame PTEI_Trans_General_Status_2 from Transmission Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
		Detects when wrong data length code received by the frame PTEI_Trans_Ratio_Status from Transmission Control Module	Wrong data length code received by the frame PTEI_Trans_Ratio_Status from Transmission Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
		Detects when wrong data length code received by the frame PTEI_Transmission_Torque_Request from Transmission Control Module	Wrong data length code received by the frame PTEI_Transmission_Torque_Request from Transmission Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
	U0403	Detects when wrong data length code received by the frame PPEI_Secondary_Axle_Status from Transfer Case Control Module	Wrong data length code received by the frame PPEI_Secondary_Axle_Status from Transfer Case Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
	U0405	Detects when wrong data length code received by the frame Adaptive_Cruise_Disp_Stat_HS from Cruise Control Module	Wrong data length code received by the frame Adaptive_Cruise_Disp_Stat_HS from Cruise Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	no MIL

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Detects when wrong data length code received by the frame PPEI_Adaptive_Cruise_Axl_Trq_Req from Cruise Control Module	Wrong data length code received by the frame PPEI_Adaptive_Cruise_Axl_Trq_Req from Cruise Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	no MIL
	U0418	Detects when wrong data length code received by the frame Antilock_Brake_and_TC_Status_HS from Brake System Control Module "A"	Wrong data length code received by the frame Antilock_Brake_and_TC_Status_HS from Brake System Control Module "A"	= TRUE - -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong data length code received by the frame Brake_Pedal_Driver_Status_HS from Brake System Control Module "A"	Wrong data length code received by the frame Brake_Pedal_Driver_Status_HS from Brake System Control Module "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong data length code received by the frame Electric_Park_Brake_Status_HS from Brake System Control Module "A"	Wrong data length code received by the frame Electric_Park_Brake_Status_HS from Brake System Control Module "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong data length code received by the frame PPEI_Chassis_Eng_Torque_Req_1 from Brake System Control Module "A"	Wrong data length code received by the frame PPEI_Chassis_Eng_Torque_Req_1 from Brake System Control Module "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong data length code received by the frame PPEI_Chassis_General_Status_1 from Brake System Control Module "A"	Wrong data length code received by the frame PPEI_Chassis_General_Status_1 from Brake System Control Module "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong data length code received by the frame PPEI_Chassis_General_Status_2 from Brake System Control Module "A"	Wrong data length code received by the frame PPEI_Chassis_General_Status_2 from Brake System Control Module "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong data length code received by the frame PPEI_Driven_Whl_Rotational_Stat from Brake System Control Module "A"	Wrong data length code received by the frame PPEI_Driven_Whl_Rotational_Stat from Brake System Control Module "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong data length code received by the frame PPEI_Driver_Command_Brake_Status from Brake System Control Module "A"	Wrong data length code received by the frame PPEI_Driver_Command_Brake_Status from Brake System Control Module "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong data length code received by the frame PPEI_Long_Lat_Sensor_Data_HS from Brake System Control Module "A"	Wrong data length code received by the frame PPEI_Long_Lat_Sensor_Data_HS from Brake System Control Module "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong data length code received by the frame PPEI_NonDrivn_Whl_Rotationl_Stat from Brake System Control Module "A"	Wrong data length code received by the frame PPEI_NonDrivn_Whl_Rotationl_Stat from Brake System Control Module "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
	U0422	Detects when wrong data length code received by the frame Body_Information_2_HS from Body Control Module	Wrong data length code received by the frame Body_Information_2_HS from Body Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Detects when wrong data length code received by the frame Body_Information_4_HS from Body Control Module	Wrong data length code received by the frame Body_Information_4_HS from Body Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
		Detects when wrong data length code received by the frame Body_Information_HS from Body Control Module	Wrong data length code received by the frame Body_Information_HS from Body Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
		Detects when wrong data length code received by the frame Immobilizer_Identifier_HS from Body Control Module	Wrong data length code received by the frame Immobilizer_Identifier_HS from Body Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
		Detects when wrong data length code received by the frame Lighting_Customization_Rqst_1_HS from Body Control Module	Wrong data length code received by the frame Lighting_Customization_Rqst_1_HS from Body Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
		Detects when wrong data length code received by the frame PPEI_Brake_Apply_Status from Body Control Module	Wrong data length code received by the frame PPEI_Brake_Apply_Status from Body Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
		Detects when wrong data length code received by the frame PPEI_Climate_System_Gen_Info2 from Body Control Module	Wrong data length code received by the frame PPEI_Climate_System_Gen_Info2 from Body Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
		Detects when wrong data length code received by the frame PPEI_Cruise_Control_Sw_Status from Body Control Module	Wrong data length code received by the frame PPEI_Cruise_Control_Sw_Status from Body Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
		Detects when wrong data length code received by the frame PPEI_Gateway_LS_General_Info from Body Control Module	Wrong data length code received by the frame PPEI_Gateway_LS_General_Info from Body Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
		Detects when wrong data length code received by the frame PPEI_Platform_Configuration_Data from Body Control Module	Wrong data length code received by the frame PPEI_Platform_Configuration_Data from Body Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
		Detects when wrong data length code received by the frame PPEI_Platform_Eng_Cntrl_Req_2 from Body Control Module	Wrong data length code received by the frame PPEI_Platform_Eng_Cntrl_Req_2 from Body Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
		Detects when wrong data length code received by the frame PPEI_Platform_Eng_Cntrl_Requests from Body Control Module	Wrong data length code received by the frame PPEI_Platform_Eng_Cntrl_Requests from Body Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
		Detects when wrong data length code received by the frame PPEI_Platform_General_Status from Body Control Module	Wrong data length code received by the frame PPEI_Platform_General_Status from Body Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.3 sec continuous	1 Trip

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Detects when wrong data length code received by the frame PPEI_Steering_Wheel_Angle from Body Control Module	Wrong data length code received by the frame PPEI_Steering_Wheel_Angle from Body Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
		Detects when wrong data length code received by the frame PPEI_VIN_Digits_10_to_17 from Body Control Module	Wrong data length code received by the frame PPEI_VIN_Digits_10_to_17 from Body Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	1 Trip
	U0447	Detects when wrong data length code received by the frame PPEI_CGM_General_Status_2_HS from Gateway "A"	Wrong data length code received by the frame PPEI_CGM_General_Status_2_HS from Gateway "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong data length code received by the frame PPEI_CGM_General_Status_HS from Gateway "A"	Wrong data length code received by the frame PPEI_CGM_General_Status_HS from Gateway "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
	U053B	Detects when wrong data length code received by the frame PPEI_Collision_Prep_Req_Status from Image Processing Module "A"	Wrong data length code received by the frame PPEI_Collision_Prep_Req_Status from Image Processing Module "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	no MIL
Powertrain Expansion CAN Bus	U0074	Diagnosis of Bus off error for Powertrain Expansion CAN controller	Bus off error is detected at Powertrain Expansion CAN controller	= TRUE -	Ignition is ON No pending or confirmed FIDs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	2 sec continuous	1 Trips
	U18A7	Detects when the time since the last message from the DC to DC Converter Control Module "A" for the frame PPEI_DC_Cnv_Int_Health_Stat_PE was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the DC to DC Converter Control Module "A" was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	2 Trips
		Detects when the time since the last message from the DC to DC Converter Control Module "A" for the frame PPEI_DC_Conv_General_Status_PE was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the DC to DC Converter Control Module "A" was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	2 Trips
	U18D3	Detects when the time since the last message from the Transmission Range Selector Control Module on Powertrain Expansion CAN Bus for the frame SIB_Input_Sensor_State_Scndry_PE was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Transmission Range Selector Control Module on Powertrain Expansion CAN Bus was received is greater than a supervision timeout value	= TRUE - -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	2 Trips
		Detects when the time since the last message from the Transmission Range Selector Control Module on Powertrain Expansion CAN Bus for the frame SIB_Linear_Sensor_Status_Sec_PE was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Transmission Range Selector Control Module on Powertrain Expansion CAN Bus was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	U0599	Detects when wrong data length code received by the frame PPEI_DC_Cnv_Int_Health_Stat_PE from DC to DC Converter Control Module "A"	Wrong data length code received by the frame PPEI_DC_Cnv_Int_Health_Stat_PE from DC to DC Converter Control Module "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong data length code received by the frame PPEI_DC_Conv_General_Status_PE from DC to DC Converter Control Module "A"	Wrong data length code received by the frame PPEI_DC_Conv_General_Status_PE from DC to DC Converter Control Module "A"	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
	U0404	Detects when wrong data length code received by the frame SIB_General_Info_2_S1 from Transmission Range Selector Control Module	Wrong data length code received by the frame SIB_General_Info_2_S1 from Transmission Range Selector Control Module	= TRUE - -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong data length code received by the frame SIB_General_Info_S1 from Transmission Range Selector Control Module	Wrong data length code received by the frame SIB_General_Info_S1 from Transmission Range Selector Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong alive rolling counter received by the frame SIB_Input_Sensor_State_Primry_S1 from Transmission Range Selector Control Module	Wrong alive rolling counter received by the frame SIB_Input_Sensor_State_Primry_S1 from Transmission Range Selector Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong checksum received by the frame SIB_Input_Sensor_State_Primry_S1 from Transmission Range Selector Control Module	Wrong checksum received by the frame SIB_Input_Sensor_State_Primry_S1 from Transmission Range Selector Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong data length code received by the frame SIB_Input_Sensor_State_Primry_S1 from Transmission Range Selector Control Module	Wrong data length code received by the frame SIB_Input_Sensor_State_Primry_S1 from Transmission Range Selector Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong alive rolling counter received by the frame SIB_Input_Sensor_State_Scndry_PE from Transmission Range Selector Control Module	Wrong alive rolling counter received by the frame SIB_Input_Sensor_State_Scndry_PE from Transmission Range Selector Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong checksum received by the frame SIB_Input_Sensor_State_Scndry_PE fromTransmission Range Selector Control Module	Wrong checksum received by the frame SIB_Input_Sensor_State_Scndry_PE from Transmission Range Selector Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong data length code received by the frame SIB_Input_Sensor_State_Scndry_PE fromTransmission Range Selector Control Module	Wrong data length code received by the frame SIB_Input_Sensor_State_Scndry_PE from Transmission Range Selector Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong alive rolling counter received by the frame SIB_Linear_Sensor_Status_Prim_S1 from Transmission Range Selector Control Module	Wrong alive rolling counter received by the frame SIB_Linear_Sensor_Status_Prim_S1 from Transmission Range Selector Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong checksum received by the frame SIB_Linear_Sensor_Status_Prim_S1 from Transmission Range Selector Control Module	Wrong checksum received by the frame SIB_Linear_Sensor_Status_Prim_S1 from Transmission Range Selector Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Detects when wrong data length code received by the frame SIB_Linear_Sensor_Status_Prim_S1 from Transmission Range Selector Control Module	Wrong data length code received by the frame SIB_Linear_Sensor_Status_Prim_S1 from Transmission Range Selector Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong alive rolling counter received by the frame SIB_Linear_Sensor_Status_Sec_PE from Transmission Range Selector Control Module	Wrong alive rolling counter received by the frame SIB_Linear_Sensor_Status_Sec_PE from Transmission Range Selector Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong checksum received by the frame SIB_Linear_Sensor_Status_Sec_PE from Transmission Range Selector Control Module	Wrong checksum received by the frame SIB_Linear_Sensor_Status_Sec_PE from Transmission Range Selector Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
		Detects when wrong data length code received by the frame SIB_Linear_Sensor_Status_Sec_PE from Transmission Range Selector Control Module	Wrong data length code received by the frame SIB_Linear_Sensor_Status_Sec_PE from Transmission Range Selector Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
Powertrain Sensor CAN Bus	U0076	Diagnosis of Bus off error forPowertrain Sensor CAN controller	Bus off error is detected at Powertrain Sensor CAN controller	= TRUE -	Ignition is ON No pending or confirmed FIDs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	2 sec continuous	2 Trips
Powertrain Sensor CAN Bus	U18A2	Detects when the time since the last message from the Fuel Pump Driver Control Module for the frame FTZM_Information_1_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Fuel Pump Driver Control Module was received is greater than a supervision timeout value	= TRUE - -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	2 Trips
	U18A2	Detects when the time since the last message from the Fuel Pump Driver Control Module for the frame FTZM_Information_11_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Fuel Pump Driver Control Module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	2 Trips
	U18A2	Detects when the time since the last message from the Fuel Pump Driver Control Module for the frame FTZM_Information_2_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Fuel Pump Driver Control Module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	2 Trips
	U18A2	Detects when the time since the last message from the Fuel Pump Driver Control Module for the frame FTZM_Information_3_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Fuel Pump Driver Control Module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	2 Trips
	U18A2	Detects when the time since the last message from the Fuel Pump Driver Control Module for the frame FTZM_Information_4_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Fuel Pump Driver Control Module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	1 sec continuous	2 Trips
	U18A2	Detects when the time since the last message from the Fuel Pump Driver Control Module for the frame FTZM_Information_5_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Fuel Pump Driver Control Module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON	= TRUE -	1 sec continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Basic enable conditions met	= see sheet enable tables -		
	U18A2	Detects when the time since the last message from the Fuel Pump Driver Control Module for the frame FTZM_Information_7_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Fuel Pump Driver Control Module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON	= TRUE -	1 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	U18A2	Detects when the time since the last message from the Fuel Pump Driver Control Module for the frame FTZM_Information_8_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Fuel Pump Driver Control Module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON	= TRUE -	1 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	U18A2	Detects when the time since the last message from the Fuel Pump Driver Control Module for the frame FTZM_Information_9_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Fuel Pump Driver Control Module was received is greater than a supervision timeout value	= TRUE -	Ignition is ON	= TRUE -	1 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	U18D2	Detects when the time since the last message from the Transmission Range Selector Control Module on Powertrain Sensor CAN Bus for the frame SIB_General_Info_2_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Transmission Range Selector Control Module on Powertrain Sensor CAN Bus was received is greater than a supervision timeout value	= TRUE -	Ignition is ON	= TRUE -	2.5 sec continuous	2 Trips
				-	Basic enable conditions met	= see sheet enable tables -		
	U18D2	Detects when the time since the last message from the Transmission Range Selector Control Module on Powertrain Sensor CAN Bus for the frame SIB_General_Info_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Transmission Range Selector Control Module on Powertrain Sensor CAN Bus was received is greater than a supervision timeout value	= TRUE -	Ignition is ON	= TRUE -	1 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	U18D2	Detects when the time since the last message from the Transmission Range Selector Control Module on Powertrain Sensor CAN Bus for the frame SIB_Input_Sensor_State_Primry_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Transmission Range Selector Control Module on Powertrain Sensor CAN Bus was received is greater than a supervision timeout value	= TRUE -	Ignition is ON	= TRUE -	1 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	U18D2	Detects when the time since the last message from the Transmission Range Selector Control Module on Powertrain Sensor CAN Bus for the frame SIB_Linear_Sensor_Status_Prim_S1 was received is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the Transmission Range Selector Control Module on Powertrain Sensor CAN Bus was received is greater than a supervision timeout value	= TRUE -	Ignition is ON	= TRUE -	1 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
Powertrain Sensor CAN Bus	U131D	Detects when wrong alive rolling counter received by the frame FTZM_Information_1_S1 (Sensor Reference Voltage Status) from Fuel Pump Driver Control Module	Wrong alive rolling counter reveiced by the frame FTZM_Information_1_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON	= TRUE -	0.5 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	U131D	Detects when wrong checksum received by the frame FTZM_Information_1_S1 (Sensor Reference Voltage Status) from Fuel Pump Driver Control Module	Wrong checksum received by the frame FTZM_Information_1_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON	= TRUE -	0.5 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	U131D	Detects when wrong data length code received by the frame FTZM_Information_1_S1 (Sensor Reference Voltage Status) from Fuel Pump Driver Control Module	Wrong data length code received by the frame FTZM_Information_1_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON	= TRUE -	0.5 sec continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Basic enable conditions met	= see sheet enable tables -		
	U131D	Detects when wrong alive rolling counter received by the frame FTZM_Information_11_S1 (Evaporative Emission System Signals) from Fuel Pump Driver Control Module	Wrong alive rolling counter reveiced by the frame FTZM_Information_11_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
	U131D	Detects when wrong checksum received by the frame FTZM_Information_11_S1 (Evaporative Emission System Signals) from Fuel Pump Driver Control Module	Wrong checksum received by the frame FTZM_Information_11_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
	U131D	Detects when wrong data length code received by the frame FTZM_Information_11_S1 (Evaporative Emission System Signals) from Fuel Pump Driver Control Module	Wrong data length code received by the frame FTZM_Information_11_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
	U131D	Detects when wrong alive rolling counter received by the frame FTZM_Information_2_S1 (Battery Voltage Signal) from Fuel Pump Driver Control Module	Wrong alive rolling counter reveiced by the frame FTZM_Information_2_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
	U131D	Detects when wrong checksum received by the frame FTZM_Information_2_S1 (Battery Voltage Signal) from Fuel Pump Driver Control Module	Wrong checksum received by the frame FTZM_Information_2_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
	U131D	Detects when wrong data length code received by the frame FTZM_Information_2_S1 (Battery Voltage Signal) from Fuel Pump Driver Control Module	Wrong data length code received by the frame FTZM_Information_2_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
	U131D	Detects when wrong alive rolling counter received by the frame FTZM_Information_3_S1 (Fuel Level Sensor 1 Signal) from Fuel Pump Driver Control Module	Wrong alive rolling counter reveiced by the frame FTZM_Information_3_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
	U131D	Detects when wrong checksum received by the frame FTZM_Information_3_S1 (Fuel Level Sensor 1 Signal) from Fuel Pump Driver Control Module	Wrong checksum received by the frame FTZM_Information_3_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
	U131D	Detects when wrong data length code received by the frame FTZM_Information_3_S1 (Fuel Level Sensor 1 Signal) from Fuel Pump Driver Control Module	Wrong data length code received by the frame FTZM_Information_3_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
	U131D	Detects when wrong alive rolling counter received by the frame FTZM_Information_4_S1 (Fuel Level Sensor 2 Signal) from Fuel Pump Driver Control Module	Wrong alive rolling counter reveiced by the frame FTZM_Information_4_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
	U131D	Detects when wrong checksum received by the frame FTZM_Information_4_S1 (Fuel Level Sensor 2 Signal) from Fuel Pump Driver Control Module	Wrong checksum received by the frame FTZM_Information_4_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
	U131D	Detects when wrong data length code received by the frame FTZM_Information_4_S1 (Fuel Level Sensor 2 Signal) from Fuel Pump Driver Control Module	Wrong data length code received by the frame FTZM_Information_4_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON	= TRUE -	0.5 sec continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Basic enable conditions met	= see sheet enable tables -		
	U131D	Detects when wrong alive rolling counter received by the frame FTZM_Information_5_S1 (Ignition Run/Start Voltage Signal) from Fuel Pump Driver Control Module	Wrong alive rolling counter reveiced by the frame FTZM_Information_5_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON	= TRUE -	0.5 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	U131D	Detects when wrong checksum received by the frame FTZM_Information_5_S1 (Ignition Run/Start Voltage Signal) from Fuel Pump Driver Control Module	Wrong checksum received by the frame FTZM_Information_5_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON	= TRUE -	0.5 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	U131D	Detects when wrong data length code received by the frame FTZM_Information_5_S1 (Ignition Run/Start Voltage Signal) from Fuel Pump Driver Control Module	Wrong data length code received by the frame FTZM_Information_5_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON	= TRUE -	0.5 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	U131D	Detects when wrong alive rolling counter received by the frame FTZM_Information_7_S1 (Fuel Pump Driver Control Module Temperature High Signal) from Fuel Pump Driver Control Module	Wrong alive rolling counter reveiced by the frame FTZM_Information_7_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON	= TRUE -	0.5 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	U131D	Detects when wrong checksum received by the frame FTZM_Information_7_S1 (Fuel Pump Driver Control Module Temperature High Signal) from Fuel Pump Driver Control Module	Wrong checksum received by the frame FTZM_Information_7_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON	= TRUE -	0.5 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	U131D	Detects when wrong data length code received by the frame FTZM_Information_7_S1 (Fuel Pump Driver Control Module Temperature High Signal) from Fuel Pump Driver Control Module	Wrong data length code received by the frame FTZM_Information_7_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON	= TRUE -	0.5 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	U131D	Detects when wrong alive rolling counter received by the frame FTZM_Information_8_S1 (Fuel Pump Control Status Signal) from Fuel Pump Driver Control Module	Wrong alive rolling counter reveiced by the frame FTZM_Information_8_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON	= TRUE -	0.5 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	U131D	Detects when wrong checksum received by the frame FTZM_Information_8_S1 (Fuel Pump Control Status Signal) from Fuel Pump Driver Control Module	Wrong checksum received by the frame FTZM_Information_8_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON	= TRUE -	0.5 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	U131D	Detects when wrong data length code received by the frame FTZM_Information_8_S1 (Fuel Pump Control Status Signal) from Fuel Pump Driver Control Module	Wrong data length code received by the frame FTZM_Information_8_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON	= TRUE -	0.5 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	U131D	Detects when wrong alive rolling counter received by the frame FTZM_Information_9_S1 (Fuel Pump Driver Control Module Reset Count) from Fuel Pump Driver Control Module	Wrong alive rolling counter reveiced by the frame FTZM_Information_9_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON	= TRUE -	0.5 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	U131D	Detects when wrong checksum received by the frame FTZM_Information_9_S1 (Fuel Pump Driver Control Module Reset Count) from Fuel Pump Driver Control Module	Wrong checksum received by the frame FTZM_Information_9_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON	= TRUE -	0.5 sec continuous	2 Trips
					Basic enable conditions met	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	U131D	Detects when wrong data length code received by the frame FTZM_Information_9_S1 (Fuel Pump Driver Control Module Reset Count) from Fuel Pump Driver Control Module	Wrong data length code received by the frame FTZM_Information_9_S1 from Fuel Pump Driver Control Module	= TRUE -	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	0.5 sec continuous	2 Trips
LIN Bus 1	U1345	Detects Bus off error at LIN channel 1.	LIN channel 1 indicates bus off error	= TRUE -	Ignition is on No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	10 counts continuous	1 Trip
	U135E	Detects when the time since the last message from the 'Transmission Control Module on Engine Control Module LIN Bus 1 Module' for frame "TCM_Rsp"(0x01) was received via LIN 1 Channel is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the 'Transmission Control Module on Engine Control Module LIN Bus 1 Module' for frame "TCM_Rsp"(0x01) was received via LIN 1 Channel	> 0.05 sec	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	3 counts Continuous	2 Trips
	U250D	Validity of the Transmission Control Data Received Via LIN	Mismatch between the transmitted range command received from the Gearshift Co-ordinator module and Echo Range Command from Transmission Control Module through LIN	= TRUE -	Current Range Command value is equal to Previous Range Command Value System is not in PARK mode and system power is used by accessories or system wakeup Ignition ON (Current range of gear lever is in PARK position Initialization of gear selection in progress is active) OR (Current range command is in parking range Current range command is in power mode OFF range) Engine Transmission Range Selection brake command is in deny driver override command Engine Transmission Range Selection brake command is in allow driver override command Manufacturer Enable Counter used to automatically arm Seed & Key LIN diagnostics enabled No pending or confirmed DTCs Basic enabling conditions are met	= TRUE - = TRUE - = TRUE - = FALSE - = FALSE - = FALSE - = FALSE - = FALSE - = FALSE - = 0 = TRUE - = see sheet inhibit tables - = see sheet enable tables -	4.25 sec Continuous	2 Trips
LIN Bus 2	U1346	Detects Bus off error at LIN channel 2.	LIN channel 2 indicates bus off error	= TRUE -	Ignition is on No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	10 counts continuous	1 Trip
LIN Bus 4	U1348	Detects Bus off error at LIN channel 4.	LIN channel 4 indicates bus off error	= TRUE -	Ignition is on No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	10 counts continuous	1 Trip
	U062F	Detects when the time since the last message from the "Charge Air Cooler Water Pump" for frame "CWP_Rsp"(0x25) was received via LIN 4 Channel is greater than the Supervision timeout value for a calibrated period of time	Time since last message from the 'Charge Air Cooler Water Pump' for frame "CWP_Rsp"(0x25) was received via LIN 4 Channel	> 0.25 sec	Ignition is ON Basic enable conditions met	= TRUE - = see sheet enable tables -	3 counts Continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
	U1378	**Path 1:** Detects when the wrong length code for frame CWP_Rsp(0x25) in LIN4 channel was detected	Wrong length code for frame CWP_Rsp(0x25) in LIN4 channel was detected	=	TRUE	-	Ignition is ON	=	TRUE	-	10	counts	Continuous	2 Trips
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Path 2: Detects when wrong alive rolling counter received by the frame CWP_Rsp(0x25) in LIN4 channel from the "Charge Air Cooler Water Pump"	Wrong alive rolling counter received by the frame CWP_Rsp(0x25) in LIN4 channel from the "Charge Air Cooler Water Pump"	=	TRUE	-	Ignition is ON	=	TRUE	-	10	counts	Continuous	2 Trips
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
LIN Bus 5	U1349	Detects Bus off error at LIN channel 5.	LIN channel 5 indicates bus off error	=	TRUE	-	Ignition is on	=	TRUE	-	10	counts	continuous	1 Trip
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
EVAP System Ventilation Valve	P0446	**Path 1** : Monitoring of Canister Ventilation Valve control - offset diagnosis	(				Error message for internal cycle Canister close valve error	=	TRUE	-			continuous	2 Trips
			Tank pressure filtered for offset-diagnosis tank pressure sensor	>=	25	-	No pending or confirmed DTCs	=	see sheet inhibit tables	-				
			Difference between tank pressure filtered for offset and ccv error threshold because cpv can not open because of vacuum	<	0	kPa	Basic enable conditions met	=	see sheet enable tables	-				
			)											
			for time	>=	2	sec								
		Path 2 : Monitoring of Canister Ventilation Valve control - based on environmental pressure	Tank pressure	>=	-900.024	Pa	Diagnosis of canister purge system is active	=	TRUE	-				
							Mass flow through purge control valve for tank leakage diagnosis	<=	0.008355556	g/sec				
							time for miscellaneous measurements	>=	5	sec				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P0455	Monitoring of tank pressure while CVV closed and CPV open (large leakage / open filler cap)	(				Basic Enable conditions are fulfilled as following conditions	=	TRUE	-			continuous	2 Trips
			Differential tank pressure	>	-0.050049	kPa	Diagnosis of canister purge system is active	=	TRUE	-				
			OR				(							
			Integrated CPV - mass flow for tank leakage diagnosis	>	0.2	l	Purge mass flow for DTEV is active	<=	0.008355556	g/sec				
			)				(							
			OR				Lowpass filtered tank pressure	>=	-900.024	Pa				
			(				OR							
			Differential tank pressure	>	A+B		Time for miscellaneous measurements	>=	5	sec				
			where A is pressure difference for termination of vacuum built-up	=	-0.050049	kPa	)							
			and B is pressure difference for further vacuum built up (0.5-mm-check)	=	-0.050049	kPa	(							
			OR				Absolute reference value of differential tank pressure	<=	0.039917	kPa				
			Integrated CPV - mass flow for tank leakage diagnosis	>	0.2	g	for time	>=	2	sec				
			)				)							
							(							
							Time for miscellaneous measurements	>=	3	sec				
							OR							
							Difference between low pass filtered tank and start pressure for TLD	<	-0.060059	kPa				
							)							
							OR							
							(							
							Absolute reference value of differential tank pressure	<=	0.039917	kPa				
							for time	>=	2	sec				
							)							
							Tank cap open check finished	=	TRUE	-				
							)							

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					Reference value of differential tank pressure	<= 0		
					OR			
					Time for miscellaneous measurements	>= 0 sec		
					)			
					(			
					Absolute reference value of differential tank pressure	<= -0.007446 kPa		
					OR			
					Integrated CPV - mass flow for tank leakage diagnosis	> 0.08993 g		
					)			
					)			
					(			
					Error message for driving distance debounce for DTESK required	= FALSE -		
					OR			
					Distance travelled since rough leak recognized	>= 300 m		
					)			
					High canister load detected (0.5mm check)	= TRUE -		
					(			
					(			
					(			
					Condition for adaptive Lambda pilot control successful	= TRUE -		
					(			
					time counter at first end of start in cycle (16 bit)	> 900 sec		
					OR			
					Engine coolant downstream temperature during the first engine start of the driving cycle.	> 143.3 deg C		
					)			
					)			
					Filtered charcoal canister charge	> 40 -		
					Inhibition time for tank leakage diagnosis (0.5mm) after high canister load	> 0		
					)			
					Vehicle conditions for enabling diagnosis:	= TRUE -		
					(			
					Condition idle speed control	= TRUE -		
					Engine is in running state	= TRUE -		
					Vehicle speed	<= 0.12622747 mph		
					)			
					Conditions for 0.5mm tank leak diagnosis fulfilled, which is the following conditions:	= TRUE -		
					(			
					Absolute difference between current ambient pressure and old value	<= 1.6016 kPa		
					for time	>= 600 sec		
					Condition canister purge active	= TRUE -		
					for time	> 20 sec		
					Integral of purge mass flow after a longer purge stop	> 4 g		
					(			
					Difference between engine coolant downstream temperature during the first engine start of the driving cycle and ambient air temperature	<= 99.8 deg C		
					Ambient air temperature sensormodel is error free	= TRUE -		
					Condition first end of start in cycle	= TRUE -		
					)			
					Engine coolant downstream temperature during the first engine start of the driving cycle	>= -7.5 deg C		
					Engine coolant downstream temperature during the first engine start of the driving cycle	<= 100.5 deg C		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P0449	Diagnosis of EVAP System Vent Valve Control Circuit- Open Load fault	EVAP powerstage reports open load fault through CAN communication message	= TRUE -	Ignition is ON	= TRUE -	2 sec continuous	2 Trips
					No pending or confirmed DTCs	= see sheet inhibit tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Basic enable conditions met	= see sheet enable tables -		
	P0498	Diagnosis of EVAP System Vent Valve Control Circuit- Circuit Low	EVAP powerstage reports short circuit to groud fault through CAN communication message	= TRUE -	Ignition is ON No pending or confirmed FIDs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	2 sec continuous	2 Trips
		Diagnosis of EVAP System Vent Valve Control Circuit- Circuit High	EVAP powerstage reports short circuit to battery fault through CAN communication message	= TRUE -	Ignition is ON No pending or confirmed FIDs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	2 sec continuous	2 Trips
Low Temperature Loop Coolant Pump (LIN4)	P3196	Detection of the pump speed performance commanded versus actual (return) speed	Filtered Speed of Charge Air Cooler Pump where |A - B| A (Filtered requested speed of charge air cooler pump) B (Filtered actual speed of charge air cooler pump)	> 200 rpm = Graph WtrPmp_CACPmpSpdPT1_I rpm = Graph WtrPmp_CACPmpSpdActPT1_I rpm	No pending or confirmed DTCs Basic enable conditions met	= see sheet inhibit tables - = see sheet enable tables -	5 sec Continuous	2 Trips
	P26FA	Detection of the recievd pump speed exceeding the maximum threshold	charge air cooler pump measured speed	> 7500 rpm	No pending or confirmed DTCs Basic enable conditions met	= see sheet inhibit tables - = see sheet enable tables -	5 sec Continuous	2 Trips
	P2BA0	Detection of the receieved pump speed falling below the minimum threshold	charge air cooler pump measured speed	< 0 rpm	No pending or confirmed DTCs Basic enable conditions met	see sheet inhibit tables - see sheet inhibit tables -	5 sec Continuous	2 Trips
	P2C48	Detection of the pump current to be within the calculated threshold for a given pump speed	Pump current where Threshold = A * B A (charge air cooler pump current high limit for a given pump speed) B (charge air cooler pump factor high limit for a given coolant temperature) OR Pump current where Threshold = C * D C (charge air cooler pump current low limit for a given pump speed) D (charge air cooler pump factor low limit for a given coolant temperature)	>= Threshold A = 20 A = 1 deg C < Threshold A = 0 A = 1 deg C	No pending or confirmed DTCs Basic enable conditions met	= see sheet inhibit tables - = see sheet inhibit tables -	5 sec Continuous	2 Trips
	P3198	Detection of the current of the pump exceeding the maximum threshold	charge air cooler pump motor measured current	> 18 A	No pending or confirmed DTCs Basic enable conditions met	= see sheet inhibit tables - = see sheet inhibit tables -	5 sec Continuous	2 Trips
	P3199	Detection of the current of the pump falling below the minimum threshold	charge air cooler pump motor measured current	< 0 A	No pending or confirmed DTCs Basic enable conditions met	= see sheet inhibit tables - = see sheet inhibit tables -	5 sec Continuous	2 Trips
MIL Bulb	P263B	Diagnoses the MIL low side driver circuit for circuit high fault	Voltage high during driver on state (indicates short-to-power)	= Short to power: between signal and controller power -	ECU is in pre drive state ECU in post drive state Basic enable conditions met	= FALSE - = FALSE - = see sheet enable tables -	1 sec Continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	P263A	Diagnoses the MIL low side driver circuit for circuit low fault	Voltage low during driver on state (indicates short-to-ground)	= Short to ground: - between signal and controller ground	ECU is in pre drive state ECU in post drive state Basic enable conditions met	= FALSE - = FALSE - = see sheet enable tables -	1 sec Continuous	2 Trips
	P0650	Diagnoses the MIL low side driver circuit for open circuit fault	Voltage high during driver off state (indicates open circuit)	= Open Circuit : >= 200 - between ECU pin and load	ECU is in pre drive state ECU in post drive state Basic enable conditions met	= FALSE - = FALSE - = see sheet enable tables -	1 sec Continuous	1 Trip
Sensor Supply Relay (FTZM voltage supply)	P16D9	Circuit Check - Short circuit to Battery	Power stage feedback voltage	> 4.5 V	Ignition is ON (Battery Voltage Battery Voltage) Power stage output signal Timeout after which the state machine No pending or confirmed DTCs Basic enable conditions met	= TRUE - >= 10.9 V <= 655.34 V < 2 sec = FALSE - <= 1 sec = see sheet inhibit tables - = see sheet enable tables -	20 event Continuous	2 Trips
	P16D8	Circuit Check - Short circuit to Ground	Power stage feedback voltage (See Look-Up-Table #P16D8-1)	< 1.95 to 4.5 V	Ignition is ON (Battery Voltage Battery Voltage) Power stage output signal No pending or confirmed DTCs Basic enable conditions met	= TRUE - >= 10.9 V <= 655.34 V < 2 sec = TRUE - = see sheet inhibit tables - = see sheet enable tables -	5 event Continuous	2 Trips
	P16D7	Circuit Check - Open Load	Power stage feedback voltage Power stage feedback voltage	>= 1.5 V <= 2 V	Ignition is ON (Battery Voltage Battery Voltage) Power stage output signal Timeout after which the state machine No pending or confirmed DTCs Basic enable conditions met	= TRUE - >= 10.9 V <= 655.34 V < 2 sec = FALSE - <= 1 sec = see sheet inhibit tables - = see sheet enable tables -	20 event Continuous	2 Trips
Sensor Supply Relay (FTZM voltage supply)	P0629	Digital output stage - Circuit High	Pre Supply Pump output voltage	> 4.7 V	(ECU is in POSTDRIVE state OR Airbag is activated) OR (Condition of the engine in stop phase Condition to stop the activation of fuel pump during startstop Validity bit of fuel low pressure value Fuel pressure actual value) (Fuel pressure actual value OR Fuel System Priming Timer is active) Battery voltage	 = TRUE - = TRUE - = TRUE - = FALSE - = TRUE - > 500 kPa > 600 kPa = TRUE - > 9 V	0.2 sec continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P0628	Digital output stage - Circuit Low	Pre Supply Pump output voltage (See Look-Up-Table #P0628-1)	< 1.95 to 4.5 V			0.05 sec continuous	2 Trips
					(			
					Engine is in running state	= TRUE -		
					OR			
					Validity bit of fuel low pressure value	= TRUE -		
					Fuel pressure actual value	< 100 kPa		
					)			
					Fuel pressure actual value	< 100 kPa		
					Fuel System Priming Timer is not active	= FALSE -		
					Battery voltage	> 9 V		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P0627	Digital output stage - Open	Pre Supply Pump output voltage	<= 2.25 V	(		1 sec continuous	2 Trips
			Pre Supply Pump output voltage	>= 1.25 V	ECU is in POSTDRIVE state	= TRUE -		
					OR			
					Airbag is activated	= TRUE -		
					)			
					OR			
					(			
					Condition of the engine in stop phase	= TRUE -		
					Condition to stop the activation of fuel pump during startstop	= FALSE -		
					Validity bit of fuel low pressure value	= TRUE -		
					Fuel pressure actual value	> 500 kPa		
					)			
					OR	=		
					(			
					Fuel pressure actual value	> 600 kPa		
					OR			
					Fuel System Priming Timer is active	= TRUE -		
					)			
					Battery voltage	> 9 V		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
Cylinder 2 Deactivation Solenoid	P3499	Detects "pumping air" error for cylinder 2 during half engine mode for a calibrated period fo time	(		Synchronisation half engine mode and air charge determination of first activated HEM cylinder	= TRUE -	Continuous	2 Trips
			"Pumping Air" Error is detected	= TRUE -	Diagnose for undesired camshaft switch event active	= TRUE -		
			)		(			
			where	(A)*(B) counts	Valve lift diagnosis enabled.	= TRUE -		
			A (see Look-Up-Table #P3499-3)	= 6 to 10 -	(			
			B	= 8 -	(			
					Engine speed	<= 2900 rpm		
					and			
					Engine speed	>= 800 rpm		
					)			
					(			
					Ratio of Intake manifold pressure rawvalue to the Pressure upstream throttle valve raw	<= 0.899994 -		
					Ratio of Intake manifold pressure rawvalue to the Pressure upstream throttle valve raw	>= 0.200012 -		
					)			
					(			
					condition: first pressure upstream throttle	= TRUE -		
					)			
					(			
					validity of the pressure value (sensor) of the	= TRUE -		
					)			
					(			
					Condition massflow over throttle blade based on throttle angle valid, Bank1	= TRUE -		
					)			
					(			
					time counter at first end of start in cycle (16 bit)	> 3 sec		
					)			
					(			
					(			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Set intake manifold pressure; Bank 1 lesser than Positive load step threshold for set pressure	<=	40	kPa		
					OR					
					diiference of Set intake manifold pressure; Bank 1 and pressure value (best of) of the intake manifold - bank 1 is lesser than caliberated threshld	<=	20	kPa		
					)					
					(					
					Set intake manifold pressure; Bank 1 is greater than Negative load step threshold for differential pressure	>=	-15	kPa		
					OR					
					diiference of Set intake manifold pressure; Bank 1 and pressure value (best of) of the intake manifold - bank 1 is greater than caliberated threshld	>=	150	kPa		
					)					
					)					
					(					
					Condition instationary state during half engine mode switching	=	FALSE	-		
					for time (see Look-Up-Table #P3499-2)	>=	0.6 to 0.85	sec		
					)					
					(					
					Scavenging rate based on scavenged air and drapped air in the cylinder	<=	1	-		
					)					
					(					
					Absolute value of the difference between the currrent value and previous value of the Position of the throttle valve on motor bench one	<=	0.6016	%		
					for time (see Look-Up-Table #P3499-1)	=	0.42 to 0.84	sec		
					)					
					)					
					Valve lift diagnosis of bank 2 enabled.	=	TRUE	-		
					(					
					(					
					Engine speed	<=	2900	rpm		
					Engine speed	>=	800	rpm		
					)					
					(					
					raw manifold pressure - Bank 2 / pressure upstream throttle valve raw (2. bank)	<=	0.200012	-		
					raw manifold pressure - Bank 2 / pressure upstream throttle valve raw (2. bank)	>=	0.899994	-		
					)					
					(					
					condition: second pressure upstream throttle valve measured valid	=	TRUE	-		
					)					
					(					
					condition, measured intake manifold pressure valid sencond bank					
					)					
					(					
					Condition Mass flow at the DK calculated from the sensor signal of the HFM valid, Bank2	=	TRUE	-		
					)					
					(					
					Condition massflow over throttle blade based on throttle angle valid, Bank2	=	TRUE	-		
					)					
					time counter at first end of start in cycle (16 bit)	>	3	sec		
					(					
					(					
					Set intake manifold pressure; Bank 2	<=	40	kPa		
					OR					
					diiference of Set intake manifold pressure; Bank 2 and pressure value (best of) of the intake manifold - bank 2	<=	20	kPa		
					)					
					(					
					Set intake manifold pressure; Bank 2	>=	-15	kPa		
					OR					
					diiference of Set intake manifold pressure; Bank 2 and pressure value (best of) of the intake manifold - bank 2	>=	150	kPa		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					)			
					)			
					(			
					Condition instationary state during half engine mode switching	= FALSE -		
					for time (see Look-Up-Table #P3499-2)	>= 0.6 to 0.85 sec		
					)			
					(			
					scavenging rate based on scavenged air and drapped air in the cylinder	<= 1 -		
					)			
					(			
					Absolute value of the difference between the currrent value and previous value of the Position of the throttle valve on motor bench two	<= 0.6016 %		
					for time (see Look-Up-Table #P3499-1)	= 0.42 to 0.84 sec		
					)			
					)			
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		
	P318A	Detects no air charge change at the intake for cylinder 2 during full engine mode for a calibrated period of time	(		Synchronisation half engine mode and air charge determination of first activated HEM cylinder	= FALSE -	Continuous	1 Trip
			No air charge change at the intake	= TRUE -	Diagnose for undesired camshaft switch event active	= TRUE -		
			)		(			
			where	(A)*(B) counts	Valve lift diagnosis enabled.	= TRUE -		
			A (see Look-Up-Table #P3499-3)	= 6 to 10 -	(			
			B	= 8 -	(			
					Engine speed	<= 2900 rpm		
					Engine speed	>= 800 rpm		
					)			
					(			
					Ratio of Intake manifold pressure rawvalue to the Pressure upstream throttle valve raw	<= 0.899994 -		
					Ratio of Intake manifold pressure rawvalue to the Pressure upstream throttle valve raw	>= 0.200012 -		
					)			
					(			
					condition: first pressure upstream throttle valve measured valid	= TRUE -		
					)			
					(			
					validity of the pressure value (sensor) of the intake manifold - bank 1	= TRUE -		
					)			
					(			
					Condition massflow over throttle blade based on throttle angle valid, Bank1	= TRUE -		
					)			
					(			
					time counter at first end of start in cycle (16 bit)	> 3 sec		
					)			
					(			
					(			
					Set intake manifold pressure; Bank 1 lesser than Positive load step threshold for set pressure	<= 40 kPa		
					OR			
					diiference of Set intake manifold pressure; Bank 1 and pressure value (best of) of the intake manifold - bank 1 is lesser than caliberated threshld	<= 20 kPa		
					)			
					(			
					Set intake manifold pressure; Bank 1 is greater than Negative load step threshold for differential pressure	>= -15 kPa		
					OR			
					diiference of Set intake manifold pressure; Bank 1 and pressure value (best of) of the intake manifold - bank 1 is greater than caliberated threshld	>= 150 kPa		
					)			
					)			
					(			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Condition instationary state during half engine mode switching	=	FALSE	-		
					for time (see Look-Up-Table #P3499-2)	>=	0.6 to 0.85	sec		
					)					
					(					
					Scavenging rate based on scavenged air and drapped air in the cylinder	<=	1	-		
					)					
					(					
					Absolute value of the difference between the currrent value and previous value of the Position of the throttle valve on motor bench one	<=	0.6016	%		
					for time (see Look-Up-Table #P3499-1)	=	0.42 to 0.84	sec		
					)					
					)					
					Valve lift diagnosis of bank 2 enabled.	=	TRUE	-		
					(					
					(					
					Engine speed	<=	2900	rpm		
					Engine speed	>=	800	rpm		
					)					
					(					
					raw manifold pressure - Bank 2 / pressure upstream throttle valve raw (2. bank)	<=	0.200012	-		
					raw manifold pressure - Bank 2 / pressure upstream throttle valve raw (2. bank)	>=	0.899994	-		
					)					
					(					
					condition: second pressure upstream throttle valve measured valid	=	TRUE	-		
					)					
					(					
					condition, measured intake manifold pressure valid sencond bank					
					)					
					(					
					Condition Mass flow at the DK calculated from the sensor signal of the HFM valid, Bank2	=	TRUE	-		
					)					
					(					
					Condition massflow over throttle blade based on throttle angle valid, Bank2	=	TRUE	-		
					)					
					time counter at first end of start in cycle (16 bit)	>	3	sec		
					(					
					(					
					Set intake manifold pressure; Bank 2	<=	40	kPa		
					OR					
					diiference of Set intake manifold pressure; Bank 2 and pressure value (best of) of the intake manifold - bank 2	<=	20	kPa		
					)					
					(					
					Set intake manifold pressure; Bank 2	>=	-15	kPa		
					OR					
					diiference of Set intake manifold pressure; Bank 2 and pressure value (best of) of the intake manifold - bank 2	>=	150	kPa		
					)					
					)					
					(					
					Condition instationary state during half engine mode switching	=	FALSE	-		
					for time (see Look-Up-Table #P3499-2)	>=	0.6 to 0.85	sec		
					)					
					(					
					scavenging rate based on scavenged air and drapped air in the cylinder	<=	1	-		
					)					
					(					
					Absolute value of the difference between the currrent value and previous value of the Position of the throttle valve on motor bench two	<=	0.6016	%		
					for time (see Look-Up-Table #P3499-1)	=	0.42 to 0.84	sec		
					)					
					)					
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		
	P3412	Diagnosis of cylinder 2 gas exchange valve control for circuit high faults	Voltage high during driver on state (indicates short-to-power)	- Short to power: - between signal and controller power	ECU is in drive state	= TRUE -	0.5 sec continuous	2 Trips
					Engine Speed	>= 80 rpm		
					Battery Voltage	> 10.9 V		
					Battery Voltage	< 25.5 V		
					Engine Speed	<= 255 1/min		
					Gas exchange valve is turned ON and OFF during start off driving cycle to check the working of valve	= TRUE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
	P3411	Diagnosis of cylinder 2 gas exchange valve control for circuit low faults	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: <= - between signal and controller ground	ECU is in drive state	= TRUE -	0.5 sec continuous	1 Trip
					Engine Speed	>= 80 rpm		
					Battery Voltage	> 10.9 V		
					Battery Voltage	< 25.5 V		
					Engine Speed	<= 255 1/min		
					Gas exchange valve is turned ON and OFF during start off driving cycle to check the working of valve	= TRUE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
	P3409	Diagnosis of cylinder 2 gas exchange valve control for open circuit faults	Voltage low during driver off state (indicates open circuit)	= Open Circuit:>= 200 K - ECU pin and load	ECU is in drive state	= TRUE -	0.5 sec continuous	2 Trips
					Engine Speed	>= 80 rpm		
					Battery Voltage	> 10.9 V		
					Battery Voltage	< 25.5 V		
					Engine Speed	<= 255 1/min		
					Gas exchange valve is turned ON and OFF during start off driving cycle to check the working of valve	= TRUE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
Cylinder 3 Deactivation Solenoid	P349A	Detects "pumping air" error for cylinder 3 during half engine mode for a calibrated period fo time	(		Synchronisation half engine mode and air charge determination of first activated HEM cylinder	= TRUE -	Continuous	2 Trips
			"Pumping Air" Error is detected	= TRUE -	Diagnose for undesired camshaft switch event active	= TRUE -		
			)		(			
			where	(A)*(B) counts	Valve lift diagnosis enabled.	= TRUE -		
			A (see Look-Up-Table #P3499-3)	= 6 to 10 -	(			
			B	= 8 -	(			
					Engine speed	<= 2900 rpm		
					Engine speed	>= 800 rpm		
					)			
					(			
					Ratio of Intake manifold pressure rawvalue to the Pressure upstream throttle valve raw	<= 0.899994 -		
					Ratio of Intake manifold pressure rawvalue to the Pressure upstream throttle valve raw	>= 0.200012 -		
					)			
					(			
					condition: first pressure upstream throttle valve measured valid	= TRUE -		
					)			
					(			
					validity of the pressure value (sensor) of the intake manifold - bank 1	= TRUE -		
					)			
					(			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Condition massflow over throttle blade based on throttle angle valid, Bank1	=	TRUE	-		
					)					
					(					
					time counter at first end of start in cycle (16 bit)	>	3	sec		
					)					
					(					
					(					
					Set intake manifold pressure; Bank 1 lesser than Positive load step threshold for set pressure	<=	40	kPa		
					OR					
					diiference of Set intake manifold pressure; Bank 1 and pressure value (best of) of the intake manifold - bank 1 is lesser than caliberated threshld	<=	20	kPa		
					)					
					(					
					Set intake manifold pressure; Bank 1 is greater than Negative load step threshold for differential pressure	>=	-15	kPa		
					OR					
					diiference of Set intake manifold pressure; Bank 1 and pressure value (best of) of the intake manifold - bank 1 is greater than caliberated threshld	>=	150	kPa		
					)					
					)					
					(					
					Condition instationary state during half engine mode switching	=	FALSE	-		
					for time (see Look-Up-Table #P3499-2)	>=	0.6 to 0.85	sec		
					)					
					(					
					Scavenging rate based on scavenged air and drapped air in the cylinder	<=	1	-		
					)					
					(					
					Absolute value of the difference between the currrent value and previous value of the Position of the throttle valve on motor bench one	<=	0.6016	%		
					for time (see Look-Up-Table #P3499-1)	=	0.42 to 0.84	sec		
					)					
					)					
					Valve lift diagnosis of bank 2 enabled.	=	TRUE	-		
					(					
					(					
					Engine speed	<=	2900	rpm		
					Engine speed	>=	800	rpm		
					)					
					(					
					raw manifold pressure - Bank 2 / pressure upstream throttle valve raw (2. bank)	<=	0.200012	-		
					raw manifold pressure - Bank 2 / pressure upstream throttle valve raw (2. bank)	>=	0.899994	-		
					)					
					(					
					condition: second pressure upstream throttle valve measured valid	=	TRUE	-		
					)					
					(					
					condition, measured intake manifold pressure valid sencond bank					
					)					
					(					
					Condition Mass flow at the DK calculated from the sensor signal of the HFM valid, Bank2	=	TRUE	-		
					)					
					(					
					Condition massflow over throttle blade based on throttle angle valid, Bank2	=	TRUE	-		
					)					
					time counter at first end of start in cycle (16 bit)	>	3	sec		
					(					
					(					
					Set intake manifold pressure; Bank 2	<=	40	kPa		
					OR					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							diiference of Set intake manifold pressure; Bank 2 and pressure value (best of) of the intake manifold - bank 2	<=	20	kPa		
							)					
							(					
							Set intake manifold pressure; Bank 2	>=	-15	kPa		
							OR					
							diiference of Set intake manifold pressure; Bank 2 and pressure value (best of) of the intake manifold - bank 2	>=	150	kPa		
							)					
							)					
							(					
							Condition instationary state during half engine mode switching	=	FALSE	-		
							for time (see Look-Up-Table #P3499-2)	>=	0.6 to 0.85	sec		
							)					
							(					
							scavenging rate based on scavenged air and drapped air in the cylinder	<=	1	-		
							)					
							(					
							Absolute value of the difference between the currrent value and previous value of the Position of the throttle valve on motor bench two	<=	0.6016	%		
							for time (see Look-Up-Table #P3499-1)	=	0.42 to 0.84	sec		
							)					
							)					
							)					
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
							Basic enabling conditions are met	=	see sheet enable tables	-		
	P318B	Detects no air charge change at the intake for cylinder 3 during full engine mode for a calibrated period of time	(				Synchronisation half engine mode and air charge determination of first activated HEM cylinder	=	FALSE	-	Continuous	1 Trip
			No air charge change at the intake	=	TRUE	-	Diagnose for undesired camshaft switch event active	=	TRUE	-		
			)				(					
			where		(A)*(B)	counts	Valve lift diagnosis enabled.	=	TRUE	-		
			A (see Look-Up-Table #P3499-3)	=	6 to 10	-	(					
			B	=	8	-	(					
							Engine speed	<=	2900	rpm		
							Engine speed	>=	800	rpm		
							)					
							(					
							Ratio of Intake manifold pressure rawvalue to the Pressure upstream throttle valve raw	<=	0.899994	-		
							Ratio of Intake manifold pressure rawvalue to the Pressure upstream throttle valve raw	>=	0.200012	-		
							)					
							(					
							condition: first pressure upstream throttle valve measured valid	=	TRUE	-		
							)					
							(					
							validity of the pressure value (sensor) of the intake manifold - bank 1	=	TRUE	-		
							)					
							(					
							Condition massflow over throttle blade based on throttle angle valid, Bank1	=	TRUE	-		
							)					
							(					
							time counter at first end of start in cycle (16 bit)	>	3	sec		
							)					
							(					
							(					
							Set intake manifold pressure; Bank 1 lesser than Positive load step threshold for set pressure	<=	40	kPa		
							OR					
							diiference of Set intake manifold pressure; Bank 1 and pressure value (best of) of the intake manifold - bank 1 is lesser than caliberated threshld	<=	20	kPa		
							)					
							(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Set intake manifold pressure; Bank 1 is greater than Negative load step threshold for differential pressure	>=	-15	kPa		
					OR					
					diference of Set intake manifold pressure; Bank 1 and pressure value (best of) of the intake manifold - bank 1 is greater than caliberated threshld	>=	150	kPa		
					)					
					)					
					(					
					Condition instationary state during half engine mode switching	=	FALSE	-		
					for time (see Look-Up-Table #P3499-2)	>=	0.6 to 0.85	sec		
					)					
					(					
					Scavenging rate based on scavenged air and drapped air in the cylinder	<=	1	-		
					)					
					(					
					Absolute value of the difference between the currrent value and previous value of the Position of the throttle valve on motor bench one	<=	0.6016	%		
					for time (see Look-Up-Table #P3499-1)	=	0.42 to 0.84	sec		
					)					
					)					
					Valve lift diagnosis of bank 2 enabled.	=	TRUE	-		
					(					
					(					
					Engine speed	<=	2900	rpm		
					Engine speed	>=	800	rpm		
					)					
					(					
					raw manifold pressure - Bank 2 / pressure upstream throttle valve raw (2. bank)	<=	0.200012	-		
					raw manifold pressure - Bank 2 / pressure upstream throttle valve raw (2. bank)	>=	0.899994	-		
					)					
					(					
					condition: second pressure upstream throttle valve measured valid	=	TRUE	-		
					)					
					(					
					condition, measured intake manifold pressure valid sencond bank					
					)					
					(					
					Condition Mass flow at the DK calculated from the sensor signal of the HFM valid, Bank2	=	TRUE	-		
					)					
					(					
					Condition massflow over throttle blade based on throttle angle valid, Bank2	=	TRUE	-		
					)					
					time counter at first end of start in cycle (16 bit)	>	3	sec		
					(					
					(					
					Set intake manifold pressure; Bank 2	<=	40	kPa		
					OR					
					diference of Set intake manifold pressure; Bank 2 and pressure value (best of) of the intake manifold - bank 2	<=	20	kPa		
					)					
					(					
					Set intake manifold pressure; Bank 2	>=	-15	kPa		
					OR					
					diference of Set intake manifold pressure; Bank 2 and pressure value (best of) of the intake manifold - bank 2	>=	150	kPa		
					)					
					)					
					(					
					Condition instationary state during half engine mode switching	=	FALSE	-		
					for time (see Look-Up-Table #P3499-2)	>=	0.6 to 0.85	sec		
					)					
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					scavenging rate based on scavenged air and drapped air in the cylinder	<= 1 -		
					)			
					(			
					Absolute value of the difference between the currrent value and previous value of the Position of the throttle valve on motor bench two	<= 0.6016 %		
					for time (see Look-Up-Table #P3499-1)	= 0.42 to 0.84 sec		
					)			
					)			
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		
	P3420	Diagnosis of cylinder 3 gas exchange valve control for circuit high faults	Voltage high during driver on state (indicates short-to-power)	- Short to power: - between signal and controller power	ECU is in drive state	= TRUE -	0.5 sec continuous	2 Trips
					Engine Speed	>= 80 rpm		
					Battery Voltage	> 10.9 V		
					Battery Voltage	< 25.5 V		
					Engine Speed	<= 255 1/min		
					Gas exchange valve is turned ON and OFF during start off driving cycle to check the working of valve	= TRUE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
	P3419	Diagnosis of cylinder 3 gas exchange valve control for circuit low faults	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: <= - between signal and controller ground	ECU is in drive state	= TRUE -	0.5 sec continuous	1 Trip
					Engine Speed	>= 80 rpm		
					Battery Voltage	> 10.9 V		
					Battery Voltage	< 25.5 V		
					Engine Speed	<= 255 1/min		
					Gas exchange valve is turned ON and OFF during start off driving cycle to check the working of valve	= TRUE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
	P3417	Diagnosis of cylinder 3 gas exchange valve control for open circuit faults	Voltage low during driver off state (indicates open circuit)	= Open Circuit:>= 200 K - ECU pin and load	ECU is in drive state	= TRUE -	0.5 sec continuous	2 Trips
					Engine Speed	>= 80 rpm		
					Battery Voltage	> 10.9 V		
					Battery Voltage	< 25.5 V		
					Engine Speed	<= 255 1/min		
					Gas exchange valve is turned ON and OFF during start off driving cycle to check the working of valve	= TRUE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
Cylinder 5 Deactivation Solenoid	P349C	Detects "pumping air" error for cylinder 5 during half engine mode for a calibrated period fo time	(		Synchronisation half engine mode and air charge determination of first activated HEM cylinder	= TRUE -	Continuous	2 Trips
			"Pumping Air" Error is detected	= TRUE -	Diagnose for undesired camshaft switch event active	= TRUE -		
			)		(			
			where	(A)*(B) counts	Valve lift diagnosis enabled.	= TRUE -		
			A (see Look-Up-Table #P3499-3)	= 6 to 10 -	(			
			B	= 8 -	(			
					Engine speed	<= 2900 rpm		
					Engine speed	>= 800 rpm		
					)			
					(			
					Ratio of Intake manifold pressure rawvalue to the Pressure upstream throttle valve raw	<= 0.899994 -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Ratio of Intake manifold pressure rawvalue to the Pressure upstream throttle valve raw	>=	0.200012	-		
					)					
					(					
					condition: first pressure upstream throttle valve measured valid	=	TRUE	-		
					)					
					(					
					validity of the pressure value (sensor) of the intake manifold - bank 1	=	TRUE	-		
					)					
					(					
					Condition massflow over throttle blade based on throttle angle valid, Bank1	=	TRUE	-		
					)					
					(					
					time counter at first end of start in cycle (16 bit)	>	3	sec		
					)					
					(					
					(					
					Set intake manifold pressure; Bank 1 lesser than Positive load step threshold for set pressure	<=	40	kPa		
					OR					
					diiference of Set intake manifold pressure; Bank 1 and pressure value (best of) of the intake manifold - bank 1 is lesser than caliberated threshld	<=	20	kPa		
					)					
					(					
					Set intake manifold pressure; Bank 1 is greater than Negative load step threshold for differential pressure	>=	-15	kPa		
					OR					
					diiference of Set intake manifold pressure; Bank 1 and pressure value (best of) of the intake manifold - bank 1 is greater than caliberated threshld	>=	150	kPa		
					)					
					)					
					(					
					Condition instationary state during half engine mode switching	=	FALSE	-		
					for time (see Look-Up-Table #P3499-2)	>=	0.6 to 0.85	sec		
					)					
					(					
					Scavenging rate based on scavenged air and drapped air in the cylinder	<=	1	-		
					)					
					(					
					Absolute value of the difference between the currrent value and previous value of the Position of the throttle valve on motor bench one	<=	0.6016	%		
					for time (see Look-Up-Table #P3499-1)	=	0.42 to 0.84	sec		
					)					
					)					
					Valve lift diagnosis of bank 2 enabled.	=	TRUE	-		
					(					
					(					
					Engine speed	<=	2900	rpm		
					Engine speed	>=	800	rpm		
					)					
					(					
					raw manifold pressure - Bank 2 / pressure upstream throttle valve raw (2. bank)	<=	0.200012	-		
					raw manifold pressure - Bank 2 / pressure upstream throttle valve raw (2. bank)	>=	0.899994	-		
					)					
					(					
					condition: second pressure upstream throttle valve measured valid	=	TRUE	-		
					)					
					(					
					condition, measured intake manifold pressure valid sencond bank					
					)					
					(					
					Condition Mass flow at the DK calculated from the sensor signal of the HFM valid, Bank2	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					) (Condition massflow over throttle blade based on throttle angle valid, Bank2) time counter at first end of start in cycle (16 bit) ((Set intake manifold pressure; Bank 2 OR diiference of Set intake manifold pressure; Bank 2 and pressure value (best of) of the intake manifold - bank 2) (Set intake manifold pressure; Bank 2 OR diiference of Set intake manifold pressure; Bank 2 and pressure value (best of) of the intake manifold - bank 2)) (Condition instationary state during half engine mode switching for time (see Look-Up-Table #P3499-2)) (scavenging rate based on scavenged air and drapped air in the cylinder) (Absolute value of the difference between the currrent value and previous value of the Position of the throttle valve on motor bench two for time (see Look-Up-Table #P3499-1)))) No pending or confirmed DTCs Basic enabling conditions are met	= TRUE - > 3 sec <= 40 kPa <= 20 kPa >= -15 kPa >= 150 kPa = FALSE - >= 0.6 to 0.85 sec <= 1 - <= 0.6016 % = 0.42 to 0.84 sec = see sheet inhibit tables - = see sheet enable tables -		
	P318D	Detects no air charge change at the intake for cylinder 5 during full engine mode for a calibrated period of time	(No air charge change at the intake) where A (see Look-Up-Table #P3499-3) B	= TRUE - (A)*(B) counts = 6 to 10 - = 8 -	Synchronisation half engine mode and air charge determination of first activated HEM cylinder Diagnose for undesired camshaft switch event active (Valve lift diagnosis enabled. ((Engine speed Engine speed) (Ratio of Intake manifold pressure rawvalue to the Pressure upstream throttle valve raw and Ratio of Intake manifold pressure rawvalue to the Pressure upstream throttle valve raw) (condition: first pressure upstream throttle valve measured valid) (validity of the pressure value (sensor) of the intake manifold - bank 1) (Condition massflow over throttle blade based on throttle angle valid, Bank1) (time counter at first end of start in cycle (16 bit)) (	= FALSE - = TRUE - = TRUE - <= 2900 rpm >= 800 rpm <= 0.899994 - >= 0.200012 - = TRUE - = TRUE - = TRUE - > 3 sec	Continuous	1 Trip

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					Set intake manifold pressure; Bank 1 lesser than Positive load step threshold for set pressure	<=	40	kPa		
					OR					
					diiference of Set intake manifold pressure; Bank 1 and pressure value (best of) of the intake manifold - bank 1 is lesser than caliberated threshld	<=	20	kPa		
					)					
					(					
					Set intake manifold pressure; Bank 1 is greater than Negative load step threshold for differential pressure	>=	-15	kPa		
					OR					
					diiference of Set intake manifold pressure; Bank 1 and pressure value (best of) of the intake manifold - bank 1 is greater than caliberated threshld	>=	150	kPa		
					)					
					)					
					(					
					Condition instationary state during half engine mode switching	=	FALSE	-		
					for time (see Look-Up-Table #P3499-2)	>=	0.6 to 0.85	sec		
					)					
					(					
					Scavenging rate based on scavenged air and drapped air in the cylinder	<=	1	-		
					)					
					(					
					Absolute value of the difference between the currrent value and previous value of the Position of the throttle valve on motor bench one	<=	0.6016	%		
					for time (see Look-Up-Table #P3499-1)	=	0.42 to 0.84	sec		
					)					
					)					
					Valve lift diagnosis of bank 2 enabled.	=	TRUE	-		
					(					
					(					
					Engine speed	<=	2900	rpm		
					Engine speed	>=	800	rpm		
					)					
					(					
					raw manifold pressure - Bank 2 / pressure upstream throttle valve raw (2. bank)	<=	0.200012	-		
					raw manifold pressure - Bank 2 / pressure upstream throttle valve raw (2. bank)	>=	0.899994	-		
					)					
					(					
					condition: second pressure upstream throttle valve measured valid	=	TRUE	-		
					)					
					(					
					condition, measured intake manifold pressure valid sencond bank					
					)					
					(					
					Condition Mass flow at the DK calculated from the sensor signal of the HFM valid, Bank2	=	TRUE	-		
					)					
					(					
					Condition massflow over throttle blade based on throttle angle valid, Bank2	=	TRUE	-		
					)					
					time counter at first end of start in cycle (16 bit)	>	3	sec		
					(					
					(					
					Set intake manifold pressure; Bank 2	<=	40	kPa		
					OR					
					diiference of Set intake manifold pressure; Bank 2 and pressure value (best of) of the intake manifold - bank 2	<=	20	kPa		
					)					
					(					
					Set intake manifold pressure; Bank 2	>=	-15	kPa		
					OR					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					diiference of Set intake manifold pressure; Bank 2 and pressure value (best of) of the intake manifold - bank 2	>= 150 kPa		
					)			
					)			
					(			
					Condition instationary state during half engine mode switching	= FALSE -		
					for time (see Look-Up-Table #P3499-2)	>= 0.6 to 0.85 sec		
					)			
					(			
					scavenging rate based on scavenged air and drapped air in the cylinder	<= 1 -		
					)			
					(			
					Absolute value of the difference between the currrent value and previous value of the Position of the throttle valve on motor bench two	<= 0.6016 %		
					for time (see Look-Up-Table #P3499-1)	= 0.42 to 0.84 sec		
					)			
					)			
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		
	P3436	Diagnosis of cylinder 5 gas exchange valve control for circuit high faults	Voltage high during driver on state (indicates short-to-power)	- Short to power: - between signal and controller power	ECU is in drive state	= TRUE -	0.5 sec continuous	2 Trips
					Engine Speed	>= 80 rpm		
					Battery Voltage	> 10.9 V		
					Battery Voltage	< 25.5 V		
					Engine Speed	<= 255 1/min		
					Gas exchange valve is turned ON and OFF during start off driving cycle to check the working of valve	= TRUE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
	P3435	Diagnosis of cylinder 5 gas exchange valve control for circuit low faults	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: <= - between signal and controller ground	ECU is in drive state	= TRUE -	0.5 sec continuous	1 Trip
					Engine Speed	>= 80 rpm		
					Battery Voltage	> 10.9 V		
					Battery Voltage	< 25.5 V		
					Engine Speed	<= 255 1/min		
					Gas exchange valve is turned ON and OFF during start off driving cycle to check the working of valve	= TRUE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
	P3433	Diagnosis of cylinder 5 gas exchange valve control for open circuit faults	Voltage low during driver off state (indicates open circuit)	= Open Circuit:>= 200 K - ECU pin and load	ECU is in drive state	= TRUE -	0.5 sec continuous	2 Trips
					Engine Speed	>= 80 rpm		
					Battery Voltage	> 10.9 V		
					Battery Voltage	< 25.5 V		
					Engine Speed	<= 255 1/min		
					Gas exchange valve is turned ON and OFF during start off driving cycle to check the working of valve	= TRUE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
Cylinder 8 Deactivation Solenoid	P349F	Detects "pumping air" error for cylinder 8 during half engine mode for a calibrated period fo time	(		Synchronisation half engine mode and air charge determination of first activated HEM cylinder	= TRUE -	Continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			"Pumping Air" Error is detected	=	TRUE	-	Diagnose for undesired camshaft switch event active	=	TRUE	-		
			)				(					
			where		(A)*(B)	counts	Valve lift diagnosis enabled.	=	TRUE	-		
			A (see Look-Up-Table #P3499-3)	=	6 to 10	-	(					
			B	=	8	-	(					
							Engine speed	<=	2900	rpm		
							Engine speed	>=	800	rpm		
							)					
							(					
							Ratio of Intake manifold pressure rawvalue to the Pressure upstream throttle valve raw	<=	0.899994	-		
							Ratio of Intake manifold pressure rawvalue to the Pressure upstream throttle valve raw	>=	0.200012	-		
							)					
							(					
							condition: first pressure upstream throttle valve measured valid	=	TRUE	-		
							)					
							(					
							validity of the pressure value (sensor) of the intake manifold - bank 1	=	TRUE	-		
							)					
							(					
							Condition massflow over throttle blade based on throttle angle valid, Bank1	=	TRUE	-		
							)					
							(					
							time counter at first end of start in cycle (16 bit)	>	3	sec		
							)					
							(					
							(					
							Set intake manifold pressure; Bank 1 lesser than Positive load step threshold for set pressure	<=	40	kPa		
							OR					
							diference of Set intake manifold pressure; Bank 1 and pressure value (best of) of the intake manifold - bank 1 is lesser than caliberated threshld	<=	20	kPa		
							)					
							(					
							Set intake manifold pressure; Bank 1 is greater than Negative load step threshold for differential pressure	>=	-15	kPa		
							OR					
							diference of Set intake manifold pressure; Bank 1 and pressure value (best of) of the intake manifold - bank 1 is greater than caliberated threshld	>=	150	kPa		
							)					
							)					
							(					
							Condition instationary state during half engine mode switching	=	FALSE	-		
							for time (see Look-Up-Table #P3499-2)	>=	0.6 to 0.85	sec		
							)					
							(					
							Scavenging rate based on scavenged air and drapped air in the cylinder	<=	1	-		
							)					
							(					
							Absolute value of the difference between the currrent value and previous value of the Position of the throttle valve on motor bench one	<=	0.6016	%		
							for time (see Look-Up-Table #P3499-1)	=	0.42 to 0.84	sec		
							)					
							)					
							Valve lift diagnosis of bank 2 enabled.	=	TRUE	-		
							(					
							(					
							Engine speed	<=	2900	rpm		
							Engine speed	>=	800	rpm		
							)					
							(					
							raw manifold pressure - Bank 2 / pressure upstream throttle valve raw (2. bank)	<=	0.200012	-		
							raw manifold pressure - Bank 2 / pressure upstream throttle valve raw (2. bank)	>=	0.899994	-		
							)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					condition: second pressure upstream throttle valve measured valid	= TRUE -		
					)			
					(			
					condition, measured intake manifold pressure valid sencond bank			
					)			
					(			
					Condition Mass flow at the DK calculated from the sensor signal of the HFM valid, Bank2	= TRUE -		
					)			
					(			
					Condition massflow over throttle blade based on throttle angle valid, Bank2	= TRUE -		
					)			
					time counter at first end of start in cycle (16 bit)	> 3 sec		
					(			
					(			
					Set intake manifold pressure; Bank 2	<= 40 kPa		
					OR			
					diiference of Set intake manifold pressure; Bank 2 and pressure value (best of) of the intake manifold - bank 2	<= 20 kPa		
					)			
					(			
					Set intake manifold pressure; Bank 2	>= -15 kPa		
					OR			
					diiference of Set intake manifold pressure; Bank 2 and pressure value (best of) of the intake manifold - bank 2	>= 150 kPa		
					)			
					)			
					(			
					Condition instationary state during half engine mode switching	= FALSE -		
					for time (see Look-Up-Table #P3499-2)	>= 0.6 to 0.85 sec		
					)			
					(			
					scavenging rate based on scavenged air and drapped air in the cylinder	<= 1 -		
					)			
					(			
					Absolute value of the difference between the currrent value and previous value of the Position of the throttle valve on motor bench two	<= 0.6016 %		
					for time (see Look-Up-Table #P3499-1)	= 0.42 to 0.84 sec		
					)			
					)			
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		
	P3190	Detects no air charge change at the intake for cylinder 8 during full engine mode for a calibrated period of time	(		Synchronisation half engine mode and air charge determination of first activated HEM cylinder	= FALSE -	Continuous	1 Trip
			No air charge change at the intake	= TRUE -	Diagnose for undesired camshaft switch event active	= TRUE -		
			)		(			
			where	(A)*(B) counts	Valve lift diagnosis enabled.	= TRUE -		
			A (see Look-Up-Table #P3499-3)	= 6 to 10 -	(			
			B	= 8 -	(			
					Engine speed	<= 2900 rpm		
					Engine speed	>= 800 rpm		
					)			
					(			
					Ratio of Intake manifold pressure rawvalue to the Pressure upstream throttle valve raw	<= 0.899994 -		
					and			
					Ratio of Intake manifold pressure rawvalue to the Pressure upstream throttle valve raw	>= 0.200012 -		
					)			
					(			
					condition: first pressure upstream throttle valve measured valid	= TRUE -		
					)			
					(			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					validity of the pressure value (sensor) of the intake manifold - bank 1	=	TRUE	-		
					)					
					(					
					Condition massflow over throttle blade based on throttle angle valid, Bank1	=	TRUE	-		
					)					
					(					
					time counter at first end of start in cycle (16 bit)	>	3	sec		
					)					
					(					
					(					
					Set intake manifold pressure; Bank 1 lesser than Positive load step threshold for set pressure	<=	40	kPa		
					OR					
					diference of Set intake manifold pressure; Bank 1 and pressure value (best of) of the intake manifold - bank 1 is lesser than caliberated threshld	<=	20	kPa		
					)					
					(					
					Set intake manifold pressure; Bank 1 is greater than Negative load step threshold for differential pressure	>=	-15	kPa		
					OR					
					diiference of Set intake manifold pressure; Bank 1 and pressure value (best of) of the intake manifold - bank 1 is greater than caliberated threshld	>=	150	kPa		
					)					
					)					
					(					
					Condition instationary state during half engine mode switching	=	FALSE	-		
					for time (see Look-Up-Table #P3499-2)	>=	0.6 to 0.85	sec		
					)					
					(					
					Scavenging rate based on scavenged air and drapped air in the cylinder	<=	1	-		
					)					
					(					
					Absolute value of the difference between the currrent value and previous value of the Position of the throttle valve on motor bench one	<=	0.6016	%		
					for time (see Look-Up-Table #P3499-1)	=	0.42 to 0.84	sec		
					)					
					)					
					Valve lift diagnosis of bank 2 enabled.	=	TRUE	-		
					(					
					(					
					Engine speed	<=	2900	rpm		
					Engine speed	>=	800	rpm		
					)					
					(					
					raw manifold pressure - Bank 2 / pressure upstream throttle valve raw (2. bank)	<=	0.200012	-		
					raw manifold pressure - Bank 2 / pressure upstream throttle valve raw (2. bank)	>=	0.899994	-		
					)					
					(					
					condition: second pressure upstream throttle valve measured valid	=	TRUE	-		
					)					
					(					
					condition, measured intake manifold pressure valid sencond bank					
					)					
					(					
					Condition Mass flow at the DK calculated from the sensor signal of the HFM valid, Bank2	=	TRUE	-		
					)					
					(					
					Condition massflow over throttle blade based on throttle angle valid, Bank2	=	TRUE	-		
					)					
					time counter at first end of start in cycle (16 bit)	>	3	sec		
					(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					Set intake manifold pressure; Bank 2	<= 40 kPa		
					OR			
					difference of Set intake manifold pressure; Bank 2 and pressure value (best of) of the intake manifold - bank 2	<= 20 kPa		
					)			
					(			
					Set intake manifold pressure; Bank 2	>= -15 kPa		
					OR			
					difference of Set intake manifold pressure; Bank 2 and pressure value (best of) of the intake manifold - bank 2	>= 150 kPa		
					)			
					)			
					(			
					Condition instationary state during half engine mode switching	= FALSE -		
					for time (see Look-Up-Table #P3499-2)	>= 0.6 to 0.85 sec		
					)			
					(			
					scavenging rate based on scavenged air and drapped air in the cylinder	<= 1 -		
					)			
					(			
					Absolute value of the difference between the currrent value and previous value of the Position of the throttle valve on motor bench two	<= 0.6016 %		
					for time (see Look-Up-Table #P3499-1)	= 0.42 to 0.84 sec		
					)			
					)			
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		
	P3460	Diagnosis of cylinder 8 gas exchange valve control for circuit high faults	Voltage high during driver on state (indicates short-to-power)	- Short to power: - between signal and controller power	ECU is in drive state	= TRUE -	0.5 sec continuous	2 Trips
					Engine Speed	>= 80 rpm		
					Battery Voltage	> 10.9 V		
					Battery Voltage	< 25.5 V		
					Engine Speed	<= 255 1/min		
					Gas exchange valve is turned ON and OFF during start off driving cycle to check the working of valve	= TRUE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
	P3459	Diagnosis of cylinder 8 gas exchange valve control for circuit low faults	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: <= - between signal and controller ground	ECU is in drive state	= TRUE -	0.5 sec continuous	1 Trip
					Engine Speed	>= 80 rpm		
					Battery Voltage	> 10.9 V		
					Battery Voltage	< 25.5 V		
					Engine Speed	<= 255 1/min		
					Gas exchange valve is turned ON and OFF during start off driving cycle to check the working of valve	= TRUE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
	P3457	Diagnosis of cylinder 8 gas exchange valve control for open circuit faults	Voltage low during driver off state (indicates open circuit)	= Open Circuit:>= 200 K - ECU pin and load	ECU is in drive state	= TRUE -	0.5 sec continuous	2 Trips
					Engine Speed	>= 80 rpm		
					Battery Voltage	> 10.9 V		
					Battery Voltage	< 25.5 V		
					Engine Speed	<= 255 1/min		
					Gas exchange valve is turned ON and OFF during start off driving cycle to check the working of valve	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
Ignition Coils	P2301	Diagnoses the Ignition Coil "A" Primary low side driver circuit for circuit high faults.	Voltage high during driver on state (indicates short-to-power)	= Short to power: between signal and controller power -	Battery voltage	> 10.9 V	0.4 sec continuous	2 Trips
					Battery voltage	< 655.34 V		
					Ignition synchronized	= TRUE -		
					Engine speed	> 1400 rpm		
					Difference between new and old ignition counter ensuring that all cylinder were fired at least once	> 9 counts		
					Basic enable conditions met	= see sheet enable tables -		
	P2300	Diagnoses the Ignition Coil "A" Primary low side driver circuit for circuit low faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: <= between signal and controller ground -	Battery voltage	> 10.9 V	0.4 sec continuous	2 Trips
					Battery voltage	< 655.34 V		
					Ignition synchronized	= TRUE -		
					Engine speed	> 1400 rpm		
					Difference between new and old ignition counter ensuring that all cylinder were fired at least once	> 9 counts		
					Basic enable conditions met	= see sheet enable tables -		
	P0351	Diagnoses the Ignition Coil "A" Primary low side driver circuit for open circuit faults.	Voltage low during driver off state (indicates open circuit)	= Open Circuit : >= 200 between ECU pin and load -	Battery voltage	> 10.9 V	0.4 sec continuous	2 Trips
					Battery voltage	< 655.34 V		
					Ignition synchronized	= TRUE -		
					Engine speed	> 1400 rpm		
					Difference between new and old ignition counter ensuring that all cylinder were fired at least once	> 9 counts		
					Basic enable conditions met	= see sheet enable tables -		
	P2304	Diagnoses the Ignition Coil "H" low side driver circuit for circuit high faults.	Voltage high during driver on state (indicates short-to-power)	= Short to power: between signal and controller power -	Battery voltage	> 10.9 V	0.4 sec continuous	2 Trips
					Battery voltage	< 655.34 V		
					Ignition synchronized	= TRUE -		
					Engine speed	> 1400 rpm		
					Difference between new and old ignition counter ensuring that all cylinder were fired at least once	> 9 counts		
					Basic enable conditions met	= see sheet enable tables -		
	P2303	Diagnoses the Ignition Coil "H" Primary low side driver circuit for circuit low faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: <= between signal and controller ground -	Battery voltage	> 10.9 V	0.4 sec continuous	2 Trips
					Battery voltage	< 655.34 V		
					Ignition synchronized	= TRUE -		
					Engine speed	> 1400 rpm		
					Difference between new and old ignition counter ensuring that all cylinder were fired at least once	> 9 counts		
					Basic enable conditions met	= see sheet enable tables -		
	P0352	Diagnoses the Ignition Coil "H" Primary low side driver circuit for open circuit faults.	Voltage low during driver off state (indicates open circuit)	= Open Circuit : >= 200 between ECU pin and load -	Battery voltage	> 10.9 V	0.4 sec continuous	2 Trips
					Battery voltage	< 655.34 V		
					Ignition synchronized	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	> 1400 rpm > 9 counts = see sheet enable tables -		
	P2307	Diagnoses the Ignition Coil "D" low side driver circuit for circuit high faults.	Voltage high during driver on state (indicates short-to-power)	= Short to power: - between signal and controller power	Battery voltage Battery voltage Ignition synchronized Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	> 10.9 V < 655.34 V = TRUE - > 1400 rpm > 9 counts = see sheet enable tables -	0.4 sec continuous	2 Trips
	P2306	Diagnoses the Ignition Coil "D" low side driver circuit for circuit low faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: <= - between signal and controller ground	Battery voltage Battery voltage Ignition synchronized Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	> 10.9 V < 655.34 V = TRUE - > 1400 rpm > 9 counts = see sheet enable tables -	0.4 sec continuous	2 Trips
	P0353	Diagnoses the Ignition Coil "D" Primary low side driver circuit for open circuit faults.	Voltage low during driver off state (indicates open circuit)	= Open Circuit : >= 200 - between ECU pin and load	Battery voltage Battery voltage Ignition synchronized Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	> 10.9 V < 655.34 V = TRUE - > 1400 rpm > 9 counts = see sheet enable tables -	0.4 sec continuous	2 Trips
	P2310	Diagnoses the Ignition Coil "C" low side driver circuit for circuit high faults.	Voltage high during driver on state (indicates short-to-power)	= Short to power: - between signal and controller power	Battery voltage Battery voltage Ignition synchronized Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	> 10.9 V < 655.34 V = TRUE - > 1400 rpm > 9 counts = see sheet enable tables -	0.4 sec continuous	2 Trips
	P2309	Diagnoses the Ignition Coil "C" low side driver circuit for circuit low faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: <= - between signal and controller ground	Battery voltage Battery voltage Ignition synchronized Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	> 10.9 V < 655.34 V = TRUE - > 1400 rpm > 9 counts = see sheet enable tables -	0.4 sec continuous	2 Trips
	P0354	Diagnoses the Ignition Coil "C" Primary low side driver circuit for open circuit faults.	Voltage low during driver off state (indicates open circuit)	= Open Circuit : >= 200 - between ECU pin and load	Battery voltage	> 10.9 V	0.4 sec continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Battery voltage Ignition synchronized Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	< 655.34 V = TRUE - > 1400 rpm > 9 counts = see sheet enable tables -		
	P2313	Diagnoses the Ignition Coil "B" Primary low side driver circuit for circuit high faults.	Voltage high during driver on state (indicates short-to-power)	= Short to power: - between signal and controller power	Battery voltage Battery voltage Ignition synchronized Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	> 10.9 V < 655.34 V = TRUE - > 1400 rpm > 9 counts = see sheet enable tables -	0.4 sec continuous	2 Trips
	P2312	Diagnoses the Ignition Coil "B" Primary low side driver circuit for circuit low faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: <= - between signal and controller ground	Battery voltage Battery voltage Ignition synchronized Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	> 10.9 V < 655.34 V = TRUE - > 1400 rpm > 9 counts = see sheet enable tables -	0.4 sec continuous	2 Trips
	P0355	Diagnoses the Ignition Coil "B" Primary low side driver circuit for open circuit faults.	Voltage low during driver off state (indicates open circuit)	= Open Circuit : >= 200 - between ECU pin and load	Battery voltage Battery voltage Ignition synchronized Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	> 10.9 V < 655.34 V = TRUE - > 1400 rpm > 9 counts = see sheet enable tables -	0.4 sec continuous	2 Trips
	P2316	Diagnoses the Ignition Coil "E" low side driver circuit for circuit high faults.	Voltage high during driver on state (indicates short-to-power)	= Short to power: - between signal and controller power	Battery voltage Battery voltage Ignition synchronized Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	> 10.9 V < 655.34 V = TRUE - > 1400 rpm > 9 counts = see sheet enable tables -	0.4 sec continuous	2 Trips
	P2315	Diagnoses the Ignition Coil "E" low side driver circuit for circuit low faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: <= - between signal and controller ground	Battery voltage Battery voltage Ignition synchronized Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	> 10.9 V < 655.34 V = TRUE - > 1400 rpm > 9 counts = see sheet enable tables -	0.4 sec continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	P0356	Diagnoses the Ignition Coil "E" Primary low side driver circuit for open circuit faults.	Voltage low during driver off state (indicates open circuit)	= Open Circuit : >= 200 - between ECU pin and load	Battery voltage Battery voltage Ignition synchronized Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	> 10.9 V < 655.34 V = TRUE - > 1400 rpm > 9 counts = see sheet enable tables -	0.4 sec continuous	2 Trips
	P2319	Diagnoses the Ignition Coil "G" low side driver circuit for circuit high faults.	Voltage high during driver on state (indicates short-to-power)	= Short to power: - between signal and controller power	Battery voltage Battery voltage Ignition synchronized Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	> 10.9 V < 655.34 V = TRUE - > 1400 rpm > 9 counts = see sheet enable tables -	0.4 sec continuous	2 Trips
	P2318	Diagnoses the Ignition Coil "G" Primary low side driver circuit for circuit low faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: <= - between signal and controller ground	Battery voltage Battery voltage Ignition synchronized Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	> 10.9 V < 655.34 V = TRUE - > 1400 rpm > 9 counts = see sheet enable tables -	0.4 sec continuous	2 Trips
	P0357	Diagnoses the Ignition Coil "G" Primary low side driver circuit for open circuit faults.	Voltage low during driver off state (indicates open circuit)	= Open Circuit : >= 200 - between ECU pin and load	Battery voltage Battery voltage Ignition synchronized Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	> 10.9 V < 655.34 V = TRUE - > 1400 rpm > 9 counts = see sheet enable tables -	0.4 sec continuous	2 Trips
	P2322	Diagnoses the Ignition Coil "F" low side driver circuit for circuit high faults.	Voltage high during driver on state (indicates short-to-power)	= Short to power: - between signal and controller power	Battery voltage Battery voltage Ignition synchronized Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	> 10.9 V < 655.34 V = TRUE - > 1400 rpm > 9 counts = see sheet enable tables -	0.4 sec continuous	no MIL
	P2321	Diagnoses the Ignition Coil "F" low side driver circuit for circuit low faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: <= - between signal and controller ground	Battery voltage Battery voltage Ignition synchronized Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	> 10.9 V < 655.34 V = TRUE - > 1400 rpm > 9 counts = see sheet enable tables -	0.4 sec continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	P0358	Diagnoses the Ignition Coil "F" Primary low side driver circuit for open circuit faults.	Voltage low during driver off state (indicates open circuit)	= Open Circuit : >= 200 - between ECU pin and load	Battery voltage Battery voltage Ignition synchronized Engine speed Difference between new and old ignition counter ensuring that all cylinder were fired at least once Basic enable conditions met	> 10.9 V < 655.34 V = TRUE - > 1400 rpm > 9 counts = see sheet enable tables -	0.4 sec continuous	2 Trips
Fuel Injection Valve - Low Side - Cylinder 1	P1248	Diagnoses the Cylinder 1 Injector "A" for short circuit fault between high side and low side of driver circuit	Voltage high during driver ON state (indicates short circuit to battery)	= Short to power: - between ECU pin and injector supply voltage	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips
	P029D	Detects mechanical failure open high pressure injection valve 1	Number of misfire counter for cylinder 4 Filtered rail pressure deviation from setpoint	> 75 - > 3.50 MPa	Diagnosis inhibited by statistical function Engine speed Engine speed relative air charge Half engine mode active for time Electrical failure with high pressure injectors No pending or confirmed DTCs Basic enable conditions met	= FALSE - < 6000 rpm > 1520 rpm < 100.008 % = FALSE - >= 0.5 sec = FALSE - = see sheet inhibit tables - = see sheet enable tables -	3 sec continuous	2 Trips
	P0201	Diagnoses the Cylinder 1 Injector "A" low side of driver circuit for open circuit faults	Voltage low during driver OFF state (indicates open circuit)	= Open Circuit: >= 200 K - ECU pin and load	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips
		Diagnoses the Cylinder 1 Injector "A" low side of driver circuit for short circuit faults (short circuit to battery or short circuit to ground)	Voltage low during driver OFF state (indicates short circuit to ground) OR Voltage high during driver ON state (indicates short circuit to battery)	= Short to ground: <= - between ECU pin and ground = Short to power: - between ECU pin and injector supply voltage	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips
Fuel Injection Valve - Low Side - Cylinder 2	P1249	Diagnoses the Cylinder 2 Injector "A" for short circuit fault between high side and low side of driver circuit	Voltage high during driver ON state (indicates short circuit to battery)	= Short to power: - between ECU pin and injector supply voltage	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips
	P02A1	Detects mechanical failure open high pressure injection valve 8	Number of misfire counter for cylinder 2 Filtered rail pressure deviation from setpoint	> 75 - > 3.50 MPa	Diagnosis inhibited by statistical function Engine speed Engine speed relative air charge Half engine mode active for time	= FALSE - < 6000 rpm > 1520 rpm < 100.008 % = FALSE - >= 0.5 sec	3 sec continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Electrical failure with high pressure injectors No pending or confirmed DTCs Basic enable conditions met	= FALSE - = see sheet inhibit tables - = see sheet enable tables -		
	P0202	Diagnoses the Cylinder 2 Injector "A" low side of driver circuit for open circuit faults	Voltage low during driver OFF state (indicates open circuit)	= Open Circuit: >= 200 K - ECU pin and load	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips
		Diagnoses the Cylinder 2 Injector "A" low side of driver circuit for short circuit faults (short circuit to battery or short circuit to ground)	Voltage low during driver OFF state (indicates short circuit to ground) OR Voltage high during driver ON state (indicates short circuit to battery)	= Short to ground: <= - between ECU pin and ground = Short to power: - between ECU pin and injector supply voltage	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips
Fuel Injection Valve - Low Side - Cylinder 3	P124A	Diagnoses the Cylinder 3 Injector "A" for short circuit fault between high side and low side of driver circuit	Voltage high during driver ON state (indicates short circuit to battery)	= Short to power: - between ECU pin and injector supply voltage	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips
	P02A5	Detects mechanical failure open high pressure injection valve 4	Number of misfire counter for cylinder 3 Filtered rail pressure deviation from setpoint	> 75 - > 3.50 MPa	Diagnosis inhibited by statistical function Engine speed Engine speed relative air charge Half engine mode active for time Electrical failure with high pressure injectors No pending or confirmed DTCs Basic enable conditions met	= FALSE - < 6000 rpm > 1520 rpm < 100.008 % = FALSE - >= 0.5 sec = FALSE - = see sheet inhibit tables - = see sheet enable tables -	3 sec continuous	2 Trips
	P0203	Diagnoses the Cylinder 3 Injector "A" low side of driver circuit for open circuit faults	Voltage low during driver OFF state (indicates open circuit)	= Open Circuit: >= 200 K - ECU pin and load	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips
		Diagnoses the Cylinder 3 Injector "A" low side of driver circuit for short circuit faults (short circuit to battery or short circuit to ground)	Voltage low during driver OFF state (indicates short circuit to ground) OR Voltage high during driver ON state (indicates short circuit to battery)	= Short to ground: <= - between ECU pin and ground = Short to power: - between ECU pin and injector supply voltage	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Injection Valve - Low Side - Cylinder 4	P124B	Diagnoses the Cylinder 4 Injector "A" for short circuit fault between high side and low side of driver circuit	Voltage high during driver ON state (indicates short circuit to battery)	= Short to power: - between ECU pin and injector supply voltage	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips
	P02A9	Detects mechanical failure open high pressure injection valve 3	Number of misfire counter for cylinder 4 Filtered rail pressure deviation from setpoint	> 75 - > 3.50 MPa	Diagnosis inhibited by statistical function Engine speed Engine speed relative air charge Half engine mode active for time Electrical failure with high pressure injectors No pending or confirmed DTCs Basic enable conditions met	= FALSE - < 6000 rpm > 1520 rpm < 100.008 % = FALSE - >= 0.5 sec = FALSE - = see sheet inhibit tables - = see sheet enable tables -	3 sec continuous	2 Trips
	P0204	Diagnoses the Cylinder 4 Injector "A" low side of driver circuit for open circuit faults	Voltage low during driver OFF state (indicates open circuit)	= Open Circuit: >= 200 K - ECU pin and load	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips
		Diagnoses the Cylinder 4 Injector "A" low side of driver circuit for short circuit faults (short circuit to battery or short circuit to ground)	Voltage low during driver OFF state (indicates short circuit to ground) OR Voltage high during driver ON state (indicates short circuit to battery)	= Short to ground: <= - between ECU pin and ground = Short to power: - between ECU pin and injector supply voltage	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips
Fuel Injection Valve - Low Side - Cylinder 5	P124C	Diagnoses the Cylinder 5 Injector "A" for short circuit fault between high side and low side of driver circuit	Voltage high during driver ON state (indicates short circuit to battery)	= Short to power: - between ECU pin and injector supply voltage	Battery Voltage and Battery Voltage and Basic enable conditions met and No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips
	P02AD	Detects mechanical failure open high pressure injection valve 2	Number of misfire counter for cylinder 5 Filtered rail pressure deviation from setpoint	> 75 - > 3.50 MPa	Diagnosis inhibited by statistical function Engine speed Engine speed relative air charge Half engine mode active for time Electrical failure with high pressure injectors No pending or confirmed DTCs Basic enable conditions met	= FALSE - < 6000 rpm > 1520 rpm < 100.008 % = FALSE - >= 0.5 sec = FALSE - = see sheet inhibit tables - = see sheet enable tables -	3 sec continuous	2 Trips
	P0205	Diagnoses the Cylinder 5 Injector "A" low side of driver circuit for open circuit faults.	Voltage low during driver OFF state (indicates open circuit)	= Open Circuit: >= 200 K - ECU pin and load	Battery Voltage Battery Voltage	>= 10.9 V <= 6553.5 V	2 events continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
		Diagnoses the Cylinder 5 Injector "A" low side of driver circuit for short circuit faults (short circuit to battery or short circuit to ground)	Voltage low during driver OFF state (indicates short circuit to ground)	= Short to ground: <= - between ECU pin and ground	Battery Voltage	>= 10.9 V	2 events continuous	2 Trips
			OR		Battery Voltage	<= 6553.5 V		
			Voltage high during driver ON state (indicates short circuit to battery)	= Short to power: - between ECU pin and injector supply voltage	Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
Fuel Injection Valve - Low Side - Cylinder 6	P124D	Diagnoses the Cylinder 6 Injector "A" for short circuit fault between high side and low side of driver circuit	Voltage high during driver ON state (indicates short circuit to battery)	= Short to power: - between ECU pin and injector supply voltage	Battery Voltage	>= 10.9 V	2 events continuous	2 Trips
					Battery Voltage	<= 6553.5 V		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
	P02B1	Detects mechanical failure open high pressure injection valve 5	Number of misfire counter for cylinder 6	> 75 -	Diagnosis inhibited by statistical function	= FALSE -	3 sec continuous	2 Trips
			Filtered rail pressure deviation from setpoint	> 3.50 MPa	Engine speed	< 6000 rpm		
					Engine speed	> 1520 rpm		
					relative air charge	< 100.008 %		
					Half engine mode active	= FALSE -		
					for time	>= 0.5 sec		
					Electrical failure with high pressure injectors	= FALSE -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P0206	Diagnoses the Cylinder 6 Injector "A" low side of driver circuit for open circuit faults	Voltage low during driver OFF state (indicates open circuit)	= Open Circuit: >= 200 K - ECU pin and load	Battery Voltage	>= 10.9 V	2 events continuous	2 Trips
					Battery Voltage	<= 6553.5 V		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
		Diagnoses the Cylinder 6 Injector "A" low side of driver circuit for short circuit faults (short circuit to battery or short circuit to ground)	Voltage low during driver OFF state (indicates short circuit to ground)	= Short to ground: <= - between ECU pin and ground	Battery Voltage	>= 10.9 V	2 events continuous	2 Trips
			OR		Battery Voltage	<= 6553.5 V		
			Voltage high during driver ON state (indicates short circuit to battery)	= Short to power: - between ECU pin and injector supply voltage	Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
Fuel Injection Valve - Low Side - Cylinder 7	P124E	Diagnoses the Cylinder 7 Injector "A" for short circuit fault between high side and low side of driver circuit	Voltage high during driver ON state (indicates short circuit to battery)	= Short to power: - between ECU pin and injector supply voltage	Battery Voltage	>= 10.9 V	2 events continuous	2 Trips
					Battery Voltage	<= 6553.5 V		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
	P02B5	Detects mechanical failure open high pressure injection valve 7	Number of misfire counter for cylinder 7	> 75 -	Diagnosis inhibited by statistical function	= FALSE -	3 sec continuous	2 Trips
			Filtered rail pressure deviation from setpoint	> 3.50 MPa	Engine speed	< 6000 rpm		
					Engine speed	> 1520 rpm		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					relative air charge Half engine mode active for time Electrical failure with high pressure injectors No pending or confirmed DTCs Basic enable conditions met	< 100.008 % = FALSE - >= 0.5 sec = FALSE - = see sheet inhibit tables - = see sheet enable tables -		
	P0207	Diagnoses the Cylinder 7 Injector "A" low side of driver circuit for open circuit faults	Voltage low during driver OFF state (indicates open circuit)	= Open Circuit: >= 200 K - ECU pin and load	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips
		Diagnoses the Cylinder 7 Injector "A" low side of driver circuit for short circuit faults (short circuit to battery or short circuit to ground)	Voltage low during driver OFF state (indicates short circuit to ground) OR Voltage high during driver ON state (indicates short circuit to battery)	= Short to ground: <= - between ECU pin and ground = Short to power: - between ECU pin and injector supply voltage	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips
Fuel Injection Valve - Low Side - Cylinder 8	P124F	Diagnoses the Cylinder 8 Injector "A" for short circuit fault between high side and low side of driver circuit	Voltage high during driver ON state (indicates short circuit to battery)	= Short to power: - between ECU pin and injector supply voltage	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips
	P02B9	Detects mechanical failure open high pressure injection valve 6	Number of misfire counter for cylinder 8 Filtered rail pressure deviation from setpoint	> 75 - > 3.50 MPa	Diagnosis inhibited by statistical function Engine speed Engine speed relative air charge Half engine mode active for time Electrical failure with high pressure injectors No pending or confirmed DTCs Basic enable conditions met	= FALSE - < 6000 rpm > 1520 rpm < 100.008 % = FALSE - >= 0.5 sec = FALSE - = see sheet inhibit tables - = see sheet enable tables -	3 sec continuous	2 Trips
	P0208	Diagnoses the Cylinder 8 Injector "A" low side of driver circuit for open circuit faults	Voltage low during driver OFF state (indicates open circuit)	= Open Circuit: >= 200 K - ECU pin and load	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips
		Diagnoses the Cylinder 8 Injector "A" low side of driver circuit for short circuit faults (short circuit to battery or short circuit to ground)	Voltage low during driver OFF state (indicates short circuit to ground) OR Voltage high during driver ON state (indicates short circuit to battery)	= Short to ground: <= - between ECU pin and ground = Short to power: - between ECU pin and injector supply voltage	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Injection Valve - High Side - Cylinder 1	P2146	Diagnoses the Cylinder 1 Injector "A" for short circuit (short circuit to battery or short circuit to ground) at high side of the driver circuit	Voltage low during driver OFF state (indicates short circuit to ground) OR Voltage high during driver ON state (indicates short circuit to battery)	= Short to ground: <= - between ECU pin and ground = Short to power: - between ECU pin and injector supply voltage	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips
Fuel Injection Valve - High Side - Cylinder 2	P2149	Diagnoses the Cylinder 2 Injector "B" for short circuit (short circuit to battery or short circuit to ground) at high side of the driver circuit	Voltage low during driver OFF state (indicates short circuit to ground) OR Voltage high during driver ON state (indicates short circuit to battery)	= Short to ground: <= - between ECU pin and ground = Short to power: - between ECU pin and injector supply voltage	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips
Fuel Injection Valve - High Side - Cylinder 3	P2152	Diagnoses the Cylinder 3 Injector "C" for short circuit (short circuit to battery or short circuit to ground) at high side of the driver circuit	Voltage low during driver OFF state (indicates short circuit to ground) OR Voltage high during driver ON state (indicates short circuit to battery)	= Short to ground: <= - between ECU pin and ground = Short to power: - between ECU pin and injector supply voltage	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips
Fuel Injection Valve - High Side - Cylinder 4	P2155	Diagnoses the Cylinder 4 Injector "D" for short circuit (short circuit to battery or short circuit to ground) at high side of the driver circuit	Voltage low during driver OFF state (indicates short circuit to ground) OR Voltage high during driver ON state (indicates short circuit to battery)	= Short to ground: <= - between ECU pin and ground = Short to power: - between ECU pin and injector supply voltage	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips
Fuel Injection Valve - High Side - Cylinder 5	P216A	Diagnoses the Cylinder 5 Injector "E" for short circuit (short circuit to battery or short circuit to ground) at high side of the driver circuit	Voltage low during driver OFF state (indicates short circuit to ground) OR Voltage high during driver ON state (indicates short circuit to battery)	= Short to ground: <= - between ECU pin and ground = Short to power: - between ECU pin and injector supply voltage	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips
Fuel Injection Valve - High Side - Cylinder 6	P216D	Diagnoses the Cylinder 6 Injector "F" for short circuit (short circuit to battery or short circuit to ground) at high side of the driver circuit	Voltage low during driver OFF state (indicates short circuit to ground) OR Voltage high during driver ON state (indicates short circuit to battery)	= Short to ground: <= - between ECU pin and ground = Short to power: - between ECU pin and injector supply voltage	Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V <= 6553.5 V = see sheet enable tables - = see sheet inhibit tables -	2 events continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
Fuel Injection Valve - High Side - Cylinder 7	P217A	Diagnoses the Cylinder 7 Injector "G" for short circuit (short circuit to battery or short circuit to ground) at high side of the driver circuit	Voltage low during driver OFF state (indicates short circuit to ground)	=	Short to ground: <= between ECU pin and ground	-	Battery Voltage	>=	10.9	V	2	events	continuous	2 Trips
			OR				Battery Voltage	<=	6553.5	V				
			Voltage high during driver ON state (indicates short circuit to battery)	=	Short to power: between ECU pin and injector supply voltage	-	Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
Fuel Injection Valve - High Side - Cylinder 8	P217D	Diagnoses the Cylinder 8 Injector "H" for short circuit (short circuit to battery or short circuit to ground) at high side of the driver circuit	Voltage low during driver OFF state (indicates short circuit to ground)	=	Short to ground: <= between ECU pin and ground	-	Battery Voltage	>=	10.9	V	2	events	continuous	2 Trips
			OR				Battery Voltage	<=	6553.5	V				
			Voltage high during driver ON state (indicates short circuit to battery)	=	Short to power: between ECU pin and injector supply voltage	-	Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
Fuel Pressure Regulator Control Circuit - High Side - B1	P0089	**Path 1a:** Plausibility check of High Pressure fuel system where controller output is compared with maximum threshold for calibrated period of time	Filtered value of the High pressure controller output	>	5.75	MPa	**Common Conditions**				10	sec	continuous	2 Trips
							Conditions for Plausibility check of Fuel supply system (							
							Airbag is activated	=	FALSE	-				
							Rail pressure sensor voltage is not plausible	=	FALSE	-				
							Battery voltage	<=	655.34	V				
							Mean value of effective relative volumetric injected fuel mass	>=	7.734	%				
							Mean value of effective relative volumetric injected fuel mass	<=	3071.953	%				
							Initial fueling mode is active	=	FALSE	-				
							)							
							Time counter at end of start	>=	7	sec				
							Conditions for reset of high-pressure regulation ((((	=	FALSE	-				
							Actual number of cylinders with injection cut-off	<	6	-				
							Desired number of cylinders with injection cut-off	<	8	-				
							) OR							
							End of start is reached	=	FALSE	-				
							) OR							
							Difference between the actual rail pressure and filtered rail pressure setpoint (A+B) where in:	>	(A+B)	MPa				
							(A) rail pressure offset during fuel cutoff for activation demand control	=	1	MPa				
							(B) maximum difference between actual rail pressure and set rail pressure for deactivation of MSV if fuel cutt off is active	=	0	MPa				
							) ((							
							High pressure pump is active	=	TRUE	-				
							(							
							Engine is in running state	=	TRUE	-				
							OR							
							Crankshaft signal is detected	=	TRUE	-				
							)							
							for time	=	0.04	sec				
							) OR							
							High pressure pump is not active	=	FALSE	-				
							End of start is reached	=	TRUE	-				
							) (							

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Start of injection enabled	= TRUE -		
					(			
					Engine start is in pre-injection mode	= TRUE -		
					Injection counter	>= (A+B) -		
					(A+B) where in:			
					(A) Number of injections for enabling high-pressure controller	= 2 -		
					(B) Number of cylinders	= 8 -		
					OR			
					Engine start is not in pre-injection mode	= FALSE -		
					Injection counter	>= 2 -		
					)			
					)			
					(			
					Engine state of synchronisation for rail pressure control activation	>= 30 -		
					(			
					Engine is in running state	= TRUE -		
					OR			
					Crankshaft signal is detected	= TRUE -		
					)			
					for time	= 0.04 sec		
					)			
					)			
					for time	= 7 sec		
					No pending or confirmed DTCs	= see sheet inhibit table -		
					Basic enable conditions met	= see sheet enable table -		
		Path 1b: Plausibility check of High Pressure fuel system where controller output is compared with maximum threshold for calibrated period of time	Filtered value of the High pressure controller output pressure	> 5.75 MPa	**Common Conditions**		6 sec continuous	2 Trips
					Fuel tank is empty or reserve	= TRUE -		
		Path 2: Plausibility check of High Pressure fuel system where controller output is compared with minimum threshold for calibrated period of time	Filtered value of the High pressure controller output pressure	< -5.75 MPa	Conditions for Plausibility check of Fuel supply system		10 sec continuous	2 Trips
					(			
					Airbag is activated	= FALSE -		
					Rail pressure sensor voltage is not plausible	= FALSE -		
					Battery voltage	<= 655.34 V		
					Mean value of effective relative volumetric injected fuel mass	>= 7.734 %		
					Mean value of effective relative volumetric injected fuel mass	<= 3071.953 %		
					Initial fueling mode is active	= FALSE -		
					)			
					Time counter at end of start	>= 7 sec		
					Conditions for reset of high-pressure regulation	= FALSE -		
					(			
					(			
					(			
					(			
					Actual number of cylinders with injection cut-off	< 6 -		
					Desired number of cylinders with injection cut-off	< 8 -		
					)			
					OR			
					End of start is reached	= FALSE -		
					)			
					OR			
					Difference between the actual rail pressure and filtered rail pressure setpoint	> (A+B) MPa		
					(A+B) where in:			
					(A) rail pressure offset during fuel cutoff for activation demand control	= 1 MPa		
					(B) maximum difference between actual rail pressure and set rail pressure for deactivation of MSV if fuel cutt off is active	= 0 MPa		
					)			
					(			
					(			
					High pressure pump is active	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					Engine is in running state	= TRUE -		
					OR			
					Crankshaft signal detected	= TRUE -		
					)			
					for time	= 0.04 sec		
					)			
					OR			
					High pressure pump not active	= FALSE -		
					End of start is reached	= TRUE -		
					)			
					(			
					Start of injection is enabled	= TRUE -		
					(			
					Engine start is in pre-injection mode	= TRUE -		
					Injection counter	>= (A+B) -		
					(A+B) where in:			
					(A) Number of injections for enabling high-pressure controller	= 2 -		
					(B) Number of cylinders	= 8 -		
					OR			
					Engine start is not in pre-injection mode	= FALSE -		
					Injection counter	>= 2 -		
					)			
					)			
					(			
					Engine state of synchronisation for rail pressure control activation	>= 30 -		
					(			
					Engine is in running state	= TRUE -		
					OR			
					Crankshaft signal is detected	= TRUE -		
					)			
					for time	= 0.04 sec		
					)			
					)			
					for time	= 7 sec		
					No pending or confirmed DTCs	= see sheet inhibit table -		
					Basic enable conditions met	= see sheet enable table -		
Fuel Pressure Regulator Control Circuit - High Side - B1	P228D	Detects if High Pressure fuel system control deviation of rail pressure is lesser than maximum threshold for calibrated period of time	Filtered value of rail pressure control deviation	< -3 MPa	Conditions for Plausibility check of Fuel supply system	= TRUE -	7 sec	2 Trips
					(			
					Airbag is activated	= FALSE -		
					Rail pressure sensor voltage is not plausible	= FALSE -		
					Battery voltage	<= 655.34 V		
					Mean value of effective relative volumetric injected fuel mass	>= 7.734 %		
					Mean value of effective relative volumetric injected fuel mass	<= 3071.953 %		
					Initial fueling mode is active	= FALSE -		
					)			
					Time counter at end of start	>= 7 sec		
					Conditions for reset of high-pressure regulation	= FALSE -		
					(			
					(			
					(			
					(			
					Actual number of cylinders with injection cut-off	< 6 -		
					Desired number of cylinders with injection cut-off	< 8 -		
					)			
					OR			
					End of start is reached	= FALSE -		
					)			
					OR			
					Difference between the actual rail pressure and filtered rail pressure setpoint	> (A+B) MPa		
					(A+B) where in:			
					(A) rail pressure offset during fuel cutoff for activation demand control	= 1 MPa		
					(B) maximum difference between actual rail pressure and set rail pressure for deactivation of MSV if fuel cutt off is active	= 0 MPa		
					)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					(			
					High pressure pump is active	= TRUE -		
					(			
					Engine is in running state	= TRUE -		
					OR			
					Crankshaft signal is detected	= TRUE -		
					)			
					for time	= 0.04 sec		
					)			
					OR			
					High pressure pump is not active	= FALSE -		
					End of start is reached	= TRUE -		
					)			
					(			
					Start of injection enabled	= TRUE -		
					(			
					(			
					Engine start is in pre-injection mode	= TRUE -		
					Injection counter	>= (A+B) -		
					(A+B) where in:			
					(A) Number of injections for enabling high-pressure controller	= 2 -		
					(B) Number of cylinders	= 8 -		
					)			
					OR			
					(			
					Engine start is not in pre-injection mode	= FALSE -		
					Injection counter	>= 2 -		
					)			
					)			
					)			
					(			
					Engine state of synchronisation for rail pressure control activation	>= 30 -		
					(			
					Engine is in running state	= TRUE -		
					OR			
					Crankshaft signal is detected	= TRUE -		
					)			
					for time	= 0.04 sec		
					)			
					)			
					for time	= 7 sec		
					High pressure diagnosis disabled due to CSERS diagnosis	= FALSE -		
					(			
					Catalyst heating activated	= FALSE -		
					OR			
					Catalyst heating request by cold engine	= FALSE -		
					OR			
					Time counter at end of start	< 2 sec		
					OR			
					Plausibility check fuel supply system active	= FALSE -		
					OR			
					(			
					Rail pressure setpoint	>= 36 MPa		
					OR			
					Rail pressure setpoint	<= 6 MPa		
					OR			
					Absolute of difference between rail pressure set point and its filtered value	>= 15 MPa		
					OR			
					Engine speed	<= 0 rpm		
					Coolant temperature at engine output	<= -3549.94 deg C		
					)			
					OR			
					High pressure regulation is reset	= TRUE -		
					)			
					No pending or confirmed DTCs	= see sheet inhibit table -		
					Basic enable conditions met	= see sheet enable table -		
	P228C	**Path 1:** Detects if High Pressure fuel system control deviation of rail pressure is greater than minimum threshold for calibrated period of time	Filtered value of rail pressure control deviation	> 3 MPa	**Common conditions**		5 sec	2 Trips
					Conditions for Plausibility check of Fuel supply system	= TRUE -		
					(			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Airbag is activated	=	FALSE	-		
					Rail pressure sensor voltage is not plausible	=	FALSE	-		
					Battery voltage	<=	655.34	V		
					Mean value of effective relative volumetric injected fuel mass	>=	7.734	%		
					Mean value of effective relative volumetric injected fuel mass	<=	3071.953	%		
					Initial fueling mode is active	=	FALSE	-		
					)					
					Time counter at end of start	>=	7	sec		
					Conditions for reset of high-pressure regulation	=	FALSE	-		
					(					
					(					
					(					
					(					
					Actual number of cylinders with injection cut-off	<	6	-		
					Desired number of cylinders with injection cut-off	<	8	-		
					)					
					OR					
					End of start is reached	=	FALSE	-		
					)					
					OR					
					Difference between the actual rail pressure and filtered rail pressure setpoint	>	(A+B)	MPa		
					(A+B) where in:					
					(A) rail pressure offset during fuel cutoff for activation demand control	=	1	MPa		
					(B) maximum difference between actual rail pressure and set rail pressure for deactivation of MSV if fuel cutt off is active	=	0	MPa		
					)					
					(					
					(					
					High pressure pump is active	=	TRUE	-		
					(					
					Engine is in running state	=	TRUE	-		
					OR					
					Crankshaft signal is detected	=	TRUE	-		
					)					
					for time	=	0.04	sec		
					)					
					OR					
					High pressure pump is not active	=	FALSE	-		
					End of start is reached	=	TRUE	-		
					)					
					(					
					Start of injection enabled	=	TRUE	-		
					(					
					(					
					Engine start is in pre-injection mode	=	TRUE	-		
					Injection counter	>=	(A+B)	-		
					(A+B) where in:					
					(A) Number of injections for enabling high-pressure controller	=	2	-		
					(B) Number of cylinders	=	8	-		
					)					
					OR					
					(					
					Engine start is not in pre-injection mode	=	FALSE	-		
					Injection counter	>=	2	-		
					)					
					)					
					)					
					(					
					Engine state of synchronisation for rail pressure control activation	>=	30	-		
					(					
					Engine is in running state	=	TRUE	-		
					OR					
					Crankshaft signal is detected	=	TRUE	-		
					)					
					for time	=	0.04	sec		
					)					
					)					
					for time	=	7	sec		
					High pressure diagnosis disabled due to CSERS diagnosis	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					Catalyst heating activated	= FALSE -		
					OR			
					Catalyst heating request by cold engine	= FALSE -		
					OR			
					Time counter at end of start	< 2 sec		
					OR			
					Plausibility check fuel supply system active	= FALSE -		
					OR			
					(			
					Rail pressure setpoint	>= 36 MPa		
					OR			
					Rail pressure setpoint	<= 6 MPa		
					OR			
					Absolute of difference between rail pressure set point and its filtered value	>= 15 MPa		
					OR			
					Engine speed	<= 0 rpm		
					Coolant temperature at engine output	<= -3549.94 deg C		
					)			
					OR			
					High pressure regulation is reset	= TRUE -		
					)			
					Fuel tank is empty or reserve	= FALSE -		
					No pending or confirmed DTCs	= see sheet inhibit table -		
					Basic enable conditions met	= see sheet enable table -		
		Path 2: Detects if High Pressure fuel system control deviation of rail pressure is greater than minimum threshold for calibrated period of time during fuel tank is empty or reserve state	Filtered value of rail pressure control deviation	> 3 MPa	**Common conditions**		5 sec	2 Trips
					Fuel tank is empty or reserve	= TRUE -		
	P00C6	Fuel Rail Pressure Too Low - Engine Cranking Bank 1	High pressure start	= FALSE -	Engine is in standby state	= TRUE -	once per driving cycle	2 Trips
			(		Condition calucation of diagnosis high pressure start is stopped	= FALSE -		
			Fuel rail pressure (see Look-Up-Table #P00C6-1)	< 7 to 12 MPa	Engine temperature for diagnosis start with high fuel pressure	<= 142.96 deg C		
			for number of synchronous counts (see Look-Up-Table #P00C6-2)	= 16 to 48 counts	Engine temperature for diagnosis start with high fuel pressure	> -42.54 deg C		
			OR		Release condition for all high pressure starts	= TRUE -		
			(		(			
			(		(			
			Fuel rail pressure (see Look-Up-Table #P00C6-1)	< 7 to 12 MPa	Engine is in ready state	= TRUE -		
			OR		OR			
			Filtered rail pressure	< 1.5 MPa	Engine is in auto stopping state	= TRUE -		
			)		OR			
			Engine is running	= TRUE -	Injection is not released	= TRUE -		
			)					
			for time (see Look-Up-Table #P00C6-3)	= 2 to 6 sec	)			
			OR		Temperature for upper threshold high pressure start	< 142.96 deg C		
			(		Temperature for lowe threshold high pressure start	>= -42.54 deg C		
			Fuel rail pressure (see Look-Up-Table #P00C6-1)	>= 7 to 12 MPa	Condition disable flow of high pressure pump	= FALSE -		
			and		(			
			Filtered rail pressure	< 1.5 MPa	Voltage rail pressure sensor not plausible	= FALSE -		
			)		Airbag activated	= FALSE -		
			)		and			
					Battery voltage	<= 655.34 V		
					)			
					)			
					Condition hot start	= FALSE -		
					(			
					Engine temperature	< 89.96 deg C		
					OR			
					Integrated air mass flow from engine start to maximum value	> 550 g		
					)			
					(			
					(			
					Condition end of start for activation of md structure	= TRUE -		
					Condition enable start injection	= TRUE -		
					)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							OR					
							Engine is in ready state	=	TRUE	-		
							)					
							(	=	TRUE	-		
							High pressure start request					
							(					
							Start type from the start coordinator indicates no start	=	TRUE	-		
							OR					
							(					
							Start type from the start coordinator indicates low pressure start	=	FALSE	-		
							Start type from the start coordinator indicates preijections with low pressure start	=	FALSE	-		
							)					
							)					
							)					
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
							Basic enable conditions met	=	see sheet enable tables	-		
		Monitoring of preinjection with low pressure	Preinjection with low pressure is active	=	FALSE	-	Engine is in standby state	=	TRUE	-		
			(				Condition calucation of diagnosis high pressure start is stopped	=	FALSE	-		
			Start temperature for the start co-ordinator	>=	-10.54	deg C	Engine temperature for diagnosis start with high fuel pressure	<=	142.96	deg C		
			OR				Engine temperature for diagnosis start with high fuel pressure	>	-42.54	deg C		
			Injection counter	>=	A * B	counts	Release condition for all high pressure starts	=	TRUE	-		
			where	=	0 to 1	cycle	(					
			A: Number of working cycle during preinjection (see Look-Up-Table #P00C6-4)									
			B: Number of cylinder				(					
			OR				Engine is in ready state	=	TRUE	-		
			State of EPM operation mode is in Backup camshaft mode	=	TRUE	-	OR					
			OR				Engine is in auto stopping state	=	TRUE	-		
			Repeated cold start	=	TRUE	-	OR					
			)				Injection is not released	=	TRUE	-		
							)					
							Temperature for upper threshold high pressure start	<	142.96	deg C		
							Temperature for lowe threshold high pressure start	>=	-42.54	deg C		
							Condition disable flow of high pressure pump	=	FALSE	-		
							(					
							Voltage rail pressure sensor not plausible	=	FALSE	-		
							Airbag activated	=	FALSE	-		
							Battery voltage	<=	655.34	V		
							)					
							)					
							Condition hot start	=	FALSE	-		
							(					
							Engine temperature	<	89.96	deg C		
							OR					
							Integrated air mass flow from engine start to maximum value	>	550	g		
							)					
							(					
							(					
							Condition end of start for activation of md structure	=	TRUE	-		
							Condition enable start injection	=	TRUE	-		
							)					
							OR					
							Engine is in ready state	=	TRUE	-		
							)					
							(	=	TRUE	-		
							High pressure start request					
							(					
							Start type from the start coordinator indicates low pressure start	=	TRUE	-		
							)					
							)					
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
							Basic enable conditions met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Regulator Control Circuit - High Side - B1	P10E8	Diagnoses the fuel quantity control valve for short circuit fault between the high side and low side of the driver circuit	Voltage low during driver OFF state (indicates short circuit to ground) OR Voltage high during driver ON state (indicates short circuit to battery)	= Short to ground: <= - between ECU pin and ground = Short to power: - between ECU pin and injector supply voltage	Battery voltage Battery voltage Engine speed Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V < 655.34 V >= 80 rpm = see sheet enable tables - = see sheet inhibit tables -	20 sec continuous	1 Trip
	P00CA	Diagnoses the fuel quantity control valve for short circuit to battery fault at the high side of the driver circuit	Voltage high during driver ON state (indicates short circuit to battery)	= Short to power: - between ECU pin and injector supply voltage	Battery voltage Battery voltage Engine speed Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V < 655.34 V >= 80 rpm = see sheet enable tables - = see sheet inhibit tables -	20 sec continuous	1 Trip
	P00C9	Diagnoses the fuel quantity control valve for short circuit to ground fault at the high side of the driver circuit	Voltage low during driver OFF state (indicates short circuit to ground)	= Short to ground: <= - between ECU pin and ground	Battery voltage Battery voltage Engine speed Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V < 655.34 V >= 80 rpm = see sheet enable tables - = see sheet inhibit tables -	20 sec continuous	1 Trip
	P0090	Detects open circuit error of fuel quantity control valve when there is high current flowing through the driver circuit	Voltage low during driver OFF state (indicates open circuit)	= Open Circuit: >= 200 K - ECU pin and load	Battery voltage Battery voltage Engine speed Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V < 655.34 V >= 80 rpm = see sheet enable tables - = see sheet inhibit tables -	20 sec continuous	no MIL
Fuel Pressure Regulator Control Circuit - Low Side - B1	P0092	Diagnoses the fuel quantity control valve for short circuit to battery fault at the low side of the driver circuit	Voltage high during driver ON state (indicates short circuit to battery)	= Short to power: - between ECU pin and injector supply voltage	Battery voltage Battery voltage Engine speed Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V < 655.34 V >= 80 rpm = see sheet enable tables - = see sheet inhibit tables -	20 sec continuous	1 Trip
	P0091	Diagnoses the fuel quantity control valve for short circuit to ground fault at the low side of the driver circuit	Voltage low during driver OFF state (indicates short circuit to ground)	= Short to ground: <= - between ECU pin and ground	Battery voltage Battery voltage Engine speed Basic enable conditions met No pending or confirmed DTCs	>= 10.9 V < 655.34 V >= 80 rpm = see sheet enable tables - = see sheet inhibit tables -	20 sec continuous	1 Trip
Fuel Pressure Regulator Control Circuit - High Side - B2	P313A	Diagnoses the fuel quantity control valve for short circuit fault between the high side and low side of the driver circuit	Voltage low during driver OFF state (indicates short circuit to ground) OR	= Short to ground: <= - between ECU pin and ground	Battery voltage Battery voltage	>= 10.9 V < 655.34 V	20 sec continuous	1 Trip

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
			Voltage high during driver ON state (indicates short circuit to battery)	=	Short to power: between ECU pin and injector supply voltage	-	Engine speed	>=	80	rpm				
							Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
	P3139	Diagnoses the fuel quantity control valve for short circuit to battery fault at the high side of the driver circuit	Voltage high during driver ON state (indicates short circuit to battery)	=	Short to power: between ECU pin and injector supply voltage	-	Battery voltage	>=	10.9	V	20	sec	continuous	1 Trip
							Battery voltage	<	655.34	V				
							Engine speed	>=	80	rpm				
							Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
	P3138	Diagnoses the fuel quantity control valve for short circuit to ground fault at the high side of the driver circuit	Voltage low during driver OFF state (indicates short circuit to ground)	=	Short to ground: <= between ECU pin and ground	-	Battery voltage	>=	10.9	V	20	sec	continuous	1 Trip
							Battery voltage	<	655.34	V				
							Engine speed	>=	80	rpm				
							Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
	P2C02	Detects open circuit error of fuel quantity control valve when there is high current flowing through the driver circuit	Voltage low during driver OFF state (indicates open circuit)	=	Open Circuit: >= 200 K ECU pin and load	-	Battery voltage	>=	10.9	V	20	sec	continuous	no MIL
							Battery voltage	<	655.34	V				
							Engine speed	>=	80	rpm				
							Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
Fuel Pressure Regulator Control Circuit - Low Side - B1	P2C04	Diagnoses the fuel quantity control valve for short circuit to battery fault at the low side of the driver circuit	Voltage high during driver ON state (indicates short circuit to battery)	=	Short to power: between ECU pin and injector supply voltage	-	Battery voltage	>=	10.9	V	20	sec	continuous	1 Trip
							Battery voltage	<	655.34	V				
							Engine speed	>=	80	rpm				
							Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
	P2C03	Diagnoses the fuel quantity control valve for short circuit to ground fault at the low side of the driver circuit	Voltage low during driver OFF state (indicates short circuit to ground)	=	Short to ground: <= between ECU pin and ground	-	Battery voltage	>=	10.9	V	20	sec	continuous	1 Trip
							Battery voltage	<	655.34	V				
							Engine speed	>=	80	rpm				
							Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
Fuel Pump - FTZM	P12A6	ECM command state for pump does not match feedback value from FTZM_Information_2_S1 signal FTZMSnsdFuelCtlEnblAtv "Fuel Tank Zone Module Sensed Fuel Control Enable Active"	Status of Pre supply pump is not plausible with the status received from the Communication module	=	TRUE	-	Rationality check for Pre-Supply pump diagnosis is active	=	TRUE	-	2	sec	continuous	1 Trip
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P129F	Commanded pump speed in ECM does not match feedback value from FTZM_Information_8_S1 signal FTZMBrshFPmpSnsdSpd "Fuel Tank Zone Module Brushless Fuel Pump Sensed Speed" - feedback speed too high	Difference between actual Pre Supply Pump speed and Pre Supply Pump speed converted from PWM value	>	200	rpm	Rationality check for Pre-Supply pump diagnosis is active	=	TRUE	-	3	sec	continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No pending or confirmed DTCs Basic enable conditions met	= see sheet inhibit tables - = see sheet enable tables -		
		Commanded pump speed in ECM does not match feedback value from FTZM_Information_8_S1 signal FTZMBrshFPmpSnsdSpd "Fuel Tank Zone Module Brushless Fuel Pump Sensed Speed" - feedback speed too low	Difference between Pre Supply Pump speed converted from PWM value and actual Pre Supply Pump speed	> 200 rpm	Rationality check for Pre-Supply pump diagnosis is active No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	3 sec continuous	2 Trips
Fuel Pump - FTZM	P2635	Filtered fuel pressure deviation in the low pressure fuel system is lesser than calibrated threshold for calibrated period of time	Filtered fuel pressure deviation in the low pressure system	< -50 kPa	Electrical fuel pump operational mode is in closed loop control (Fuel flow demand of electrical fuel pump Engine is running state Pre-Supply pump is ON) No pending or confirmed DTCs Basic enable conditions met	= TRUE - >= 0.1 l/h = TRUE - = TRUE - = see sheet inhibit tables - = see sheet enable tables -	15 sec continuous	2 Trips
	P2635	Filtered fuel pressure deviation in the low pressure fuel system is greater than calibrated threshold for calibrated period of time	Filtered fuel pressure deviation in the low pressure system	> 50 kPa	Electrical fuel pump operational mode is in closed loop control (Fuel flow demand of electrical fuel pump Engine is running state Pre-Supply pump is ON) No pending or confirmed DTCs Basic enable conditions met	= TRUE - >= 0.1 l/h = TRUE - = TRUE - = see sheet inhibit tables - = see sheet enable tables -	15 sec continuous	2 Trips
	P102B	Monitoring of FTZM fuel pump output for circuits high fault	Fuel Tank Zone Module(FTZM) fuel pump output is shorted to battery	= TRUE -	Ignition ON No pending or confirmed DTCs Basic enabling conditions are met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	0.5 sec Continuous	2 Trips
	P102A	Monitoring of FTZM fuel pump output for circuits low fault	Fuel Tank Zone Module(FTZM) fuel pump output is shorted to ground	= TRUE -	Ignition ON No pending or confirmed DTCs Basic enabling conditions are met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	0.5 sec Continuous	2 Trips
	P1029	Monitoring of FTZM fuel pump output for circuits open fault	Fuel Tank Zone Module(FTZM) fuel pump output circuit is opened	= TRUE -	Ignition ON No pending or confirmed DTCs Basic enabling conditions are met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	0.5 sec Continuous	2 Trips
Camshaft Position Actuator - Intake B1	P2089	Diagnoses the "A" Camshaft Position Actuator Bank 1 low side driver circuit for short circuit to battery faults.	Voltage high during driver on state (indicates short-to-power)	= Short to power: <= 0.5 signal and controller power -	Ignition is ON ECU is in drive state Engine Speed Battery Voltage Battery Voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - = TRUE - >= 80 rpm > 10.9 V < 25.5 V = see sheet inhibit tables - = see sheet enable tables -	1 sec Continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	P2088	Diagnoses the "A" Camshaft Position Actuator Bank 1 low side driver circuit for short circuit to ground faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: <= - between signal and controller ground	Ignition is ON ECU is in drive state Engine Speed Battery Voltage Battery Voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - = TRUE - >= 80 rpm > 10.9 V < 25.5 V = see sheet inhibit tables - = see sheet enable tables -	0.2 sec Continuous	2 Trips
	P0010	Diagnoses the "A" Camshaft Position Actuator Bank 1 low side driver circuit for open circuit faults	Voltage low during driver off state (indicates open circuit)	= Open Circuit : >= 200 - between ECU pin and load	Ignition is ON ECU is in drive state Engine Speed Battery Voltage Battery Voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - = TRUE - >= 80 rpm > 10.9 V < 25.5 V = see sheet inhibit tables - = see sheet enable tables -	1 sec Continuous	2 Trips
Camshaft Position Actuator - Intake B2	P2093	Diagnoses the "A" Camshaft Position Actuator Bank 2 low side driver circuit for short circuit to battery faults.	Voltage high during driver on state (indicates short-to-power)	= Short to power: <= 0.5 - signal and controller power	Ignition is ON ECU is in drive state Engine Speed Battery Voltage Battery Voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - = TRUE - >= 80 rpm > 10.9 V < 25.5 V = see sheet inhibit tables - = see sheet enable tables -	1 sec Continuous	2 Trips
	P2092	Diagnoses the "A" Camshaft Position Actuator Bank 2 low side driver circuit for short circuit to ground faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: <= - between signal and controller ground	Ignition is ON ECU is in drive state Engine Speed Battery Voltage Battery Voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - = TRUE - >= 80 rpm > 10.9 V < 25.5 V = see sheet inhibit tables - = see sheet enable tables -	0.2 sec Continuous	2 Trips
	P0020	Diagnoses the "A" Camshaft Position Actuator Bank 2 low side driver circuit for open circuit faults	Voltage low during driver off state (indicates open circuit)	= Open Circuit : >= 200 - between ECU pin and load	Ignition is ON ECU is in drive state Engine Speed Battery Voltage Battery Voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - = TRUE - >= 80 rpm > 10.9 V < 25.5 V = see sheet inhibit tables - = see sheet enable tables -	1 sec Continuous	2 Trips
Camshaft Position Actuator - Exhaust B1	P2091	Diagnoses the "B" Camshaft Position Actuator Bank 1 low side driver circuit for short circuit to battery faults.	Voltage high during driver on state (indicates short-to-power)	= Short to power: <= 0.5 - signal and controller power	Ignition is ON ECU is in drive state Engine Speed Battery Voltage Battery Voltage No pending or confirmed DTCs	= TRUE - = TRUE - >= 80 rpm > 10.9 V < 25.5 V = see sheet inhibit tables -	1 sec Continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Basic enable conditions met	= see sheet enable tables -		
	P2090	Diagnoses the "B" Camshaft Position Actuator Bank 1 low side driver circuit for short circuit to ground faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: <= - between signal and controller ground	Ignition is ON ECU is in drive state Engine Speed Battery Voltage Battery Voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - = TRUE - >= 80 rpm > 10.9 V < 25.5 V = see sheet inhibit tables - = see sheet enable tables -	0.2 sec Continuous	2 Trips
	P0013	Diagnoses the "B" Camshaft Position Actuator Bank 1 low side driver circuit for open circuit faults	Voltage low during driver off state (indicates open circuit)	= Open Circuit : >= 200 - between ECU pin and load	Ignition is ON ECU is in drive state Engine Speed Battery Voltage Battery Voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - = TRUE - >= 80 rpm > 10.9 V < 25.5 V = see sheet inhibit tables - = see sheet enable tables -	1 sec Continuous	2 Trips
Camshaft Position Actuator - Exhaust B2	P2095	Diagnoses the "B" Camshaft Position Actuator Bank 2 low side driver circuit for short circuit to battery faults.	Voltage high during driver on state (indicates short-to-power)	= Short to power: <= 0.5 - signal and controller power	Ignition is ON ECU is in drive state Engine Speed Battery Voltage Battery Voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - = TRUE - >= 80 rpm > 10.9 V < 25.5 V = see sheet inhibit tables - = see sheet enable tables -	1 sec Continuous	2 Trips
	P2094	Diagnoses the "B" Camshaft Position Actuator Bank 2 low side driver circuit for short circuit to ground faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: <= - between signal and controller ground	Ignition is ON ECU is in drive state Engine Speed Battery Voltage Battery Voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - = TRUE - >= 80 rpm > 10.9 V < 25.5 V = see sheet inhibit tables - = see sheet enable tables -	0.2 sec Continuous	2 Trips
	P0023	Diagnoses the "B" Camshaft Position Actuator Bank 2 low side driver circuit for open circuit faults	Voltage low during driver off state (indicates open circuit)	= Open Circuit : >= 200 - between ECU pin and load	Ignition is ON ECU is in drive state Engine Speed Battery Voltage Battery Voltage No pending or confirmed DTCs Basic enable conditions met	= TRUE - = TRUE - >= 80 rpm > 10.9 V < 25.5 V = see sheet inhibit tables - = see sheet enable tables -	1 sec Continuous	2 Trips
Camshaft Position Actuator Park Lock - Intake B1 (Electronic Actuator)	P1011	Inlet camshaft Bank 1 locking position offset check	Absolute angle difference between the actual position and the locking position of inlet camshaft bank1 for number of times	>= 8 degrees > 2 -	Engine is cranking e.g. end of startup has not reached or has reached for time Engine OFF time before cranking was long enough to allow camshaft actuator return in locking position, which is the following condition: Ignition off time	<= 1 sec = TRUE - >= 1 sec	Once per driving cycle	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(Automatic start is active No of automatic start) Engine speed Difference between desired position phase actuator and locking position of inlet camshaft bank1 Inlet camshaft adaption is performed No pending or confirmed DTCs Basic enable conditions met	= TRUE - <= 1 count >= 120 rpm <= 4 degrees = TRUE - = see sheet inhibit tables - = see sheet enable tables -		
Camshaft Position Actuator Park Lock - Intake B1 (Electronic Actuator)	P25CC	Diagnoses the Camshaft Lock Pin Actuator Bank 1 low side driver circuit for short circuit to battery faults.	Voltage high during driver on state (indicates short-to-power)	= Short to power: <= 0.5 signal and controller power -	ECU is in drive state Engine Speed Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	= TRUE - >= 80 rpm > 10.9 V < 25.5 V = see sheet enable tables - = see sheet inhibit tables -	1 sec continuous	2 Trips
	P25CB	Diagnoses the Camshaft Lock Pin Actuator Bank 1 low side driver circuit for short circuit to ground faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: <= between signal and -	ECU is in drive state Engine Speed Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	= TRUE - >= 80 rpm > 10.9 V < 25.5 V = see sheet enable tables - = see sheet inhibit tables -	1 sec continuous	2 Trips
	P25CA	Diagnoses the Camshaft Lock Pin Actuator Bank 1 low side driver circuit for open circuit faults	Voltage low during driver off state (indicates open circuit)	= Open Circuit : >= 200 between ECU pin and load -	ECU is in drive state Engine Speed Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	= TRUE - >= 80 rpm > 10.9 V < 25.5 V = see sheet enable tables - = see sheet inhibit tables -	1 sec continuous	2 Trips
Camshaft Position Actuator Park Lock - Intake B2 (Electronic Actuator)	P1013	Inlet camshaft Bank 2 locking position offset check	The angle difference between the actual position and the locking position of inlet camshaft bank2 for number of times	>= 8 degrees > 2 -	Engine is cranking e.g. end of startup has not reached or has reached for time Engine OFF time before cranking was long enough to allow camshaft actuator return in locking position, which is the following condition: Ignition off time (Automatic start is active No of automatic start) Engine speed Difference between desired position phase actuator and locking position of inlet camshaft bank1 Inlet camshaft adaption is performed No pending or confirmed DTCs Basic enable conditions met	<= 1 sec = TRUE - >= 1 sec = TRUE - <= 1 count >= 120 rpm <= 4 degrees = TRUE - = see sheet inhibit tables - = see sheet enable tables -	Once per driving cycle	2 Trips
Camshaft Position Actuator Park Lock - Intake B2 (Electronic Actuator)	P25CF	Diagnoses the Camshaft Lock Pin Actuator Bank 2 low side driver circuit for short circuit to battery faults.	Voltage high during driver on state (indicates short-to-power)	= Short to power: <= 0.5 signal and controller power -	ECU is in drive state	= TRUE -	1 sec continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine Speed Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	>= 80 rpm > 10.9 V < 25.5 V = see sheet enable tables - = see sheet inhibit tables -		
	P25CE	Diagnoses the Camshaft Lock Pin Actuator Bank 2 low side driver circuit for short circuit to ground faults.	Voltage low during driver off state (indicates short-to-ground)	= Short to ground: <= between signal and -	ECU is in drive state Engine Speed Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs	= TRUE - >= 80 rpm > 10.9 V < 25.5 V = see sheet enable tables - = see sheet inhibit tables -	1 sec continuous	2 Trips
	P25CD	Diagnoses the Camshaft Lock Pin Actuator Bank 2 low side driver circuit for open circuit faults	Voltage low during driver off state (indicates open circuit)	= Open Circuit : >= 200 between ECU pin and load -	ECU is in drive state Engine Speed Battery Voltage Battery Voltage Basic enable conditions met No pending or confirmed DTCs Basic enable conditions met	= TRUE - >= 80 rpm > 10.9 V < 25.5 V = see sheet enable tables - = see sheet inhibit tables - = see sheet enable tables -	1 sec continuous	2 Trips
Engine Oil Pressure Control Actuator	P0524	Oil pressure - Low	Relative engine oil pressure (see Look-Up Table #P0524-1) for time (see Look-Up Table #P0524-2)	< -70 to 182 kPa 6 to 15 sec	(Absolute value of transversal acceleration for time for hold time after condition becomes false) No pending or confirmed DTCs Basic enable conditions met	<= 5 g >= 0 sec <= 0 sec = see sheet inhibit tables - = see sheet enable tables -	0 sec	1 Trip
	P06DD	Measured oil pressure compared to setpoint - High	Difference between measured engine oil pressure and oil pressure surface set point (see Look-Up Table #P06DD-1) for time constant filter	> 100 to 800 kPa > 1.9998779 sec	Short trip test active (Absolute value of transversal acceleration for time for hold time after condition becomes false) Oil temperature Oil pump high side switch commanded on Backup duty cycle for oil pressure is in use In electric drive mode No pending or confirmed DTCs Basic enable conditions met	= FALSE - >= 5 g >= 0 sec <= 0 sec > -50.04 deg C = TRUE - = FALSE - = FALSE - = see sheet inhibit tables - = see sheet enable tables -	1 sec	2 Trip
	P06DD	Measured oil pressure compared to setpoint - Low	Engine oil pressure minus oil pressure set point (see Look-Up Table #P06DD-2)	< -800 to -40 kPa	Short trip test active (Absolute value of transversal acceleration for time for hold time after condition becomes false) Oil temperature Oil pump high side switch commanded on Backup duty cycle for oil pressure is in use In electric drive mode No pending or confirmed DTCs Basic enable conditions met	= FALSE - >= 5 g >= 0 sec <= 0 sec > -50.04 deg C = TRUE - = FALSE - = FALSE - = see sheet inhibit tables - = see sheet enable tables -	1 sec	2 Trip

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	P06DC	Diagnoses oil pump low side driver circuit for circuit high fault	Oil pump actuator driver has posted a high circuit failure	= TRUE - Short to power: - between signal and controller power	Actuator power stage is enabled Battery voltage for time No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V >= 0 sec = see sheet inhibit tables - = see sheet enable tables -	0.05 sec	2 Trips
	P06DB	Diagnoses oil pump low side driver circuit for circuit low fault	Oil pump actuator driver has posted a low circuit failure	= TRUE - Short to ground: <= - between signal and controller ground	Actuator power stage is enabled Battery voltage for time No pending or confirmed DTCs Basic enable conditions met	= FALSE - > 10.9 V >= 0 sec = see sheet inhibit tables - = see sheet enable tables -	0.05 sec	2 Trips
	P06DA	Diagnoses oil pump low side driver circuit for open circuit fault	Oil pump actuator driver has posted an open circuit failure	= TRUE - Open Circuit: >= 200 K - ECU pin and load	Actuator power stage is enabled Battery voltage for time No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V >= 0 sec = see sheet inhibit tables - = see sheet enable tables -	1 sec	2 Trips
	P06DA	Diagnoses oil pump low side driver circuit for over temperature circuit fault	Oil pump actuator driver has posted an over temperature circuit failure	= TRUE - Over Temperature: -	Actuator power stage is enabled Battery voltage for time No pending or confirmed DTCs Basic enable conditions met	= TRUE - > 10.9 V >= 0 sec = see sheet inhibit tables - = see sheet enable tables -	1 sec	2 Trips
Engine Starter Motor Actuator	P06E9	Detects no engine movement in spite of requested active power stage (mechanical blocked engine, relay malfunction) for a calibrated time.	(Difference between camshaft edge counter and stored camshaft edge counter everytime when starter diagnosis was activated OR Difference between camshaft edge counter and stored camshaft edge counter everytime when starter diagnosis was activated Difference between camshaft edge counter and stored camshaft edge counter everytime when starter diagnosis was activated) Engine speed	< 3 - < 0 - < -32765 - = 0 rpm	Battery voltage Battery voltage ECU is in drive state Starter release from monitoring is active (Starter relay is active for time OR Starter relay is active for time Starter relay is active for time) No pending or confirmed DTCs Basic enable conditions met	>= 8 V <= 655.34 V = TRUE - = TRUE - = TRUE - > 0.026 sec = TRUE - > 0.02 sec = TRUE - <= 0.021 sec = see sheet inhibit tables - = see sheet enable tables -	1.5 sec continuous	no MIL
Engine Starter Motor Actuator	P0617	Starter motor relay circuit feedback voltage is greater than a calibrated threshold for a calibrated period of time.	Power stage 1 feedback voltage	> 4.5 V	Battery voltage Battery voltage ECU is in drive state Starter relay powestage 1 is active	>= 8 V <= 655.34 V = TRUE - = FALSE -	1 sec continuous	no MIL

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
							Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
	P0616	Starter motor relay circuit feedback voltage is less than a calibrated threshold for a calibrated period of time.	Power stage 1 feedback voltage (see Look-Up-Table #P0616-1)	<	1.95 to 4.5	V	Battery voltage	>=	8	V	0.05	sec	continuous	no MIL
							Battery voltage	<=	655.34	V				
							ECU is in drive state	=	TRUE	-				
							Starter relay powestage 1 is active	=	FALSE	-				
							Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
	P0615	Starter motor relay circuit feedback voltage is within a calibrated threshold range for a calibrated period of time.	Power stage 1 feedback voltage	>=	1.2	V	Battery voltage	>=	8	V	1	sec	continuous	no MIL
			Power stage 1 feedback voltage	<=	2.8	V	Battery voltage	<=	655.34	V				
							ECU is in drive state	=	TRUE	-				
							Starter relay powestage 1 is active	=	FALSE	-				
							Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
Engine Starter Pinion Actuator	P26E6	Starter motor relay "B" circuit feedback voltage is greather than a calibrated threshold for a calibrated period of time.	Power stage 2 feedback voltage	>	4.5	V	Battery voltage	>=	8	V	1	sec	continuous	no MIL
							Battery voltage	<=	655.34	V				
							ECU is in drive state	=	TRUE	-				
							Starter relay powestage 1 is active	=	FALSE	-				
							Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
	P26E5	Starter motor relay "B" circuit feedback voltage is less than a calibrated threshold for a calibrated period of time.	Power stage 2 feedback voltage (see Look-Up-Table #P0616-1)	<	1.95 to 4.5	V	Battery voltage	>=	8	V	0.05	sec	continuous	no MIL
							Battery voltage	<=	655.34	V				
							ECU is in drive state	=	TRUE	-				
							Starter relay powestage 1 is active	=	FALSE	-				
							Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
	P26E4	Starter motor relay "B" circuit feedback voltage is within a calibrated threshold range for a calibrated period of time.	Power stage 2 feedback voltage	>=	1.2	V	Battery voltage	>=	8	V	1	sec	continuous	no MIL
			Power stage 2 feedback voltage	<=	2.8	V	Battery voltage	<=	655.34	V				
							ECU is in drive state	=	TRUE	-				
							Starter relay powestage 1 is active	=	FALSE	-				
							Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
Turbocharger Bypass Valve - B1	P0035	Diagnosis of turbocharger bypass valve for short circuit to battery faults	Voltage high during driver ON state (indicates short circuit to battery)	=	Short to power: between ECU pin and injector supply voltage	-		=	TRUE	-	0.5	sec	continuous	2 Trips
							Conditions for enabling the powerstage diagnosis:							
							(							
							ECU is in drive state	=	TRUE	-				
							engine speed with low resolution	>=	80	rpm				
							Battery voltage	>	10.9	V				
							Battery voltage	<	25.5	V				
							)							
							Basic enable conditions met	=	see sheet enable tables	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
	P0034	Diagnosis of turbocharger bypass valve for short circuit to ground faults	Voltage low during driver OFF state (indicates short circuit to ground)	=	Short to ground: <= between ECU pin and ground	-					0.5	sec	continuous	2 Trips
							Conditions for enabling the powerstage diagnosis:							
							(							
							ECU is in drive state	=	TRUE	-				
							engine speed with low resolution	>=	80	rpm				
							Battery voltage	>	10.9	V				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Battery voltage) Basic enable conditions met No pending or confirmed DTCs	< 25.5 V = see sheet enable tables - = see sheet inhibit tables -		
	P0033	Diagnosis of turbocharger bypass valve for open circuit faults	Voltage low during driver OFF state (indicates open circuit)	= Open Circuit: >= 200 K - ECU pin and load	Conditions for enabling the powerstage diagnosis: (ECU is in drive state engine speed with low resolution Battery voltage Battery voltage) Basic enable conditions met No pending or confirmed DTCs	= TRUE - = TRUE - >= 80 rpm > 10.9 V < 25.5 V = see sheet enable tables - = see sheet inhibit tables -	0.5 sec continuous	2 Trips
Turbocharger Bypass Valve - B2	P00C2	Diagnosis of turbocharger bypass valve for short circuit to battery faults	Voltage high during driver ON state (indicates short circuit to battery)	= Short to power: - between ECU pin and injector supply voltage	Conditions for enabling the powerstage diagnosis: (ECU is in drive state engine speed with low resolution Battery voltage Battery voltage) Basic enable conditions met No pending or confirmed DTCs	= TRUE - = TRUE - >= 80 rpm > 10.9 V < 25.5 V = see sheet enable tables - = see sheet inhibit tables -	0.5 sec continuous	2 Trips
	P00C1	Diagnosis of turbocharger bypass valve for short circuit to ground faults	Voltage low during driver OFF state (indicates short circuit to ground)	= Short to ground: <= - between ECU pin and ground	Conditions for enabling the powerstage diagnosis: (ECU is in drive state engine speed with low resolution Battery voltage Battery voltage) Basic enable conditions met No pending or confirmed DTCs	= TRUE - = TRUE - >= 80 rpm > 10.9 V < 25.5 V = see sheet enable tables - = see sheet inhibit tables -	0.5 sec continuous	2 Trips
	P00C0	Diagnosis of turbocharger bypass valve for open circuit faults	Voltage low during driver OFF state (indicates open circuit)	= Open Circuit: >= 200 K - ECU pin and load	Conditions for enabling the powerstage diagnosis: (ECU is in drive state engine speed with low resolution Battery voltage Battery voltage) Basic enable conditions met No pending or confirmed DTCs	= TRUE - = TRUE - >= 80 rpm > 10.9 V < 25.5 V = see sheet enable tables - = see sheet inhibit tables -	0.5 sec continuous	2 Trips
EVAP Purge Valve - B1	P0459	Diagnoses the EVAP System Purge Control Valve low side driver circuit for circuit high faults.	Output (driver) current	>= 5.6 A	Battery voltage Battery voltage Power stage (driver) is switched on Basic enable conditions met No pending or confirmed DTCs	>= 10 V <= 17 V = TRUE - = see sheet enable tables - = see sheet inhibit tables -	1 sec continuous	2 Trips
	P0458	Diagnoses the EVAP System Purge Control Valve low side driver circuit for circuit low faults.	Output (driver) voltage	<= 2.74 V	Battery voltage Battery voltage Power stage (driver) is switched off Basic enable conditions met	>= 10 V <= 17 V = TRUE - = see sheet enable tables -	1 sec continuous	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No pending or confirmed DTCs	= see sheet inhibit tables -		
	P0443	Diagnoses the EVAP System Purge Control Valve low side driver circuit for open circuit faults.	Output (driver) voltage	> 3.26 V	Battery voltage	>= 10 V	1 sec continuous	2 Trips
			Output (driver) voltage	<= 4.7 V	Battery voltage	<= 17 V		
					Power stage (driver) is switched off	= TRUE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
EVAP Purge Valve - B2	P04AD	Diagnoses the EVAP System Purge Control Valve low side driver circuit for circuit high faults.	Output (driver) current	>= 5.6 A	Battery voltage	>= 10 V	1 sec continuous	2 Trips
					Battery voltage	<= 17 V		
					Power stage (driver) is switched on	= TRUE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
	P04AC	Diagnoses the EVAP System Purge Control Valve low side driver circuit for circuit low faults.	Output (driver) voltage	<= 2.74 V	Battery voltage	>= 10 V	1 sec continuous	2 Trips
					Battery voltage	<= 17 V		
					Power stage (driver) is switched off	= TRUE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
	P04AB	Diagnoses the EVAP System Purge Control Valve low side driver circuit for open circuit faults.	Output (driver) voltage	> 3.26 V	Battery voltage	>= 10 V	1 sec continuous	2 Trips
			Output (driver) voltage	<= 4.7 V	Battery voltage	<= 17 V		
					Power stage (driver) is switched off	= TRUE -		
					Basic enable conditions met	= see sheet enable tables -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
Throttle Actuator - B1	P2176	Throttle actuator Bank1 first initialization - lower mechanical stop learning fail	(		(Offset learning aborted OR	= FALSE -	Once per driving cycle	1 Trip
			Initial learning of the closed throttle valve position has started	= TRUE -				
			Aborted due to one of the enable conditions no longer being fulfilled (see secondary parameters))	= TRUE -	Offset learning successful)	= FALSE -		
			OR		Offset check at cold temperature conditions active	= FALSE -		
			(		((			
		First learning of closed mechanical stop: Throttle position at lower mechanical stop	**Step 1** (Learning of the closed throttle valve position)**:** Lower mechanical stop offset learning aborted at step 1 (moving throttle valve to the closed position) due to the following reason (closed position has not reached): (		(Return spring check aborted OR	= TRUE -		
					Return spring check successful)	= TRUE -		
			(Difference between actual throttle position sensor1 at lower mechanical stop and desired value for adaptation (based on max. allowed for lower mechanical stop voltage))	> 1.5 %	Return spring check fault is set OR	= FALSE -		
					Device type)	> 0 -		
			for time)	>= 1 sec	(Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	> 29 sec		
			)		(((			
			OR (		Offset learning active OR (	= TRUE -		
		First learning of closed mechanical stop: Duty cycle at lower mechanical stop and resulting change in sensor voltage	**Step 2** (If no fault in step 1 then ramp to closed position with duty cylce in a defined range and check sensor voltages)**:**					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			Lower mechanical stop offset learning aborted at step 2 (pressing throttle valve to the low mechanical stop with certain force) due to the				Offset learning active	=	FALSE	-		
			(				(					
			Calculated duty cycle ratio	<=	60	%	The powerstage of the throttle actuator is commanded on	=	TRUE	-		
			)				Battery voltage	>	7.5	V		
			for time	>=	1	sec	)					
							)					
							)					
			)				OR					
			OR				Power save is active	=	TRUE	-		
							)					
			(				Limp home driving mode requested	=	FALSE	-		
		Range check of learned sensor voltage at low mechanical stop	**Step 3** (If no fault in step 2 then check range of learned sensor voltages at lower mechanical stop):				Safety fuel cut off requested	=	FALSE	-		
			Lower mechanical stop offset learning aborted at step 3 (sensor offset learning at low mechanical stop) due to one of the the following conditions:				Torque limitation requested	=	FALSE	-		
							)					
			(				(	=	FALSE	-		
							Long term and short term adaptation chosen					
			Lower mechanical stop voltage sensor 1	>	0.69458	V	OR					
			OR				(	=	TRUE	-		
							Long term and short term adaptation chosen					
			Lower mechanical stop voltage sensor 1	<	0.37964	V	Long term and short term is released	=	TRUE	-		
			OR				)					
			Lower mechanical stop voltage sensor 2	>	4.61426	V	)					
			OR				OR					
			Lower mechanical stop voltage sensor 2	<	4.36157	V	(					
			)				(					
			)				First learning performed	=	FALSE	-		
							OR					
							Limp air position is not plausible	=	TRUE	-		
							OR					
							External trigger to start offset learning	=	TRUE	-		
							)					
							(	=	TRUE	-		
							ECU is in drive state					
							OR					
							ECU is in post drive state for time	>	5	sec		
							)					
							)					
							OR					
							ECU is in post drive state for time	>	5	sec		
							)					
							Offset learning will be enabled when below conditions are satisfied	=	TRUE	-		
							(					
							(					
							(					
							Offset learning active	=	TRUE	-		
							OR					
							(					
							Offset learning active	=	FALSE	-		
							(					
							The powerstage of the throttle actuator is commanded on	=	TRUE	-		
							Battery voltage	>	7.5	V		
							)					
							)					
							)					
							OR					
							Power save is active	=	TRUE	-		
							)					
							Limp home driving mode requested	=	FALSE	-		
							Safety fuel cut off requested	=	FALSE	-		
							Torque limitation requested	=	FALSE	-		
							)					
							Vehicle speed	<=	0.62150404	mph		
							Engine speed	<=	300	rpm		
							Battery voltage	<=	655.34	V		
							Battery voltage	>=	10	V		
							Intake air temperature before throttle valve	<=	143.26	deg C		
							Intake air temperature before throttle valve	>=	5.26	deg C		
							Engine coolant temperature	<=	100.46	deg C		
							Engine coolant temperature	>=	5.26	deg C		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
							Basic enable conditions met	=	see sheet enable tables	-				
		Throttle actuator Bank1 - lower mechanical stop learning fail	Lower mechanical stop offset learning aborted at step 2 (pressing throttle valve to the low mechanical stop with certain force) due to the following reason (duty cycle ratio has not reached threshold):				(Offset learning aborted	=	FALSE	-	1	sec	Once per driving cycle	1 Trip
			(				OR							
			Calculated duty cycle ratio	<=	60	%	Offset learning successful	=	FALSE	-				
							)							
			for time	>=	1	sec	Offset check at cold temperature conditions active	=	FALSE	-				
			)				(							
							(							
			OR				(Return spring check aborted	=	TRUE	-				
							OR							
			Lower mechanical stop offset learning aborted at step 3 (sensor offset learning at low mechanical stop) due to one of the the following conditions:											
			(				Return spring check successful	=	TRUE	-				
							)							
			Lower mechanical stop voltage sensor 1	>	0.69458	V	Return spring check fault is set	=	FALSE	-				
							)							
			OR				OR							
			Lower mechanical stop voltage sensor 1	<	0.37964	V	Device type	>	0	-				
							)							
			OR				(							
			Lower mechanical stop voltage sensor 2	>	4.61426	V	Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	>	29	sec				
							(							
			OR				(							
							(							
			Lower mechanical stop voltage sensor 2	<	4.36157	V	Offset learning active	=	TRUE	-				
			)				OR							
							(							
							Offset learning active	=	FALSE	-				
							(							
							The powerstage of the throttle actuator is commanded on	=	TRUE	-				
							Battery voltage	>	7.5	V				
							)							
							)							
							)							
							OR							
							Power save is active	=	TRUE	-				
							)							
							Limp home driving mode requested	=	FALSE	-				
							Safety fuel cut off requested	=	FALSE	-				
							Torque limitation requested	=	FALSE	-				
							)							
							(Long term and short term adaptation chosen	=	FALSE	-				
							OR							
							(Long term and short term adaptation chosen	=	TRUE	-				
							Long term and short term is released	=	TRUE	-				
							)							
							)							
							OR							
							(							
							(							
							First learning performed	=	FALSE	-				
							OR							
							Limp air position is not plausible	=	TRUE	-				
							OR							
							External trigger to start offset learning	=	TRUE	-				
							)							
							(ECU is in drive state	=	TRUE	-				
							OR							
							ECU is in post drive state for time	>	5	sec				
							)							
							)							
							OR							
							ECU is in post drive state for time	>	5	sec				
							)							

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Offset learning will be enabled when below conditions are satisfied	=	TRUE	-		
							(					
							(					
							(					
							Offset learning active	=	TRUE	-		
							OR					
							(					
							Offset learning active	=	FALSE	-		
							(					
							The powerstage of the throttle actuator is commanded on	=	TRUE	-		
							Battery voltage	>	7.5	V		
							)					
							)					
							)					
							OR					
							Power save is active	=	TRUE	-		
							)					
							Limp home driving mode requested	=	FALSE	-		
							Safety fuel cut off requested	=	FALSE	-		
							Torque limitation requested	=	FALSE	-		
							)					
							Vehicle speed	<=	0.62150404	mph		
							Engine speed	<=	300	rpm		
							Battery voltage	<=	655.34	V		
							Battery voltage	>=	10	V		
							Intake air temperature before throttle valve	<=	143.26	deg C		
							Intake air temperature before throttle valve	>=	5.26	deg C		
							Engine coolant temperature	<=	100.46	deg C		
							Engine coolant temperature	>=	5.26	deg C		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
							Basic enable conditions met	=	see sheet enable tables	-		
	P30E3	**Path 1:** Throttle position at lower mechanical stop exceeded maximum limit for Throttle Position Sensor Bank 1	**Step 1 (**Learning of the closed throttle valve position)**:**				(				1 sec once per driving cycle	1 Trip
							Offset learning aborted	=	FALSE	-		
			Actuator throttle position	>	(Vmax - V) * Tgrad + Offset	%	OR					
			Where:				Offset learning successful	=	FALSE	-		
							)					
			Vmax (Maximum voltage value allowed at mechanical stop, position sensor 1)	=	0.69458	V	Offset check at cold temperature conditions active	=	FALSE	-		
			V (Actual learned sensor voltage of sensor 1 at the lower mechanical stop)	=	sensed voltage	V	(					
			Tgrad (Gradient of the throttle valve angle versus sensor 1 voltage)	=	calculated value	% / V	(					
							(	=	TRUE	-		
							Return spring check aborted					
			Offset (Offset to Desired position value to start ramping into mechanical stop)	=	1.5	%	OR					
							Return spring check successful	=	TRUE	-		
		Path 2: Range check of learned sensor voltage at lower mechanical stop for Throttle Position Sensor Bank 1 : Maximum learning limit exceeded	Low mechanical stop first learning has been performed	=	TRUE	-	Return spring check fault is set	=	FALSE	-		
							)					
			and				OR					
			Step 3 (If no fault in step 1 then check range of learned sensor voltages at lower mechanical stop)**:**				Device type	>	0	-		
							)					
			Actual learned sensor voltage of sensor 1 at the mechanical stop	>	0.69458	V	(					
			OR				Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	>	29	sec		
							(					
			Actual learned sensor voltage of sensor 2 at the mechanical stop	>	4.61426	V	(					
							(					
							Offset learning active	=	TRUE	-		
							OR					
							(					
							Offset learning active	=	FALSE	-		
							(					
							The powerstage of the throttle actuator is commanded on	=	TRUE	-		
							Battery voltage	>	7.5	V		
							)					
							)					
							)					
							OR					
							Power save is active	=	TRUE	-		
							)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Limp home driving mode requested	= FALSE -		
					Safety fuel cut off requested	= FALSE -		
					Torque limitation requested	= FALSE -		
					)			
					(	= FALSE -		
					Long term and short term adaptation chosen			
					OR			
					(	= TRUE -		
					Long term and short term adaptation chosen			
					Long term and short term is released	= TRUE -		
					)			
					)			
					OR			
					(			
					(			
					First learning performed	= FALSE -		
					OR			
					Limp air position is not plausible	= TRUE -		
					OR			
					External trigger to start offset learning	= TRUE -		
					)			
					(	= TRUE -		
					ECU is in drive state			
					OR			
					ECU is in post drive state for time	> 5 sec		
					)			
					)			
					OR			
					ECU is in post drive state for time	> 5 sec		
					)			
					Offset learning will be enabled when below conditions are satisfied	= TRUE -		
					(			
					(			
					(			
					Offset learning active	= TRUE -		
					OR			
					(			
					Offset learning active	= FALSE -		
					(			
					The powerstage of the throttle actuator is commanded on	= TRUE -		
					Battery voltage	> 7.5 V		
					)			
					)			
					)			
					OR			
					Power save is active	= TRUE -		
					)			
					Limp home driving mode requested	= FALSE -		
					Safety fuel cut off requested	= FALSE -		
					Torque limitation requested	= FALSE -		
					)			
					Vehicle speed	<= 0.62150404 mph		
					Engine speed	<= 300 rpm		
					Battery voltage	<= 655.34 V		
					Battery voltage	>= 10 V		
					Intake air temperature before throttle valve	<= 143.26 deg C		
					Intake air temperature before throttle valve	>= 5.26 deg C		
					Engine coolant temperature	<= 100.46 deg C		
					Engine coolant temperature	>= 5.26 deg C		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P30E4	Range check of learned sensor voltage at lower mechanical stop for Throttle Position Sensor Bank 1: Minimum learning limit exceeded	Low mechanical stop first learning has been performed	= TRUE -	(	= FALSE -	1 sec once per driving cycle	1 Trip
					Offset learning aborted			
			and		OR			
			Step 3 (If no fault in step 2 then check range of learned sensor voltages at lower mechanical stop)**:**		Offset learning successful	= FALSE -		
					)			
			Actual learned sensor voltage of sensor 1 at the mechanical stop	<= 0.69458 V	Offset check at cold temperature conditions active	= FALSE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Actual learned sensor voltage of sensor 2 at the mechanical stop	<= 4.61426 V	(			
					(			
			(		(	= TRUE -		
					Return spring check aborted			
			Actual learned sensor voltage of sensor 1 at the mechanical stop	< 0.37964 V	OR			
			OR		Return spring check successful	= TRUE -		
					)			
			Actual learned sensor voltage of sensor 2 at the mechanical stop	< 4.36157 V	Return spring check fault is set	= FALSE -		
					)			
			)		OR			
					Device type	> 0 -		
					)			
					(			
					Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	> 29 sec		
					(			
					(			
					(			
					Offset learning active	= TRUE -		
					OR			
					(			
					Offset learning active	= FALSE -		
					(			
					The powerstage of the throttle actuator is commanded on	= TRUE -		
					Battery voltage	> 7.5 V		
					)			
					)			
					)			
					OR			
					Power save is active	= TRUE -		
					)			
					Limp home driving mode requested	= FALSE -		
					Safety fuel cut off requested	= FALSE -		
					Torque limitation requested	= FALSE -		
					)			
					(	= FALSE -		
					Long term and short term adaptation chosen			
					OR			
					(	= TRUE -		
					Long term and short term adaptation chosen			
					Long term and short term is released	= TRUE -		
					)			
					)			
					OR			
					(			
					(			
					First learning performed	= FALSE -		
					OR			
					Limp air position is not plausible	= TRUE -		
					OR			
					External trigger to start offset learning	= TRUE -		
					)			
					(	= TRUE -		
					ECU is in drive state			
					OR			
					ECU is in post drive state for time	> 5 sec		
					)			
					)			
					OR			
					ECU is in post drive state for time	> 5 sec		
					)			
					Offset learning will be enabled when below conditions are satisfied	= TRUE -		
					(			
					(			
					(			
					Offset learning active	= TRUE -		
					OR			
					(			
					Offset learning active	= FALSE -		
					(			
					The powerstage of the throttle actuator is commanded on	= TRUE -		
					Battery voltage	> 7.5 V		
					)			
					)			
					)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR			
					Power save is active	= TRUE -		
					)			
					Limp home driving mode requested	= FALSE -		
					Safety fuel cut off requested	= FALSE -		
					Torque limitation requested	= FALSE -		
					)			
					Vehicle speed	<= 0.62150404 mph		
					Engine speed	<= 300 rpm		
					Battery voltage	<= 655.34 V		
					Battery voltage	>= 10 V		
					Intake air temperature before throttle valve	<= 143.26 deg C		
					Intake air temperature before throttle valve	>= 5.26 deg C		
					Engine coolant temperature	<= 100.46 deg C		
					Engine coolant temperature	>= 5.26 deg C		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P2101	Rationality check of throttle actuator control Bank 1 deviation - Actual actuator position is continuously monitored against commanded value	(		(ECU is in DRIVE state	= TRUE -	0.5 sec continuous	1 Trip
			Difference between actual actuator position and its commanded value	> A * B + C %	OR			
			OR		ECU is in POSTDRIVE state	= TRUE -		
					)			
			Difference between commanded value and actual actuator position	> (A * B + C) %	(Powerstage switched off by diagnosis	= TRUE -		
			)		)			
			Where:		for time	>= 0.799805 sec		
			(A) Rate of change of the commanded value	= calculated value % / s	The powerstage of the actuator is switched on, following conditions:	= TRUE -		
			(B) Factor for allowed control deviation	= 0.02 -	(			
			(C) Allowed control deviation in steady state	= 5 %	State of the thottle valve powerstage bank 1	> 0 -		
					)			
					Release of adaptation	= FALSE -		
					Actual position is valid	= TRUE -		
					Request safety fuel cut off SKA bank 1, following condition:	= FALSE -		
					(			
					Request reversible safety fuel cut off SKA bank 1, which has following condition:	= FALSE -		
					(			
					Battery voltage for throttle valve operation sufficient bank 1	> 7.5 V		
					OR			
					Engine speed	> 1000 rpm		
					)			
					Limp home position not reached bank 1	= FALSE -		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P0638	Range check of Throttle Actuator Control duty cycle Bank 1	Absolute value of Throttle valve duty cycle ratio bank 1	> Minimum(A, (B*C)) %	(ECU is in DRIVE state	= TRUE -	0.6001 sec continuous	1 Trip
			Where:		OR			
			A - Upper threshold for Throttle Actuator Control duty cycle Bank 1 diagnosis in case of low battery voltage	95 %	ECU is in POSTDRIVE state	= TRUE -		
					)			
			B - Upper threshold for Throttle Actuator Control duty cycle bank1 diagnosis	80 %	Absolute value of position controller of the throttle valve bank 1 of motor bench one / gradient of the filtered desired value	< 78.1 %/s		
			C - Factor for battery voltage compensation bank 1	13.5V / measured battery voltage [V] -	The powerstage of the actuator is switched on, following conditions:	= TRUE -		
					(			
					State of the thottle valve powerstage bank 1	> 0 -		
					)			
					Release of adaptation	= FALSE -		
					Actual position is valid	= TRUE -		
					Request safety fuel cut off SKA bank 1, following condition:	= FALSE -		
					(			
					Request reversible safety fuel cut off SKA bank 1, which has following condition:	= FALSE -		
					(			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Battery voltage for throttle valve operation sufficient bank 1	= TRUE -		
					OR			
					Engine speed	> 1000 rpm		
					)			
					Limp home position not reached bank 1	= FALSE -		
					)			
					Battery voltage for throttle valve operation sufficient for bank 1	= TRUE -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P1551	**Path 1:** Drift check of limp air position Bank 1 - comparison of actual learned value with first learned limp air position	Absolute difference between actual learned sensor voltage of sensor 1 at limp air position after mean value calculation and first learned sensor voltage of sensor 1 at limp air position	>= 1.40015 V	(Offset learning aborted	= FALSE -	Once per driving cycle	1 Trip
			OR Absolute difference between first learned sensor voltage of sensor 2 at limp air position and actual learned sensor voltage of sensor 2 at limp air position after mean value calculation	>= 1.40015 V	OR Offset learning successful)	= FALSE -		
					Offset check at cold temperature conditions active	= FALSE -		
					(((Return spring check aborted	= TRUE -		
					OR Return spring check successful	= TRUE -		
					) Return spring check fault is set	= FALSE -		
					) OR Device type	> 0 -		
					) (Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	> 29 sec		
					(((Offset learning active	= TRUE -		
					OR (Offset learning active	= FALSE -		
					(The powerstage of the throttle actuator is commanded on	= TRUE -		
					Battery voltage	> 7.5 V		
					))) OR Power save is active	= TRUE -		
					) Limp home driving mode requested	= FALSE -		
					Safety fuel cut off requested	= FALSE -		
					Torque limitation requested	= FALSE -		
					) (Long term and short term adaptation chosen	= FALSE -		
					OR (Long term and short term adaptation chosen	= TRUE -		
					Long term and short term is released	= TRUE -		
					)) OR ((First learning performed	= FALSE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR			
					Limp air position is not plausible	= TRUE -		
					OR			
					External trigger to start offset learning	= TRUE -		
					)			
					(	= TRUE -		
					ECU is in drive state			
					OR			
					ECU is in post drive state for time	> 5 sec		
					)			
					)			
					OR			
					ECU is in post drive state for time	> 5 sec		
					)			
					Offset learning will be enabled when below conditions are satisfied	= TRUE -		
					(			
					(			
					(			
					Offset learning active	= TRUE -		
					OR			
					(			
					Offset learning active	= FALSE -		
					(			
					The powerstage of the throttle actuator is commanded on	= TRUE -		
					Battery voltage	> 7.5 V		
					)			
					)			
					)			
					OR			
					Power save is active	= TRUE -		
					)			
					Limp home driving mode requested	= FALSE -		
					Safety fuel cut off requested	= FALSE -		
					Torque limitation requested	= FALSE -		
					)			
					Vehicle speed	<= 0.62150404 mph		
					Engine speed	<= 300 rpm		
					Battery voltage	<= 655.34 V		
					Battery voltage	>= 10 V		
					Intake air temperature before throttle valve	<= 143.26 deg C		
					Intake air temperature before throttle valve	>= 5.26 deg C		
					Engine coolant temperature	<= 100.46 deg C		
					Engine coolant temperature	>= 5.26 deg C		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
		Path 2: Range check of limp air position for Bank 1 - high	Difference between actual learned sensor voltage of sensor 1 at limp air position after mean value calculation and actual learned sensor voltage of sensor 1 at the lower mechanical stop	> 1.39771 V	(	= FALSE -	Once per driving cycle	1 Trip
					Offset learning aborted			
			OR		OR			
			Difference between actual learned sensor voltage of sensor 2 at the lower mechanical stop and actual learned sensor voltage of sensor 2 at limp air position after mean value calculation	> 1.39771 V	Offset learning successful	= FALSE -		
					)			
					Offset check at cold temperature conditions active	= FALSE -		
					(			
					(			
					(	= TRUE -		
					Return spring check aborted			
					OR			
					Return spring check successful	= TRUE -		
					)			
					Return spring check fault is set	= FALSE -		
					)			
					OR			
					Device type	> 0 -		
					)			
					(			
					Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	> 29 sec		
					(			
					(			
					(			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					Offset learning active	=	TRUE	-		
					OR					
					(					
					Offset learning active	=	FALSE	-		
					(					
					The powerstage of the throttle actuator is commanded on	=	TRUE	-		
					Battery voltage	>	7.5	V		
					)					
					)					
					)					
					OR					
					Power save is active	=	TRUE	-		
					)					
					Limp home driving mode requested	=	FALSE	-		
					Safety fuel cut off requested	=	FALSE	-		
					Torque limitation requested	=	FALSE	-		
					)					
					(	=	FALSE	-		
					Long term and short term adaptation chosen					
					OR					
					(	=	TRUE	-		
					Long term and short term adaptation chosen					
					Long term and short term is released	=	TRUE	-		
					)					
					)					
					OR					
					(					
					(					
					First learning performed	=	FALSE	-		
					OR					
					Limp air position is not plausible	=	TRUE	-		
					OR					
					External trigger to start offset learning	=	TRUE	-		
					)					
					(	=	TRUE	-		
					ECU is in drive state					
					OR					
					ECU is in post drive state for time	>	5	sec		
					)					
					)					
					OR					
					ECU is in post drive state for time	>	5	sec		
					)					
					Offset learning will be enabled when below conditions are satisfied	=	TRUE	-		
					(					
					(					
					(					
					Offset learning active	=	TRUE	-		
					OR					
					(					
					Offset learning active	=	FALSE	-		
					(					
					The powerstage of the throttle actuator is commanded on	=	TRUE	-		
					Battery voltage	>	7.5	V		
					)					
					)					
					)					
					OR					
					Power save is active	=	TRUE	-		
					)					
					Limp home driving mode requested	=	FALSE	-		
					Safety fuel cut off requested	=	FALSE	-		
					Torque limitation requested	=	FALSE	-		
					)					
					Vehicle speed	<=	0.62150404	mph		
					Engine speed	<=	300	rpm		
					Battery voltage	<=	655.34	V		
					Battery voltage	>=	10	V		
					Intake air temperature before throttle valve	<=	143.26	deg C		
					Intake air temperature before throttle valve	>=	5.26	deg C		
					Engine coolant temperature	<=	100.46	deg C		
					Engine coolant temperature	>=	5.26	deg C		
					No pending or confirmed DTCs	=	see sheet inhibit tables	-		
					Basic enable conditions met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Path 3: Range check of limp air position for Bank 1 - low	Difference between actual learned sensor voltage of sensor 1 at limp air position after mean value calculation and actual learned sensor voltage of sensor 1 at the lower mechanical stop	<	0.77026	V	(Offset learning aborted	=	FALSE	-	Once per driving cycle	1 Trip
			OR Difference between actual learned sensor voltage of sensor 2 at the lower mechanical stop and actual learned sensor voltage of sensor 2 at limp air position after mean value calculation	<	0.77026	V	OR Offset learning successful)	=	FALSE	-		
							Offset check at cold temperature conditions active	=	FALSE	-		
							(((Return spring check aborted	=	TRUE	-		
							OR Return spring check successful	=	TRUE	-		
							) Return spring check fault is set	=	FALSE	-		
							) OR Device type	>	0	-		
							) (Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	>	29	sec		
							(((Offset learning active	=	TRUE	-		
							OR (Offset learning active	=	FALSE	-		
							(The powerstage of the throttle actuator is commanded on	=	TRUE	-		
							Battery voltage	>	7.5	V		
							))) OR Power save is active	=	TRUE	-		
							) Limp home driving mode requested	=	FALSE	-		
							Safety fuel cut off requested	=	FALSE	-		
							Torque limitation requested	=	FALSE	-		
							) (Long term and short term adaptation chosen	=	FALSE	-		
							OR (Long term and short term adaptation chosen	=	TRUE	-		
							Long term and short term is released	=	TRUE	-		
							)) OR ((First learning performed	=	FALSE	-		
							OR Limp air position is not plausible	=	TRUE	-		
							OR External trigger to start offset learning	=	TRUE	-		
							) (ECU is in drive state	=	TRUE	-		
							OR ECU is in post drive state for time	>	5	sec		
							)) OR ECU is in post drive state for time	>	5	sec		
							) Offset learning will be enabled when below conditions are satisfied	=	TRUE	-		
							(((					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Offset learning active	=	TRUE	-		
							OR					
							(					
							Offset learning active	=	FALSE	-		
							(					
							The powerstage of the throttle actuator is	=	TRUE	-		
							commanded on					
							Battery voltage	>	7.5	V		
							)					
							)					
							)					
							OR					
							Power save is active	=	TRUE	-		
							)					
							Limp home driving mode requested	=	FALSE	-		
							Safety fuel cut off requested	=	FALSE	-		
							Torque limitation requested	=	FALSE	-		
							)					
							Vehicle speed	<=	0.62150404	mph		
							Engine speed	<=	300	rpm		
							Battery voltage	<=	655.34	V		
							Battery voltage	>=	10	V		
							Intake air temperature before throttle valve	<=	143.26	deg C		
							Intake air temperature before throttle valve	>=	5.26	deg C		
							Engine coolant temperature	<=	100.46	deg C		
							Engine coolant temperature	>=	5.26	deg C		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
							Basic enable conditions met	=	see sheet enable tables	-		
		Path 4: Limp air position drift Bank 1 - comparison with lower mechanical stop sensor voltage	(				(	=	FALSE	-	Once per driving cycle	1 Trip
							Offset learning aborted					
			Actual offset learning step	=	4	-	OR					
			and				Offset learning successful	=	FALSE	-		
							)					
			(|A - B|) Absolute value of the actual learned value minus last stored value	>	0.15503	V	Offset check at cold temperature conditions active	=	FALSE	-		
			Where:				(					
							(					
			A	=	(A1 + A2) / 2	V	(	=	TRUE	-		
							Return spring check aborted					
			B	=	(B1 + B2) / 2	V	OR					
			A1	=	A11 - A12	V	Return spring check successful	=	TRUE	-		
							)					
			A2	=	A22 - A21	V	Return spring check fault is set	=	FALSE	-		
							)					
			B1	=	B11 - B12	V	OR					
			B2	=	B22 - B21	V	Device type	>	0	-		
							)					
			(A11) Learned sensor voltage of sensor 1 at limp air position				(					
			(A12) Learned reference sensor voltage of sensor 1 at the lower mechanical stop				Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	>	29	sec		
							(					
			(A22) Learned reference sensor voltage of sensor 2 at the lower mechanical stop				(					
							(					
			(A21) Learned sensor voltage of sensor 2 at limp air position				Offset learning active	=	TRUE	-		
			(B11) Actual learned sensor voltage of sensor 1 at limp air position after mean value calculation				OR					
			(B12) Learned reference sensor voltage of sensor 1 at the lower mechanical stop				(					
			(B22) Learned reference sensor voltage of sensor 2 at the lower mechanical stop				Offset learning active	=	FALSE	-		
			(B21) Actual learned sensor voltage of sensor 2 at limp air position after mean value calculation				(					
			)				The powerstage of the throttle actuator is	=	TRUE	-		
							commanded on					
							and					
							Battery voltage	>	7.5	V		
							)					
							)					
							)					
							OR					
							Power save is active	=	TRUE	-		
							)					
							Limp home driving mode requested	=	FALSE	-		
							Safety fuel cut off requested	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Torque limitation requested	= FALSE -		
					)			
					(	= FALSE -		
					Long term and short term adaptation chosen			
					OR			
					(	= TRUE -		
					Long term and short term adaptation chosen			
					Long term and short term is released	= TRUE -		
					)			
					)			
					OR			
					(			
					(			
					First learning performed	= FALSE -		
					OR			
					Limp air position is not plausible	= TRUE -		
					OR			
					External trigger to start offset learning	= TRUE -		
					)			
					(	= TRUE -		
					ECU is in drive state			
					OR			
					ECU is in post drive state for time	> 5 sec		
					)			
					)			
					OR			
					ECU is in post drive state for time	> 5 sec		
					)			
					Offset learning will be enabled when below conditions are satisfied	= TRUE -		
					(			
					(			
					(			
					Offset learning active	= TRUE -		
					OR			
					(			
					Offset learning active	= FALSE -		
					(			
					The powerstage of the throttle actuator is commanded on	= TRUE -		
					Battery voltage	> 7.5 V		
					)			
					)			
					)			
					OR			
					Power save is active	= TRUE -		
					)			
					Limp home driving mode requested	= FALSE -		
					Safety fuel cut off requested	= FALSE -		
					Torque limitation requested	= FALSE -		
					)			
					Vehicle speed	<= 0.62150404 mph		
					Engine speed	<= 300 rpm		
					Battery voltage	<= 655.34 V		
					Battery voltage	>= 10 V		
					Intake air temperature before throttle valve	<= 143.26 deg C		
					Intake air temperature before throttle valve	>= 5.26 deg C		
					Engine coolant temperature	<= 100.46 deg C		
					Engine coolant temperature	>= 5.26 deg C		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P2119	**Path 1:** Throttle valve opening spring check - opening failure for Bank 1	Here it is checked whether opening spring can be returned by mechanical force only to the defined limp home position in the defined time		(	= FALSE -	0.26 sec once per driving cycle	1 Trip
			(		Offset learning aborted			
			Actual offset learning step	= 4 -	OR			
			(		Offset learning successful	= FALSE -		
			(		)			
			Limp air position is implausible	= TRUE -	Offset check at cold temperature conditions active	= FALSE -		
			OR		(			
					(			
			First learning performed	= FALSE -	(	= TRUE -		
					Return spring check aborted			
			)		OR			
			Position of the throttle valve	<= A * C1 %	Return spring check successful	= TRUE -		
					)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Return spring check fault is set	=	FALSE	-		
							)					
			for time	>=	0.26	sec	OR					
			)				Device type	>	0	-		
							)					
			OR				(					
			(				Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	>	29	sec		
							(					
			Limp air position is implausible	=	FALSE	-	(					
							(					
			First learning performed	=	TRUE	-	Offset learning active	=	TRUE	-		
			Position of the throttle valve	<=	Limp home position of throttle valve - 3%	%	OR					
			Limp air position is implausible when:				(					
			Absolute difference of the deviation of limp air position sensor voltage at ECU start from lower mechanical stop position sensor voltage and the deviation of actual learned limp air position sensor voltage from lower mechanical stop position sensor voltage	>	0.15503	V	Offset learning active	=	FALSE	-		
			for time	>=	0.26	sec	(					
			)				The powerstage of the throttle actuator is commanded on	=	TRUE	-		
			)									
			Where:				Battery voltage	>	7.5	V		
			(A) Gradient of the throttle valve angle	=	100% / ((V12 - V11) + (V21 - V22)) * 0.5	%/V	)					
							)					
							)					
			(C1) Threshold for minimum absolute limp air position allowed	=	0.77026	V	OR					
			(V12) Actual learned sensor voltage of sensor 1 at the upper mechanical stop				Power save is active	=	TRUE	-		
							)					
			(V11) Actual learned sensor voltage of sensor 1 at the lower mechanical stop				Limp home driving mode requested	=	FALSE	-		
			(V21) Actual learned sensor voltage of sensor 2 at the lower mechanical stop				Safety fuel cut off requested	=	FALSE	-		
			(V22) Actual learned sensor voltage of sensor 2 at the upper mechanical stop				Torque limitation requested	=	FALSE	-		
							)					
							(	=	FALSE	-		
							Long term and short term adaptation chosen					
							OR					
							(	=	TRUE	-		
							Long term and short term adaptation chosen					
							Long term and short term is released	=	TRUE	-		
							)					
							)					
							OR					
							(					
							(					
							First learning performed	=	FALSE	-		
							OR					
							Limp air position is not plausible	=	TRUE	-		
							OR					
							External trigger to start offset learning	=	TRUE	-		
							)					
							(	=	TRUE	-		
							ECU is in drive state					
							OR					
							ECU is in post drive state for time	>	5	sec		
							)					
							)					
							OR					
							ECU is in post drive state for time	>	5	sec		
							)					
							Offset learning will be enabled when below conditions are satisfied	=	TRUE	-		
							(					
							(					
							(					
							Offset learning active	=	TRUE	-		
							OR					
							(					
							Offset learning active	=	FALSE	-		
							(					
							The powerstage of the throttle actuator is commanded on	=	TRUE	-		
							Battery voltage	>	7.5	V		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					)			
					)			
					)			
					OR			
					Power save is active	= TRUE -		
					)			
					Limp home driving mode requested	= FALSE -		
					Safety fuel cut off requested	= FALSE -		
					Torque limitation requested	= FALSE -		
					)			
					Vehicle speed	<= 0.62150404 mph		
					Engine speed	<= 300 rpm		
					Battery voltage	<= 655.34 V		
					Battery voltage	>= 10 V		
					Intake air temperature before throttle valve	<= 143.26 deg C		
					Intake air temperature before throttle valve	>= 5.26 deg C		
					Engine coolant temperature	<= 100.46 deg C		
					Engine coolant temperature	>= 5.26 deg C		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
		Path 2: Throttle valve opening spring failure while spreading the opening spring for Bank 1	Position of the throttle valve	> 1 + B1 + B2 %	(		0.3 sec once per driving cycle	1 Trip
					Offset learning aborted	= FALSE -		
			Where:		OR			
			(B1) Offset for the lower mechanical stop because of dirt	= Calculated parameter %	Offset learning successful	= FALSE -		
					)			
			(B2) Range for actual position (offset to desired value) to check whether open spring spread position is reached	= 1 %	Offset check at cold temperature conditions active	= FALSE -		
					(			
					(			
					(	= TRUE -		
					Return spring check aborted			
					OR			
					Return spring check successful	= TRUE -		
					)			
					Return spring check fault is set	= FALSE -		
					)			
					OR			
					Device type	> 0 -		
					)			
					(			
					Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	> 29 sec		
					(			
					(			
					(			
					Offset learning active	= TRUE -		
					OR			
					(			
					Offset learning active	= FALSE -		
					(			
					The powerstage of the throttle actuator is commanded on	= TRUE -		
					Battery voltage	> 7.5 V		
					)			
					)			
					)			
					OR			
					Power save is active	= TRUE -		
					)			
					Limp home driving mode requested	= FALSE -		
					Safety fuel cut off requested	= FALSE -		
					Torque limitation requested	= FALSE -		
					)			
					(	= FALSE -		
					Long term and short term adaptation chosen			
					OR			
					(	= TRUE -		
					Long term and short term adaptation chosen			
					Long term and short term is released	= TRUE -		
					)			
					)			
					OR			
					(			
					(			
					First learning performed	= FALSE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
							OR							
							Limp air position is not plausible	=	TRUE	-				
							OR							
							External trigger to start offset learning	=	TRUE	-				
							)							
							(	=	TRUE	-				
							ECU is in drive state							
							OR							
							ECU is in post drive state for time	>	5	sec				
							)							
							)							
							OR							
							ECU is in post drive state for time	>	5	sec				
							)							
							Offset learning will be enabled when below conditions are satisfied	=	TRUE	-				
							(							
							(							
							(							
							Offset learning active	=	TRUE	-				
							OR							
							(							
							Offset learning active	=	FALSE	-				
							(							
							The powerstage of the throttle actuator is commanded on	=	TRUE	-				
							Battery voltage	>	7.5	V				
							)							
							)							
							)							
							OR							
							Power save is active	=	TRUE	-				
							)							
							Limp home driving mode requested	=	FALSE	-				
							Safety fuel cut off requested	=	FALSE	-				
							Torque limitation requested	=	FALSE	-				
							)							
							Vehicle speed	<=	0.62150404	mph				
							Engine speed	<=	300	rpm				
							Battery voltage	<=	655.34	V				
							Battery voltage	>=	10	V				
							Intake air temperature before throttle valve	<=	143.26	deg C				
							Intake air temperature before throttle valve	>=	5.26	deg C				
							Engine coolant temperature	<=	100.46	deg C				
							Engine coolant temperature	>=	5.26	deg C				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Path 3: Throttle valve return spring failure check for Bank 1	(				(	=	FALSE	-	0.36	sec	once per driving cycle	1 Trip
			(				Offset learning aborted							
			Limp air position is implausible	=	TRUE	-	OR							
			OR				Offset learning successful	=	FALSE	-				
							)							
			First learning performed	=	FALSE	-	Offset check at cold temperature conditions active	=	FALSE	-				
			)				(							
							(							
			Position of the throttle valve	>	A * C1	V	(	=	TRUE	-				
							Return spring check aborted							
			for time	>=	0.36	sec	OR							
			)				Return spring check successful	=	TRUE	-				
							)							
			OR				Return spring check fault is set	=	FALSE	-				
							)							
			(				OR							
			Limp air position is implausible	=	FALSE	-	Device type	>	0	-				
							)							
			First learning performed	=	TRUE	-	(							
			Position of the throttle valve	>	Limp home position of throttle valve + 3%	%	Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	>	29	sec				
							(							
			Limp air position is implausible when:				(							
							(							
			Absolute difference of the deviation of limp air position sensor voltage at ECU start from lower mechanical stop position sensor voltage and the deviation of actual learned limp air position sensor voltage from lower mechanical stop position sensor voltage	>	0.15503	V	Offset learning active	=	TRUE	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			for time	>= 0.36 sec	OR			
			)		(			
			Where:		Offset learning active	= FALSE -		
			(A) Gradient of the throttle valve angle	= 100% / ((V12 - V11) + (V21 - V22)) * 0.5 %/V	(			
			(C1) Threshold for maximum absolute limp air position allowed	= 1.39771 V	The powerstage of the throttle actuator is commanded on	= TRUE -		
			(V12) Actual learned sensor voltage of sensor 1 at the upper mechanical stop		Battery voltage	> 7.5 V		
			(V11) Actual learned sensor voltage of sensor 1 at the lower mechanical stop		)			
					)			
					)			
			(V21) Actual learned sensor voltage of sensor 2 at the lower mechanical stop		OR			
			(V22) Actual learned sensor voltage of sensor 2 at the upper mechanical stop		Power save is active	= TRUE -		
					)			
					Limp home driving mode requested	= FALSE -		
					Safety fuel cut off requested	= FALSE -		
					Torque limitation requested	= FALSE -		
					)			
					(	= FALSE -		
					Long term and short term adaptation chosen			
					OR			
					(	= TRUE -		
					Long term and short term adaptation chosen			
					Long term and short term is released	= TRUE -		
					)			
					)			
					OR			
					(			
					(			
					First learning performed	= FALSE -		
					OR			
					Limp air position is not plausible	= TRUE -		
					OR			
					External trigger to start offset learning	= TRUE -		
					)			
					(	= TRUE -		
					ECU is in drive state			
					OR			
					ECU is in post drive state for time	> 5 sec		
					)			
					)			
					OR			
					ECU is in post drive state for time	> 5 sec		
					)			
					Offset learning will be enabled when below conditions are satisfied	= TRUE -		
					(			
					(			
					(			
					Offset learning active	= TRUE -		
					OR			
					(			
					Offset learning active	= FALSE -		
					(			
					The powerstage of the throttle actuator is commanded on	= TRUE -		
					Battery voltage	> 7.5 V		
					)			
					)			
					)			
					OR			
					Power save is active	= TRUE -		
					)			
					Limp home driving mode requested	= FALSE -		
					Safety fuel cut off requested	= FALSE -		
					Torque limitation requested	= FALSE -		
					)			
					Vehicle speed	<= 0.62150404 mph		
					Engine speed	<= 300 rpm		
					Battery voltage	<= 655.34 V		
					Battery voltage	>= 10 V		
					Intake air temperature before throttle valve	<= 143.26 deg C		
					Intake air temperature before throttle valve	>= 5.26 deg C		
					Engine coolant temperature	<= 100.46 deg C		
					Engine coolant temperature	>= 5.26 deg C		
					No pending or confirmed DTCs	= see sheet inhibit tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
							Basic enable conditions met	=	see sheet enable tables	-				
		Path 4: Throttle valve return spring failure while spreading the return spring for Bank 1	Position of the throttle valve	<=	(D1 + D2) - D3	%	(Offset learning aborted	=	FALSE	-	0.2	sec	once per driving cycle	1 Trip
			Where:				OR							
			(D1) Limp home position of the throttle valve	=	Calculated parameter	%	Offset learning successful)	=	FALSE	-				
			(D2) Value by which return spring is spread starting from power off position	=	15	%	Offset check at cold temperature conditions active	=	FALSE	-				
			(D3) Range for actual position (offset to desired value) to check whether return spring spread position is reached	=	2	%	((							
							(Return spring check aborted	=	TRUE	-				
							OR							
							Return spring check successful)	=	TRUE	-				
							Return spring check fault is set)	=	FALSE	-				
							OR							
							Device type)	>	0	-				
							(Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	>	29	sec				
							(((Offset learning active	=	TRUE	-				
							OR							
							(Offset learning active	=	FALSE	-				
							(The powerstage of the throttle actuator is commanded on	=	TRUE	-				
							Battery voltage)))	>	7.5	V				
							OR							
							Power save is active)	=	TRUE	-				
							Limp home driving mode requested	=	FALSE	-				
							Safety fuel cut off requested	=	FALSE	-				
							Torque limitation requested)	=	FALSE	-				
							(Long term and short term adaptation chosen	=	FALSE	-				
							OR							
							(Long term and short term adaptation chosen	=	TRUE	-				
							Long term and short term is released))	=	TRUE	-				
							OR							
							((First learning performed	=	FALSE	-				
							OR							
							Limp air position is not plausible	=	TRUE	-				
							OR							
							External trigger to start offset learning)	=	TRUE	-				
							(ECU is in drive state	=	TRUE	-				
							OR							
							ECU is in post drive state for time))	>	5	sec				
							OR							
							ECU is in post drive state for time)	>	5	sec				
							Offset learning will be enabled when below conditions are satisfied	=	TRUE	-				
							(((Offset learning active	=	TRUE	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR			
					(			
					Offset learning active	= FALSE -		
					(			
					The powerstage of the throttle actuator is commanded on	= TRUE -		
					Battery voltage	> 7.5 V		
					)			
					)			
					)			
					OR			
					Power save is active	= TRUE -		
					)			
					Limp home driving mode requested	= FALSE -		
					Safety fuel cut off requested	= FALSE -		
					Torque limitation requested	= FALSE -		
					)			
					Vehicle speed	<= 0.62150404 mph		
					Engine speed	<= 300 rpm		
					Battery voltage	<= 655.34 V		
					Battery voltage	>= 10 V		
					Intake air temperature before throttle valve	<= 143.26 deg C		
					Intake air temperature before throttle valve	>= 5.26 deg C		
					Engine coolant temperature	<= 100.46 deg C		
					Engine coolant temperature	>= 5.26 deg C		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P2100	**Path 1 :** Diagnosis of the Throttle Actuator Control Bank 1 H bridge circuit for open circuit fault	Voltage low during driver OFF state (indicates open circuit)	= Open Circuit: >= 200 K - ECU pin and load	(ECU is in DRIVE state	= TRUE -	0.799805 sec continuous	1 Trip
					OR			
					ECU is in POSTDRIVE state	= TRUE -		
					)			
					The powerstage of the actuator is switched on, following conditions:	= TRUE -		
					(			
					State of the thottle valve powerstage bank 1	> 0 -		
					)			
					Release of adaptation	= FALSE -		
					Actual position is valid	= TRUE -		
					Request safety fuel cut off SKA bank 1, following condition:	= FALSE -		
					(			
					Request reversible safety fuel cut off SKA bank 1, which has following condition:	= FALSE -		
					(			
					Battery voltage for throttle valve operation sufficient bank 1	> 7.5 V		
					OR			
					Engine speed	> 1000 rpm		
					)			
					Limp home position not reached bank 1	= FALSE -		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
		Path 2: Check throttle valve power stage IC for over temperature	Over temperature error from the power stage is detected	= TRUE -	(ECU is in DRIVE state	= TRUE -	continuous	1 Trip
					OR			
					ECU is in POSTDRIVE state	= TRUE -		
					)			
					The powerstage of the actuator is switched on, following conditions:	= TRUE -		
					(			
					State of the thottle valve powerstage bank 1	> 0 -		
					)			
					Release of adaptation	= FALSE -		
					Actual position is valid	= TRUE -		
					Request safety fuel cut off SKA bank 1, following condition:	= FALSE -		
					(			
					Request reversible safety fuel cut off SKA bank 1, which has following condition:	= FALSE -		
					(			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							Battery voltage for throttle valve operation sufficient bank 1	>	7.5	V		
							OR					
							Engine speed	>	1000	rpm		
							)					
							Limp home position not reached bank 1	=	FALSE	-		
							)					
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
							Basic enable conditions met	=	see sheet enable tables	-		
		Path 3 : Diagnoses the Turbine bypass valve H bridge high side driver circuit at out 1 for circuit low fault	Voltage low during driver ON state (indicates short circuit to ground)	=	Short to ground: <= between signal and controller ground	-	(ECU is in DRIVE state	=	TRUE	-	continuous	1 Trip
		Diagnoses the Turbine bypass valve H bridge low side driver circuit at out 2 for circuit high fault	OR Voltage high during driver ON state (indicates short circuit to battery)	=	Short to power: <= 0.5 signal and controller power	-	OR ECU is in POSTDRIVE state	=	TRUE	-		
							)					
							The powerstage of the actuator is switched on, following conditions:	=	TRUE	-		
							(					
							State of the thottle valve powerstage bank 1	>	0	-		
							)					
							Release of adaptation	=	FALSE	-		
							Actual position is valid	=	TRUE	-		
							Request safety fuel cut off SKA bank 1, following condition:	=	FALSE	-		
							(					
							Request reversible safety fuel cut off SKA bank 1, which has following condition:	=	FALSE	-		
							(					
							Battery voltage for throttle valve operation sufficient bank 1	>	7.5	V		
							OR					
							Engine speed	>	1000	rpm		
							)					
							Limp home position not reached bank 1	=	FALSE	-		
							)					
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
							Basic enable conditions met	=	see sheet enable tables	-		
Throttle Actuator - B2	P218A	Throttle actuator Bank2 first initialization - lower mechanical stop learning fail	(				(Offset learning aborted	=	FALSE	-	Once per driving cycle	1 Trip
			Initial learning of the closed throttle valve position has started	=	TRUE	-	OR					
			Aborted due to one of the enable conditions no longer being fulfilled (see secondary parameters)	=	TRUE	-	Offset learning successful	=	FALSE	-		
			)				)					
			OR				Offset check at cold temperature conditions active	=	FALSE	-		
		First learning of closed mechanical stop: Throttle position at lower mechanical stop	Lower mechanical stop offset learning aborted at step 1 (moving throttle valve to the closed position) due to the following reason (closed position has not reached):				((					
			(				(Return spring check aborted	=	TRUE	-		
			(Difference between actual throttle position sensor2 at lower mechanical stop and desired	>	1.5	%	OR Return spring check successful	=	TRUE	-		
			)				) Return spring check fault for bank 2 is set	=	FALSE	-		
							)					
			for time	>=	1	sec	OR					
			)				Device type	>	0	-		
							)					
			OR Lower mechanical stop offset learning aborted at step 2 (pressing throttle valve to the low mechanical stop with certain force) due to the following reason (duty cycle ratio has not reached threshold):				(Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	>	29	sec		
			(				(					
							(					
		First learning of closed mechanical stop: Duty cycle at lower mechanical stop and resulting change in sensor voltage	Calculated duty cycle ratio	<=	60	%	(Offset learning active	=	TRUE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			)				OR					
			for time	>=	1	sec	(					
			OR				Offset learning active	=	FALSE	-		
		Range check of learned sensor voltage at low mechanical stop	Lower mechanical stop offset learning aborted at step 3 (sensor offset learning at low mechanical stop) due to one of the the following conditions:				(					
			(				The powerstage of the throttle actuator for bank 2 is commanded on	=	TRUE	-		
			Lower mechanical stop voltage sensor 1	>	0.69458	V	Battery voltage	>	7.5	V		
			OR				)					
							)					
							)					
			Lower mechanical stop voltage sensor 1	<	0.37964	V	OR					
			OR				Power save is active for bank 2	=	TRUE	-		
							)					
			Lower mechanical stop voltage sensor 2	>	4.61426	V	Limp home driving mode requested for bank 2	=	FALSE	-		
			OR				Safety fuel cut off requested for bank 2	=	FALSE	-		
			Lower mechanical stop voltage sensor 2	<	4.36157	V	Torque limitation requested for bank 2	=	FALSE	-		
							)					
			)				(Long term and short term adaptation chosen	=	FALSE	-		
							OR					
							(Long term and short term adaptation chosen	=	TRUE	-		
							Long term and short term is released	=	TRUE	-		
							)					
							)					
							OR					
							(					
							(					
							First learning performed	=	FALSE	-		
							OR					
							Limp air position is not plausible	=	TRUE	-		
							OR					
							External trigger to start offset learning	=	TRUE	-		
							)					
							(	=	TRUE	-		
							ECU is in drive state					
							OR					
							ECU is in post drive state for time	>	5	sec		
							)					
							)					
							OR					
							ECU is in post drive state for time	>	5	sec		
							)					
							Offset learning will be enabled when below conditions are satisfied	=	TRUE	-		
							(					
							(					
							(					
							Offset learning active	=	TRUE	-		
							OR					
							(					
							Offset learning active	=	FALSE	-		
							(					
							The powerstage of the throttle actuator for bank 2 is commanded on	=	TRUE	-		
							Battery voltage	>	7.5	V		
							)					
							)					
							)					
							OR					
							Power save is active for bank 2	=	TRUE	-		
							)					
							Limp home driving mode requested for bank 2	=	FALSE	-		
							Safety fuel cut off requested for bank 2	=	FALSE	-		
							Torque limitation requested for bank 2	=	FALSE	-		
							)					
							Vehicle speed	<=	0.62150404	mph		
							Engine speed	<=	300	rpm		
							Battery voltage	<=	655.34	V		
							Battery voltage	>=	10	V		
							Intake air temperature before throttle valve	<=	143.26	deg C		
							Intake air temperature before throttle valve	>=	5.26	deg C		
							Engine coolant temperature	<=	100.46	deg C		
							Engine coolant temperature	>=	5.26	deg C		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
		Throttle actuator Bank2 - lower mechanical stop learning fail	Lower mechanical stop offset learning aborted at step 2 (pressing throttle valve to the low mechanical stop with certain force) due to the following reason (duty cycle ratio has not reached threshold):				(Offset learning aborted	=	FALSE	-	1	sec	Once per driving cycle	1 Trip
			(Calculated duty cycle ratio	<=	60	%	OR Offset learning successful	=	FALSE	-				
			for time	>=	1	sec	) Offset check at cold temperature conditions active	=	FALSE	-				
			)				((							
			OR				(Return spring check aborted OR	=	TRUE	-				
			Lower mechanical stop offset learning aborted at step 3 (sensor offset learning at low mechanical stop) due to one of the the following conditions:											
			(				Return spring check successful	=	TRUE	-				
			Lower mechanical stop voltage sensor 1	>	0.69458	V	) Return spring check fault for bank 2 is set	=	FALSE	-				
							)							
			OR Lower mechanical stop voltage sensor 1	<	0.37964	V	OR Device type	>	0	-				
			OR Lower mechanical stop voltage sensor 2	>	4.61426	V	) (Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	>	29	sec				
			OR				((							
			Lower mechanical stop voltage sensor 2)	<	4.36157	V	(Offset learning active	=	TRUE	-				
							OR (Offset learning active	=	FALSE	-				
							(The powerstage of the throttle actuator for bank 2 is commanded on	=	TRUE	-				
							Battery voltage	>	7.5	V				
							))) OR							
							Power save is active for bank 2	=	TRUE	-				
							) Limp home driving mode requested for bank 2	=	FALSE	-				
							Safety fuel cut off requested for bank 2	=	FALSE	-				
							Torque limitation requested for bank 2	=	FALSE	-				
							) (Long term and short term adaptation chosen	=	FALSE	-				
							OR (Long term and short term adaptation chosen	=	TRUE	-				
							Long term and short term is released	=	TRUE	-				
							)) OR ((							
							First learning performed	=	FALSE	-				
							OR Limp air position is not plausible	=	TRUE	-				
							OR External trigger to start offset learning	=	TRUE	-				
							) (ECU is in drive state	=	TRUE	-				
							OR ECU is in post drive state for time	>	5	sec				
							))							

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR			
					ECU is in post drive state for time	> 5 sec		
					)			
					Offset learning will be enabled when below conditions are satisfied	= TRUE -		
					(			
					(			
					(			
					Offset learning active	= TRUE -		
					OR			
					(			
					Offset learning active	= FALSE -		
					(			
					The powerstage of the throttle actuator for bank 2 is commanded on	= TRUE -		
					Battery voltage	> 7.5 V		
					)			
					)			
					)			
					OR			
					Power save is active for bank 2	= TRUE -		
					)			
					Limp home driving mode requested for bank 2	= FALSE -		
					Safety fuel cut off requested for bank 2	= FALSE -		
					Torque limitation requested for bank 2	= FALSE -		
					)			
					Vehicle speed	<= 0.62150404 mph		
					Engine speed	<= 300 rpm		
					Battery voltage	<= 655.34 V		
					Battery voltage	>= 10 V		
					Intake air temperature before throttle valve	<= 143.26 deg C		
					Intake air temperature before throttle valve	>= 5.26 deg C		
					Engine coolant temperature	<= 100.46 deg C		
					Engine coolant temperature	>= 5.26 deg C		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P30E5	**Path 1:** Throttle position at lower mechanical stop exceeded maximum limit for Throttle Position Sensor Bank 2	**Step 1 (**Learning of the closed throttle valve position)**:**		(Offset learning aborted	= FALSE -	1 sec once per driving cycle	1 Trip
			Actuator throttle position	> (Vmax - V) * Tgrad + Offset %	OR			
			Where:		Offset learning successful	= FALSE -		
					)			
			Vmax (Maximum voltage value allowed at mechanical stop, position sensor bank 2)	= 0.69458 V	Offset check at cold temperature conditions active	= FALSE -		
			V (Actual learned sensor voltage of sensor bank 2 at the lower mechanical stop)	= sensed voltage V	(			
					(			
			Tgrad (Gradient of the throttle valve angle versus sensor bank 2 voltage)	= calculated value % / V	(Return spring check aborted	= TRUE -		
			Offset (Offset to Desired position value to start ramping into mechanical stop)	= 1.5 %	OR			
					Return spring check successful	= TRUE -		
					)			
		Path 2: Range check of learned sensor voltage at lower mechanical stop for Throttle Position Sensor Bank 2 : Maximum learning limit exceeded	Low mechanical stop first learning has been performed	= TRUE -	Return spring check fault for bank 2 is set	= FALSE -		
					)			
			and		OR			
			Step 3 (If no fault in step 2 then check range of learned sensor voltages at lower mechanical stop)**:**		Device type	> 0 -		
					)			
			Actual learned sensor voltage of sensor 1 at the mechanical stop	> 0.69458 V	(			
			OR		Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	> 29 sec		
					(			
			Actual learned sensor voltage of sensor 2 at the mechanical stop	> 4.61426 V	(			
					(			
					Offset learning active	= TRUE -		
					OR			
					(			
					Offset learning active	= FALSE -		
					(			
					The powerstage of the throttle actuator for bank 2 is commanded on	= TRUE -		
					Battery voltage	> 7.5 V		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					)					
					)					
					)					
					OR					
					Power save is active for bank 2	=	TRUE	-		
					)					
					Limp home driving mode requested for bank 2	=	FALSE	-		
					Safety fuel cut off requested for bank 2	=	FALSE	-		
					Torque limitation requested for bank 2	=	FALSE	-		
					)					
					(	=	FALSE	-		
					Long term and short term adaptation chosen					
					OR					
					(	=	TRUE	-		
					Long term and short term adaptation chosen					
					Long term and short term is released	=	TRUE	-		
					)					
					)					
					OR					
					(					
					(					
					First learning performed	=	FALSE	-		
					OR					
					Limp air position is not plausible	=	TRUE	-		
					OR					
					External trigger to start offset learning	=	TRUE	-		
					)					
					(	=	TRUE	-		
					ECU is in drive state					
					OR					
					ECU is in post drive state for time	>	5	sec		
					)					
					)					
					OR					
					ECU is in post drive state for time	>	5	sec		
					)					
					Offset learning will be enabled when below conditions are satisfied	=	TRUE	-		
					(					
					(					
					(					
					Offset learning active	=	TRUE	-		
					OR					
					(					
					Offset learning active	=	FALSE	-		
					(					
					The powerstage of the throttle actuator for bank 2 is commanded on	=	TRUE	-		
					Battery voltage	>	7.5	V		
					)					
					)					
					)					
					OR					
					Power save is active for bank 2	=	TRUE	-		
					)					
					Limp home driving mode requested for bank 2	=	FALSE	-		
					Safety fuel cut off requested for bank 2	=	FALSE	-		
					Torque limitation requested for bank 2	=	FALSE	-		
					)					
					Vehicle speed	<=	0.62150404	mph		
					Engine speed	<=	300	rpm		
					Battery voltage	<=	655.34	V		
					Battery voltage	>=	10	V		
					Intake air temperature before throttle valve	<=	143.26	deg C		
					Intake air temperature before throttle valve	>=	5.26	deg C		
					Engine coolant temperature	<=	100.46	deg C		
					Engine coolant temperature	>=	5.26	deg C		
					No pending or confirmed DTCs	=	see sheet inhibit tables	-		
					Basic enable conditions met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
	P30E6	Range check of learned sensor voltage at lower mechanical stop for Throttle Position Sensor Bank 2: Minimum learning limit exceeded	Low mechanical stop first learning has been performed	=	TRUE	-	(Offset learning aborted	=	FALSE	-	1	sec	once per driving cycle	1 Trip
			and **Step 3** (If no fault in step 2 then check range of learned sensor voltages at lower mechanical stop):				OR Offset learning successful)	=	FALSE	-				
			Actual learned sensor voltage of sensor 1 at the mechanical stop	<=	0.69458	V	Offset check at cold temperature conditions active	=	FALSE	-				
			Actual learned sensor voltage of sensor 2 at the mechanical stop	<=	4.61426	V	((							
			(				(Return spring check aborted	=	TRUE	-				
			Actual learned sensor voltage of sensor 1 at the mechanical stop	<	0.37964	V	OR							
			OR				Return spring check successful	=	TRUE	-				
			Actual learned sensor voltage of sensor 2 at the mechanical stop	<	4.36157	V	) Return spring check fault for bank 2 is set	=	FALSE	-				
			)				) OR							
							Device type	>	0	-				
							) (Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	>	29	sec				
							(((Offset learning active	=	TRUE	-				
							OR (Offset learning active	=	FALSE	-				
							(The powerstage of the throttle actuator for bank 2 is commanded on	=	TRUE	-				
							Battery voltage	>	7.5	V				
							))) OR Power save is active for bank 2	=	TRUE	-				
							) Limp home driving mode requested for bank 2	=	FALSE	-				
							Safety fuel cut off requested for bank 2	=	FALSE	-				
							Torque limitation requested for bank 2	=	FALSE	-				
							) (Long term and short term adaptation chosen	=	FALSE	-				
							OR (Long term and short term adaptation chosen	=	TRUE	-				
							Long term and short term is released	=	TRUE	-				
							)) OR ((First learning performed	=	FALSE	-				
							OR Limp air position is not plausible	=	TRUE	-				
							OR External trigger to start offset learning	=	TRUE	-				
							) (ECU is in drive state	=	TRUE	-				
							OR ECU is in post drive state for time	>	5	sec				
							)) OR ECU is in post drive state for time	>	5	sec				
							) Offset learning will be enabled when below conditions are satisfied	=	TRUE	-				
							(((							

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Offset learning active	= TRUE -		
					OR			
					(			
					Offset learning active	= FALSE -		
					(			
					The powerstage of the throttle actuator for bank 2 is commanded on	= TRUE -		
					Battery voltage	> 7.5 V		
					)			
					)			
					)			
					OR			
					Power save is active for bank 2	= TRUE -		
					)			
					Limp home driving mode requested for bank 2	= FALSE -		
					Safety fuel cut off requested for bank 2	= FALSE -		
					Torque limitation requested for bank 2	= FALSE -		
					)			
					Vehicle speed	<= 0.62150404 mph		
					Engine speed	<= 300 rpm		
					Battery voltage	<= 655.34 V		
					Battery voltage	>= 10 V		
					Intake air temperature before throttle valve	<= 143.26 deg C		
					Intake air temperature before throttle valve	>= 5.26 deg C		
					Engine coolant temperature	<= 100.46 deg C		
					Engine coolant temperature	>= 5.26 deg C		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P210B	Rationality check of throttle actuator control Bank 2 deviation - Actual actuator position is continuously monitored against commanded value	(		(	= TRUE -	0.5 sec continuous	1 Trip
					ECU is in DRIVE state			
			Difference between actual actuator position and its commanded value	> A * B + C %	OR			
			OR		ECU is in POSTDRIVE state	= TRUE -		
					)			
			Difference between commanded value and actual actuator position	> (A * B + C) %	(	= TRUE -		
					Powerstage switched off by diagnosis			
			)		)			
			Where:		for time	>= 0.799805 sec		
			(A) Rate of change of the commanded value	= calculated value % / s	The powerstage of the actuator is switched on, following conditions:	= TRUE -		
			(B) Factor for allowed control deviation	= 0.02 -	(			
			(C) Allowed control deviation in steady state	= 5 %	State of the thottle valve powerstage bank 2	> 0 -		
					)			
					Release of adaptation	= FALSE -		
					Actual position is valid	= TRUE -		
					Request safety fuel cut off SKA bank 2, following condition:	= FALSE -		
					(			
					Request reversible safety fuel cut off SKA bank 2, which has following condition:	= FALSE -		
					(			
					Battery voltage for throttle valve operation sufficient bank 2	> 7.5 V		
					OR			
					Engine speed	> 1000 rpm		
					)			
					Limp home position not reached bank 2	= FALSE -		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
							Basic enable conditions met	=	see sheet enable tables	-				
	P0639	Range check of Throttle Actuator Control duty cycle Bank 2	Absolute value of Throttle valve duty cycle ratio bank 2 where	>	Minimum(A, (B*C))	%	(ECU is in DRIVE state OR	=	TRUE	-	0.6001	sec	continuous	1 Trip
			A - Upper threshold for Throttle Actuator Control duty cycle Bank 2 diagnosis in case of low battery voltage		95	%	ECU is in POSTDRIVE state)	=	TRUE	-				
			B - Upper threshold for Throttle Actuator Control duty cycle bank 2 diagnosis		80	%	Absolute value of position controller of the throttle valve bank 2 of motor bench one / gradient of the filtered desired value	<	78.1	%/s				
			C - Factor for battery voltage compensation bank 2		13.5V / measured battery voltage [V]	-	The powerstage of the actuator is switched on, following conditions: (	=	TRUE	-				
							State of the thottle valve powerstage bank 2)	>	0	-				
							Release of adaptation	=	FALSE	-				
							Actual position is valid	=	TRUE	-				
							Request safety fuel cut off SKA bank 2, following condition: (	=	FALSE	-				
							Request reversible safety fuel cut off SKA bank 2, which has following condition: (	=	FALSE	-				
							Battery voltage for throttle valve operation sufficient bank 2 OR	=	TRUE	-				
							Engine speed)	>	1000	rpm				
							Limp home position not reached bank 2)	=	FALSE	-				
							Battery voltage for throttle valve operation sufficient for bank 2	=	TRUE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P30E7	**Path 1:** Drift check of limp air position Bank 2 - comparison of actual learned value with first learned limp air position	Absolute difference between actual learned sensor voltage of sensor 1 at limp air position after mean value calculation and first learned sensor voltage of sensor 1 at limp air position OR	>=	1.40015	V	(Offset learning aborted	=	FALSE	-			Once per driving cycle	1 Trip
			Absolute difference between first learned sensor voltage of sensor 2 at limp air position and actual learned sensor voltage of sensor 2 at limp air position after mean value calculation	>=	1.40015	V	OR Offset learning successful)	=	FALSE	-				
							Offset check at cold temperature conditions active ((	=	FALSE	-				
							(Return spring check aborted OR	=	TRUE	-				
							Return spring check successful)	=	TRUE	-				
							Return spring check fault for bank 2 is set) OR	=	FALSE	-				
							Device type) (	>	0	-				
							Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time (((	>	29	sec				
							Offset learning active OR (	=	TRUE	-				
							Offset learning active (	=	FALSE	-				
							The powerstage of the throttle actuator for bank 2 is commanded on	=	TRUE	-				
							Battery voltage)))	>	7.5	V				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR			
					Power save is active for bank 2	= TRUE -		
					)			
					Limp home driving mode requested for bank 2	= FALSE -		
					Safety fuel cut off requested for bank 2	= FALSE -		
					Torque limitation requested for bank 2	= FALSE -		
					)			
					(	= FALSE -		
					Long term and short term adaptation chosen			
					OR			
					(	= TRUE -		
					Long term and short term adaptation chosen			
					Long term and short term is released	= TRUE -		
					)			
					)			
					OR			
					(			
					(			
					First learning performed	= FALSE -		
					OR			
					Limp air position is not plausible	= TRUE -		
					OR			
					External trigger to start offset learning	= TRUE -		
					)			
					(	= TRUE -		
					ECU is in drive state			
					OR			
					ECU is in post drive state for time	> 5 sec		
					)			
					)			
					OR			
					ECU is in post drive state for time	> 5 sec		
					)			
					Offset learning will be enabled when below conditions are satisfied	= TRUE -		
					(			
					(			
					(			
					Offset learning active	= TRUE -		
					OR			
					(			
					Offset learning active	= FALSE -		
					(			
					The powerstage of the throttle actuator for bank 2 is commanded on	= TRUE -		
					Battery voltage	> 7.5 V		
					)			
					)			
					)			
					OR			
					Power save is active for bank 2	= TRUE -		
					)			
					Limp home driving mode requested for bank 2	= FALSE -		
					Safety fuel cut off requested for bank 2	= FALSE -		
					Torque limitation requested for bank 2	= FALSE -		
					)			
					Vehicle speed	<= 0.62150404 mph		
					Engine speed	<= 300 rpm		
					Battery voltage	<= 655.34 V		
					Battery voltage	>= 10 V		
					Intake air temperature before throttle valve	<= 143.26 deg C		
					Intake air temperature before throttle valve	>= 5.26 deg C		
					Engine coolant temperature	<= 100.46 deg C		
					Engine coolant temperature	>= 5.26 deg C		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
		Path 2: Range check of limp air position for Bank 2 - high	Difference between actual learned sensor voltage of sensor 1 at limp air position after mean value calculation and actual learned sensor voltage of sensor 1 at the lower mechanical stop	> 1.40015 V	(	= FALSE -	Once per driving cycle	1 Trip
					Offset learning aborted			
			OR		OR			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Difference between actual learned sensor voltage of sensor 2 at the lower mechanical stop and actual learned sensor voltage of sensor 2 at limp air position after mean value calculation	> 1.40015 V	Offset learning successful)	= FALSE -		
					Offset check at cold temperature conditions active (((	= FALSE -		
					Return spring check aborted	= TRUE -		
					OR Return spring check successful)	= TRUE -		
					Return spring check fault for bank 2 is set) OR	= FALSE -		
					Device type) (	> 0 -		
					Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time (((	> 29 sec		
					Offset learning active OR (	= TRUE -		
					Offset learning active (	= FALSE -		
					The powerstage of the throttle actuator for bank 2 is commanded on	= TRUE -		
					Battery voltage))) OR	> 7.5 V		
					Power save is active for bank 2)	= TRUE -		
					Limp home driving mode requested for bank 2	= FALSE -		
					Safety fuel cut off requested for bank 2	= FALSE -		
					Torque limitation requested for bank 2) (	= FALSE -		
					Long term and short term adaptation chosen OR (	= FALSE -		
					Long term and short term adaptation chosen	= TRUE -		
					Long term and short term is released)) OR ((	= TRUE -		
					First learning performed OR	= FALSE -		
					Limp air position is not plausible OR	= TRUE -		
					External trigger to start offset learning) (	= TRUE -		
					ECU is in drive state OR	= TRUE -		
					ECU is in post drive state for time)) OR	> 5 sec		
					ECU is in post drive state for time)	> 5 sec		
					Offset learning will be enabled when below conditions are satisfied (((	= TRUE -		
					Offset learning active OR (	= TRUE -		
					Offset learning active (	= FALSE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					The powerstage of the throttle actuator for bank 2 is commanded on	= TRUE -		
					Battery voltage	> 7.5 V		
					)			
					)			
					)			
					OR			
					Power save is active for bank 2	= TRUE -		
					)			
					Limp home driving mode requested for bank 2	= FALSE -		
					Safety fuel cut off requested for bank 2	= FALSE -		
					Torque limitation requested for bank 2	= FALSE -		
					)			
					Vehicle speed	<= 0.62150404 mph		
					Engine speed	<= 300 rpm		
					Battery voltage	<= 655.34 V		
					Battery voltage	>= 10 V		
					Intake air temperature before throttle valve	<= 143.26 deg C		
					Intake air temperature before throttle valve	>= 5.26 deg C		
					Engine coolant temperature	<= 100.46 deg C		
					Engine coolant temperature	>= 5.26 deg C		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
		Path 3: Range check of limp air position for Bank 2 - low	Difference between actual learned sensor voltage of sensor 1 at limp air position after mean value calculation and actual learned sensor voltage of sensor 1 at the lower mechanical stop	< 0.77026 V	(Offset learning aborted	= FALSE -	Once per driving cycle	1 Trip
			OR					
			Difference between actual learned sensor voltage of sensor 2 at the lower mechanical stop and actual learned sensor voltage of sensor 2 at limp air position after mean value calculation	< 0.77026 V	OR Offset learning successful	= FALSE -		
					)			
					Offset check at cold temperature conditions active	= FALSE -		
					(			
					(			
					(	= TRUE -		
					Return spring check aborted			
					OR			
					Return spring check successful	= TRUE -		
					)			
					Return spring check fault for bank 2 is set	= FALSE -		
					)			
					OR			
					Device type	> 0 -		
					)			
					(			
					Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	> 29 sec		
					(			
					(			
					(			
					Offset learning active	= TRUE -		
					OR			
					(			
					Offset learning active	= FALSE -		
					(			
					The powerstage of the throttle actuator for bank 2 is commanded on	= TRUE -		
					Battery voltage	> 7.5 V		
					)			
					)			
					)			
					OR			
					Power save is active for bank 2	= TRUE -		
					)			
					Limp home driving mode requested for bank 2	= FALSE -		
					Safety fuel cut off requested for bank 2	= FALSE -		
					Torque limitation requested for bank 2	= FALSE -		
					)			
					(Long term and short term adaptation chosen	= FALSE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							OR					
							(	=	TRUE	-		
							Long term and short term adaptation chosen					
							Long term and short term is released	=	TRUE	-		
							)					
							)					
							OR					
							(					
							(					
							First learning performed	=	FALSE	-		
							OR					
							Limp air position is not plausible	=	TRUE	-		
							OR					
							External trigger to start offset learning	=	TRUE	-		
							)					
							(	=	TRUE	-		
							ECU is in drive state					
							OR					
							ECU is in post drive state for time	>	5	sec		
							)					
							)					
							OR					
							ECU is in post drive state for time	>	5	sec		
							)					
							Offset learning will be enabled when below conditions are satisfied	=	TRUE	-		
							(					
							(					
							(					
							Offset learning active	=	TRUE	-		
							OR					
							(					
							Offset learning active	=	FALSE	-		
							(					
							The powerstage of the throttle actuator for bank 2 is commanded on	=	TRUE	-		
							Battery voltage	>	7.5	V		
							)					
							)					
							)					
							OR					
							Power save is active for bank 2	=	TRUE	-		
							)					
							Limp home driving mode requested for bank 2	=	FALSE	-		
							Safety fuel cut off requested for bank 2	=	FALSE	-		
							Torque limitation requested for bank 2	=	FALSE	-		
							)					
							Vehicle speed	<=	0.62150404	mph		
							Engine speed	<=	300	rpm		
							Battery voltage	<=	655.34	V		
							Battery voltage	>=	10	V		
							Intake air temperature before throttle valve	<=	143.26	deg C		
							Intake air temperature before throttle valve	>=	5.26	deg C		
							Engine coolant temperature	<=	100.46	deg C		
							Engine coolant temperature	>=	5.26	deg C		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
							Basic enable conditions met	=	see sheet enable tables	-		
		Path 4: Limp air position drift Bank 2 - comparison with lower mechanical stop sensor voltage	(				(	=	FALSE	-	Once per driving cycle	1 Trip
							Offset learning aborted					
			Actual offset learning step	=	4	-	OR					
			and				Offset learning successful	=	FALSE	-		
							)					
			(|A - B|) Absolute value of the actual learned value minus last stored value	>	0.15503	V	Offset check at cold temperature conditions active	=	FALSE	-		
			Where:				(					
							(					
			A	=	(A1 + A2) / 2	V	(	=	TRUE	-		
							Return spring check aborted					
			B	=	(B1 + B2) / 2	V	OR					
			A1	=	A11 - A12	V	Return spring check successful	=	TRUE	-		
							)					
			A2	=	A22 - A21	V	Return spring check fault for bank 2 is set	=	FALSE	-		
							)					
			B1	=	B11 - B12	V	OR					
			B2	=	B22 - B21	V	Device type	>	0	-		
							)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			(A11) Learned sensor voltage of sensor 1 at limp air position, bank 2 (A12) Learned reference sensor voltage of sensor 1 at the lower mechanical stop, bank 2 (A22) Learned reference sensor voltage of sensor 2 at the lower mechanical stop (A21) Learned sensor voltage of sensor 2 at limp air position, bank 2 (B11) Actual learned sensor voltage of sensor 1 at limp air position after mean value calculation (B12) Learned reference sensor voltage of sensor 1 at the lower mechanical stop, bank 2 (B22) Learned reference sensor voltage of sensor 2 at the lower mechanical stop, bank 2 (B21) Actual learned sensor voltage of sensor 2 at limp air position after mean value calculation)		(					
					Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	>	29	sec		
					(((					
					Offset learning active	=	TRUE	-		
					OR (					
					Offset learning active	=	FALSE	-		
					(					
					The powerstage of the throttle actuator for bank 2 is commanded on	=	TRUE	-		
					Battery voltage	>	7.5	V		
					))) OR					
					Power save is active for bank 2	=	TRUE	-		
					)					
					Limp home driving mode requested for bank 2	=	FALSE	-		
					Safety fuel cut off requested for bank 2	=	FALSE	-		
					Torque limitation requested for bank 2	=	FALSE	-		
					)					
					(	=	FALSE	-		
					Long term and short term adaptation chosen OR					
					(	=	TRUE	-		
					Long term and short term adaptation chosen					
					Long term and short term is released	=	TRUE	-		
					)) OR ((					
					First learning performed	=	FALSE	-		
					OR					
					Limp air position is not plausible	=	TRUE	-		
					OR					
					External trigger to start offset learning	=	TRUE	-		
					)					
					(	=	TRUE	-		
					ECU is in drive state OR					
					ECU is in post drive state for time	>	5	sec		
					)) OR					
					ECU is in post drive state for time	>	5	sec		
					)					
					Offset learning will be enabled when below conditions are satisfied	=	TRUE	-		
					(((					
					Offset learning active	=	TRUE	-		
					OR (					
					Offset learning active	=	FALSE	-		
					(					
					The powerstage of the throttle actuator for bank 2 is commanded on	=	TRUE	-		
					Battery voltage	>	7.5	V		
					))) OR					
					Power save is active for bank 2	=	TRUE	-		
					)					
					Limp home driving mode requested for bank 2	=	FALSE	-		
					Safety fuel cut off requested for bank 2	=	FALSE	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
							Torque limitation requested for bank 2	=	FALSE	-				
							)							
							Vehicle speed	<=	0.62150404	mph				
							Engine speed	<=	300	rpm				
							Battery voltage	<=	655.34	V				
							Battery voltage	>=	10	V				
							Intake air temperature before throttle valve	<=	143.26	deg C				
							Intake air temperature before throttle valve	>=	5.26	deg C				
							Engine coolant temperature	<=	100.46	deg C				
							Engine coolant temperature	>=	5.26	deg C				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P211D	**Path 1:** Throttle valve opening spring check - opening failure for Bank 2	Here it is checked whether opening spring can be returned by mechanical force only to the defined limp home position in the defined time				(	=	FALSE	-	0.26	sec	once per driving cycle	1 Trip
							Offset learning aborted							
			(											
			Actual offset learning step	=	4	-	OR							
			(				Offset learning successful	=	FALSE	-				
			(				)							
			Limp air position is implausible	=	TRUE	-	Offset check at cold temperature conditions active	=	FALSE	-				
			OR				(							
							(							
			First learning performed	=	FALSE	-	(	=	TRUE	-				
							Return spring check aborted							
			)				OR							
			Position of the throttle valve	<=	A * C1	%	Return spring check successful	=	TRUE	-				
							)							
			for time	>=	0.26	sec	Return spring check fault for bank 2 is set	=	FALSE	-				
							)							
			)				OR							
			OR				Device type	>	0	-				
							)							
			(				(							
			Limp air position is implausible	=	FALSE	-	Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	>	29	sec				
							(							
			First learning performed	=	TRUE	-	(							
							(							
			Position of the throttle valve	<=	Limp home position of throttle valve - 3%	%	Offset learning active	=	TRUE	-				
			Limp air position is implausible when:				OR							
			Absolute difference of the deviation of limp air position sensor voltage at ECU start from lower mechanical stop position sensor voltage and the deviation of actual learned limp air position sensor voltage from lower mechanical stop position sensor voltage	>	0.15503	V	(							
			for time	>=	0.26	sec	Offset learning active	=	FALSE	-				
			)				(							
			)											
			Where:				The powerstage of the throttle actuator for bank 2 is commanded on	=	TRUE	-				
			(A) Gradient of the throttle valve angle	=	100% / ((V12 - V11) + (V21 - V22)) * 0.5	%/V	Battery voltage	>	7.5	V				
			(C1) Threshold for minimum absolute limp air position allowed	=	0.77026	V	)							
							)							
							)							
			(V12) Actual learned sensor voltage of sensor 1 at the upper mechanical stop				OR							
			(V11) Actual learned sensor voltage of sensor 1 at the lower mechanical stop				Power save is active for bank 2	=	TRUE	-				
							)							
			(V21) Actual learned sensor voltage of sensor 2 at the lower mechanical stop				Limp home driving mode requested for bank 2	=	FALSE	-				
			(V22) Actual learned sensor voltage of sensor 2 at the upper mechanical stop				Safety fuel cut off requested for bank 2	=	FALSE	-				
							Torque limitation requested for bank 2	=	FALSE	-				
							)							
							(	=	FALSE	-				
							Long term and short term adaptation chosen							
							OR							
							(	=	TRUE	-				
							Long term and short term adaptation chosen							
							Long term and short term is released	=	TRUE	-				
							)							

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					)			
					OR			
					(			
					(			
					First learning performed	= FALSE -		
					OR			
					Limp air position is not plausible	= TRUE -		
					OR			
					External trigger to start offset learning	= TRUE -		
					)			
					(	= TRUE -		
					ECU is in drive state			
					OR			
					ECU is in post drive state for time	> 5 sec		
					)			
					)			
					OR			
					ECU is in post drive state for time	> 5 sec		
					)			
					Offset learning will be enabled when below conditions are satisfied	= TRUE -		
					(			
					(			
					(			
					Offset learning active	= TRUE -		
					OR			
					(			
					Offset learning active	= FALSE -		
					(			
					The powerstage of the throttle actuator for bank 2 is commanded on	= TRUE -		
					Battery voltage	> 7.5 V		
					)			
					)			
					)			
					OR			
					Power save is active for bank 2	= TRUE -		
					)			
					Limp home driving mode requested for bank 2	= FALSE -		
					Safety fuel cut off requested for bank 2	= FALSE -		
					Torque limitation requested for bank 2	= FALSE -		
					)			
					Vehicle speed	<= 0.62150404 mph		
					Engine speed	<= 300 rpm		
					Battery voltage	<= 655.34 V		
					Battery voltage	>= 10 V		
					Intake air temperature before throttle valve	<= 143.26 deg C		
					Intake air temperature before throttle valve	>= 5.26 deg C		
					Engine coolant temperature	<= 100.46 deg C		
					Engine coolant temperature	>= 5.26 deg C		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
		Path 2: Throttle valve opening spring failure while spreading the opening spring for Bank 2	Position of the throttle valve	> 1 + B1 + B2 %	(	= FALSE -	0.3 sec once per driving cycle	1 Trip
					Offset learning aborted			
			Where:		OR			
			(B1) Offset for the lower mechanical stop because of dirt	= Calculated Parameter %	Offset learning successful	= FALSE -		
					)			
			(B2) Range for actual position (offset to desired value) to check whether open spring spread position is reached	= 1 %	Offset check at cold temperature conditions active	= FALSE -		
					(			
					(			
					(	= TRUE -		
					Return spring check aborted			
					OR			
					Return spring check successful	= TRUE -		
					)			
					Return spring check fault for bank 2 is set	= FALSE -		
					)			
					OR			
					Device type	> 0 -		
					)			
					(			
					Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	> 29 sec		
					(			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					(			
					Offset learning active	= TRUE -		
					OR			
					(			
					Offset learning active	= FALSE -		
					(			
					The powerstage of the throttle actuator for bank 2 is	= TRUE -		
					commanded on			
					Battery voltage	> 7.5 V		
					)			
					)			
					)			
					OR			
					Power save is active for bank 2	= TRUE -		
					)			
					Limp home driving mode requested for bank 2	= FALSE -		
					Safety fuel cut off requested for bank 2	= FALSE -		
					Torque limitation requested for bank 2	= FALSE -		
					)			
					(	= FALSE -		
					Long term and short term adaptation chosen			
					OR			
					(	= TRUE -		
					Long term and short term adaptation chosen			
					Long term and short term is released	= TRUE -		
					)			
					)			
					OR			
					(			
					(			
					First learning performed	= FALSE -		
					OR			
					Limp air position is not plausible	= TRUE -		
					OR			
					External trigger to start offset learning	= TRUE -		
					)			
					(	= TRUE -		
					ECU is in drive state			
					OR			
					ECU is in post drive state for time	> 5 sec		
					)			
					)			
					OR			
					ECU is in post drive state for time	> 5 sec		
					)			
					Offset learning will be enabled when below conditions are satisfied	= TRUE -		
					(			
					(			
					(			
					Offset learning active	= TRUE -		
					OR			
					(			
					Offset learning active	= FALSE -		
					(			
					The powerstage of the throttle actuator for bank 2 is	= TRUE -		
					commanded on			
					Battery voltage	> 7.5 V		
					)			
					)			
					)			
					OR			
					Power save is active for bank 2	= TRUE -		
					)			
					Limp home driving mode requested for bank 2	= FALSE -		
					Safety fuel cut off requested for bank 2	= FALSE -		
					Torque limitation requested for bank 2	= FALSE -		
					)			
					Vehicle speed	<= 0.62150404 mph		
					Engine speed	<= 300 rpm		
					Battery voltage	<= 655.34 V		
					Battery voltage	>= 10 V		
					Intake air temperature before throttle valve	<= 143.26 deg C		
					Intake air temperature before throttle valve	>= 5.26 deg C		
					Engine coolant temperature	<= 100.46 deg C		
					Engine coolant temperature	>= 5.26 deg C		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
							Basic enable conditions met	=	see sheet enable tables	-		
		Path 3: Throttle valve return spring failure check for Bank 2	(				(	=	FALSE	-	0.36 sec once per driving cycle	1 Trip
			(				Offset learning aborted					
			Limp air position is implausible	=	TRUE	-	OR					
			OR				Offset learning successful	=	FALSE	-		
							)					
			First learning performed	=	FALSE	-	Offset check at cold temperature conditions active	=	FALSE	-		
			)				(					
							(					
			Position of the throttle valve	>	A * C1	V	(	=	TRUE	-		
							Return spring check aborted					
			for time	>=	0.36	sec	OR					
			)				Return spring check successful	=	TRUE	-		
							)					
			OR				Return spring check fault for bank 2 is set	=	FALSE	-		
							)					
			(				OR					
			Limp air position is implausible	=	FALSE	-	Device type	>	0	-		
							)					
			First learning performed	=	TRUE	-	(					
			Position of the throttle valve	>	Limp home position of throttle valve + 3%	%	Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	>	29	sec		
							(					
			Limp air position is implausible when:				(					
							(					
			Absolute difference of the deviation of limp air position sensor voltage at ECU start from lower mechanical stop position sensor voltage and the deviation of actual learned limp air position sensor voltage from lower mechanical stop position sensor voltage	>	0.15503	V	Offset learning active	=	TRUE	-		
			for time	>=	0.36	sec	OR					
			)				(					
			Where:				Offset learning active	=	FALSE	-		
			(A) Gradient of the throttle valve angle	=	100% / ((V12 - V11) + (V21 - V22)) * 0.5	%/V	(					
			(C1) Threshold for minimum absolute limp air position allowed	=	1.39771	V	The powerstage of the throttle actuator for bank 2 is commanded on	=	TRUE	-		
			(V12) Actual learned sensor voltage of sensor 1 at the upper mechanical stop				Battery voltage	>	7.5	V		
			(V11) Actual learned sensor voltage of sensor 1 at the lower mechanical stop				)					
							)					
							)					
			(V21) Actual learned sensor voltage of sensor 2 at the lower mechanical stop				OR					
			(V22) Actual learned sensor voltage of sensor 2 at the upper mechanical stop				Power save is active for bank 2	=	TRUE	-		
							)					
							Limp home driving mode requested for bank 2	=	FALSE	-		
							Safety fuel cut off requested for bank 2	=	FALSE	-		
							Torque limitation requested for bank 2	=	FALSE	-		
							)					
							(	=	FALSE	-		
							Long term and short term adaptation chosen					
							OR					
							(	=	TRUE	-		
							Long term and short term adaptation chosen					
							Long term and short term is released	=	TRUE	-		
							)					
							)					
							OR					
							(					
							(					
							First learning performed	=	FALSE	-		
							OR					
							Limp air position is not plausible	=	TRUE	-		
							OR					
							External trigger to start offset learning	=	TRUE	-		
							)					
							(	=	TRUE	-		
							ECU is in drive state					
							OR					
							ECU is in post drive state for time	>	5	sec		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					)			
					)			
					OR			
					ECU is in post drive state for time	> 5 sec		
					)			
					Offset learning will be enabled when below conditions are satisfied	= TRUE -		
					(			
					(			
					(			
					Offset learning active	= TRUE -		
					OR			
					(			
					Offset learning active	= FALSE -		
					(			
					The powerstage of the throttle actuator for bank 2 is commanded on	= TRUE -		
					Battery voltage	> 7.5 V		
					)			
					)			
					)			
					OR			
					Power save is active for bank 2	= TRUE -		
					)			
					Limp home driving mode requested for bank 2	= FALSE -		
					Safety fuel cut off requested for bank 2	= FALSE -		
					Torque limitation requested for bank 2	= FALSE -		
					)			
					Vehicle speed	<= 0.62150404 mph		
					Engine speed	<= 300 rpm		
					Battery voltage	<= 655.34 V		
					Battery voltage	>= 10 V		
					Intake air temperature before throttle valve	<= 143.26 deg C		
					Intake air temperature before throttle valve	>= 5.26 deg C		
					Engine coolant temperature	<= 100.46 deg C		
					Engine coolant temperature	>= 5.26 deg C		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
		Path 4: Throttle valve return spring failure while spreading the return spring for Bank 2	Position of the throttle valve	<= (D1 + D2) - D3 %	(	= FALSE -	0.2 sec once per driving cycle	1 Trip
					Offset learning aborted			
			Where:		OR			
			(D1) Limp home position of the throttle valve	= Calculated parameter %	Offset learning successful	= FALSE -		
					)			
			(D2) Value by which return spring is spread starting from power off position	= 15 %	Offset check at cold temperature conditions active	= FALSE -		
			(D3) Range for actual position (offset to desired value) to check whether return spring spread position is reached	= 2 %	(			
					(			
					(	= TRUE -		
					Return spring check aborted			
					OR			
					Return spring check successful	= TRUE -		
					)			
					Return spring check fault for bank 2 is set	= FALSE -		
					)			
					OR			
					Device type	> 0 -		
					)			
					(			
					Offset learning will be enabled during ECU is in drive state when below conditions are satisfied for time	> 29 sec		
					(			
					(			
					(			
					Offset learning active	= TRUE -		
					OR			
					(			
					Offset learning active	= FALSE -		
					(			
					The powerstage of the throttle actuator for bank 2 is commanded on	= TRUE -		
					Battery voltage	> 7.5 V		
					)			
					)			
					)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR			
					Power save is active for bank 2	= TRUE -		
					)			
					Limp home driving mode requested for bank 2	= FALSE -		
					Safety fuel cut off requested for bank 2	= FALSE -		
					Torque limitation requested for bank 2	= FALSE -		
					)			
					(	= FALSE -		
					Long term and short term adaptation chosen			
					OR			
					(	= TRUE -		
					Long term and short term adaptation chosen			
					Long term and short term is released	= TRUE -		
					)			
					)			
					OR			
					(			
					(			
					First learning performed	= FALSE -		
					OR			
					Limp air position is not plausible	= TRUE -		
					OR			
					External trigger to start offset learning	= TRUE -		
					)			
					(	= TRUE -		
					ECU is in drive state			
					OR			
					ECU is in post drive state for time	> 5 sec		
					)			
					)			
					OR			
					ECU is in post drive state for time	> 5 sec		
					)			
					Offset learning will be enabled when below conditions are satisfied	= TRUE -		
					(			
					(			
					(			
					Offset learning active	= TRUE -		
					OR			
					(			
					Offset learning active	= FALSE -		
					(			
					The powerstage of the throttle actuator for bank 2 is commanded on	= TRUE -		
					Battery voltage	> 7.5 V		
					)			
					)			
					)			
					OR			
					Power save is active for bank 2	= TRUE -		
					)			
					Limp home driving mode requested for bank 2	= FALSE -		
					Safety fuel cut off requested for bank 2	= FALSE -		
					Torque limitation requested for bank 2	= FALSE -		
					)			
					Vehicle speed	<= 0.62150404 mph		
					Engine speed	<= 300 rpm		
					Battery voltage	<= 655.34 V		
					Battery voltage	>= 10 V		
					Intake air temperature before throttle valve	<= 143.26 deg C		
					Intake air temperature before throttle valve	>= 5.26 deg C		
					Engine coolant temperature	<= 100.46 deg C		
					Engine coolant temperature	>= 5.26 deg C		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P210A	**Path 1 :** Diagnosis of the Throttle Actuator Control Bank 2 H bridge circuit for open circuit fault	Voltage low during driver OFF state (indicates open circuit)	= Open Circuit: >= 200 K - ECU pin and load	(	= TRUE -	0.799805 sec continuous	1 Trip
					ECU is in DRIVE state			
					OR			
					ECU is in POSTDRIVE state	= TRUE -		
					)			
					The powerstage of the actuator is switched on, following conditions:	= TRUE -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					State of the thottle valve powerstage bank 2	> 0 -		
					)			
					Release of adaptation	= FALSE -		
					Actual position is valid	= TRUE -		
					Request safety fuel cut off SKA bank 2, following condition:	= FALSE -		
					(			
					Request reversible safety fuel cut off SKA bank 2, which has following condition:	= FALSE -		
					(			
					Battery voltage for throttle valve operation sufficient bank 2	> 7.5 V		
					OR			
					Engine speed	> 1000 rpm		
					)			
					Limp home position not reached bank 2	= FALSE -		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
		Path 2: Check throttle valve power stage IC for over temperature	Over temperature error from the power stage is detected	= TRUE -	(ECU is in DRIVE state	= TRUE -	continuous	1 Trip
					OR			
					ECU is in POSTDRIVE state	= TRUE -		
					)			
					The powerstage of the actuator is switched on, following conditions:	= TRUE -		
					(			
					State of the thottle valve powerstage bank 2	> 0 -		
					)			
					Release of adaptation	= FALSE -		
					Actual position is valid	= TRUE -		
					Request safety fuel cut off SKA bank 2, following condition:	= FALSE -		
					(			
					Request reversible safety fuel cut off SKA bank 2, which has following condition:	= FALSE -		
					(			
					Battery voltage for throttle valve operation sufficient bank 2	> 7.5 V		
					OR			
					Engine speed	> 1000 rpm		
					)			
					Limp home position not reached bank 2	= FALSE -		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
		Path 3 : Diagnoses the Turbine bypass valve H bridge high side driver circuit at out 1 for circuit low fault	Voltage low during driver ON state (indicates short circuit to ground)	= Short to ground: <= - between signal and controller ground	(ECU is in DRIVE state	= TRUE -	continuous	1 Trip
			OR		OR			
		Diagnoses the Turbine bypass valve H bridge low side driver circuit at out 2 for circuit high fault	Voltage high during driver ON state (indicates short circuit to battery)	= Short to power: <= 0.5 - signal and controller power	ECU is in POSTDRIVE state	= TRUE -		
					)			
					The powerstage of the actuator is switched on, following conditions:	= TRUE -		
					(			
					State of the thottle valve powerstage bank 2	> 0 -		
					)			
					Release of adaptation	= FALSE -		
					Actual position is valid	= TRUE -		
					Request safety fuel cut off SKA bank 2, following condition:	= FALSE -		
					(			
					Request reversible safety fuel cut off SKA bank 2, which has following condition:	= FALSE -		
					(			
					Battery voltage for throttle valve operation sufficient bank 2	> 7.5 V		
					OR			
					Engine speed	> 1000 rpm		
					)			
					Limp home position not reached bank 2	= FALSE -		
					)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
							Basic enable conditions met	=	see sheet enable tables	-		
Turbocharge Wastegate Actuator - H-Bridge Leg 1 - B1	P2B93	Monitoring of valve drift at closed position	(				Actuator is completely closed	=	TRUE	-	continuous	2 Trips
			(				(					
			Slope of the sensor	>=	0		Actuator position is set at 0% which means that actuator is closed	=	TRUE	-		
			Actuator position is set at 0% which means that actuator is closed	=	TRUE	-	(					
			(				Current actuator torque (See Look-up table #P2B93-1)	<=	-134	Ncm		
			Average sensor voltage from turbine bypass valve 1 position sensor	>	2.0026	V	Suspect for reaching mechanical minimum bound of valve	=	TRUE	-		
			OR				(					
			(				Internal desired value for governor	<	0	%		
			Average sensor voltage from turbine bypass valve 1 position sensor	<	0.424	V	Actuator position is unchanged	=	TRUE	-		
			Average sensor voltage from turbine bypass valve 1 position sensor	>=	0.244	V	(					
			)				Absolute value of the gradient of the actuator speed	<	350	mV/s		
			)				for events	=	2	-		
			)				)					
			OR				)					
			(				)					
			Slope of the sensor curve	<	0		for time		0.01	sec		
			Actuator position is set at 0% which means that actuator is closed	=	FALSE	-	OR					
			(				Actuator position is set at 0% which means that actuator is closed	=	FALSE	-		
			Average sensor voltage from turbine bypass valve 1 position sensor	>	2.0026	V	(					
			OR				Current actuator torque (See Look-up table #P2B93-2)	>=	134	Ncm		
			(				Suspect for reaching mechanical maximum bound of valve	=	TRUE	-		
			Average sensor voltage from turbine bypass valve 1 position sensor	<	0.424	V	(					
			Average sensor voltage from turbine bypass valve 1 position sensor	>=	0.244	V	Internal desired value for governor	>	100	%		
			)				Actuator position is unchanged	=	TRUE	-		
			)				(					
			)				Absolute value of the gradient of the actuator speed	<	350	mV/s		
			OR				for events	=	2	-		
			(				)					
			Slope of the sensor	>=	0		)					
			Actuator position is set at 0% which means that actuator is closed	=	FALSE	-	)					
			(				for time		0.01	sec		
			Average sensor voltage from turbine bypass valve 1 position sensor	<	0.424	V	)					
			OR				Offset learning is active	=	TRUE	-		
			(				(					
			Average sensor voltage from turbine bypass valve 1 position sensor	>	2.0026	V	Battery voltage	>=	9	V		
			Average sensor voltage from turbine bypass valve 1 position sensor	<=	4.0726	V	Battery voltage	<=	655.34	V		
			)				Environmental pressure[See Look Up Table #P2B93-3]	>	0	kPa		
			)				Engine is in running state	=	TRUE	-		
			)				for time		0	sec		
			OR				Air temperature	>=	-3549.94	deg C		
			(				Air temperature	<=	143.96	deg C		
			Slope of the sensor	<	0		Exhaust temperature	>=	-40.04	deg C		
			Actuator position is set at 0% which means that actuator is closed	=	TRUE	-	Exhaust temperature	<=	149.96	deg C		
			(				Engine temperature	<=	129.96	deg C		
			Average sensor voltage from turbine bypass valve 1 position sensor	<	0.424	V	Engine temperature	>=	-40.04	deg C		
			OR				Brake is not pressed	=	TRUE	-		
			(				Number of cycles since brake active	<=	0	-		
			Average sensor voltage from turbine bypass valve 1 position sensor	>	2.0026	V	Pressure disturbance	<	3276.7	kPa		
			Average sensor voltage from turbine bypass valve 1 position sensor	<=	4.0726	V	Injection quantity	<	327.67	mg/hub		
			)				Engine speed	<	3000	rpm		
			)				(					
			)				(					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
			)				Torque for offset learning based on actuator position where (A) Maximum of minimum torque required to perform offset learning at default position and negation of torque limitation value based on actuator position	<=	A	%		
			OR (									
			Raw learned value at the closed mechanical endstop	<=	4.0726	V	)					
			Raw learned value at the closed mechanical endstop	>=	0.244	V	OR					
			(				(					
			Raw learned value at the closed electrical endstop	>	2.0026	V	Torque for offset learning based on actuator position where	>=	A	%		
			OR									
			Raw learned value at the closed electrical endstop	<	0.244	V	(A) Minimum of minimum torque required to perform offset learning not at default position and torque limitation value based on actuator position					
			)				)					
			)				)					
							Clean and verify function is active	=	TRUE	-		
							Number of clean and verify function completed	>=	1	-		
							)					
							Timer for starting offset learning	>=	0.01	sec		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
							Basic enable conditions met	=	see sheet enable tables	-		
	P25B4	Monitoring of turbine bypass valve 1 jammed at closed position	Actual position of turbine bypass valve 1	>	50	%	(				continuous	2 Trips
							Control valve was detected as jammed	=	TRUE	-		
							for time	>	1	sec		
							)					
							Rapid heat-up mode	=	FALSE	-		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
							Basic enable conditions met	=	see sheet enable tables	-		
	P25B3	Monitoring of turbine bypass valve 1 jammed at open position	Actual position of turbine bypass valve 1	<=	50	%	(				continuous	2 Trips
							Control valve was detected as jammed	=	TRUE	-		
							for time	>	1	sec		
							)					
							Rapid heat-up mode	=	FALSE	-		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
							Basic enable conditions met	=	see sheet enable tables	-		
	P25B4	Monitoring of turbine bypass valve 1 jammed at closed position	Actual position of turbine bypass valve 1	>	50	%	(				continuous	2 Trips
							Control valve was detected as jammed	=	TRUE	-		
							for time	>	1	sec		
							)					
							Rapid heat-up mode	=	FALSE	-		
							No pending or confirmed DTCs	=	see sheet inhibit tables	-		
							Basic enable conditions met	=	see sheet enable tables	-		
	P2ABD	**Path 1:** Diagnoses the Turbine bypass valve H bridge circuit for over current fault	Current flow at any path of the H-bridge	>	5.75	A	Power stage (H-bridge circuit) is switched on	=	TRUE	-	1.5 sec continuous	2 Trips
							No open load diagnosis active	=	TRUE	-		
							Basic enable conditions met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No Pending or Confirmed DTCs	= see sheet inhibit tables -		
	P2ABD	**Path 2:** Diagnoses the Turbine bypass valve H bridge circuit for over temperature fault	Temperature within the H-bridge powerstage circuit	> 175 deg C	Power stage (H-bridge circuit) is switched on No open load diagnosis active Basic enable conditions met No Pending or Confirmed DTCs	= TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	1 sec continuous	2 Trips
	P103A	Diagnoses the Turbine bypass valve H bridge circuit for short circuit over load fault	Voltage low between signals H-bridge output 1 + 2 (indicates short circuit over load)	= Short over load: <= - between signal output 1 + 2	Power stage (H-bridge circuit) is switched on No open load diagnosis active Basic enable conditions met No Pending or Confirmed DTCs	= TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	1.5 sec continuous	2 Trips
	P1038	Diagnoses the Turbine bypass valve H bridge circuit for undervoltage fault	ECM internal voltage supply of turbine bypass valve/control circuit	< 3.1 V	Power stage (H-bridge circuit) is switched on No open load diagnosis active Basic enable conditions met No Pending or Confirmed DTCs	= TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	5 sec continuous	2 Trips
	P0246	Diagnoses the Turbine bypass valve H bridge low side driver circuit at out 1 for circuit high fault	Voltage high (indicates short circuit to battery)	= Short to power <= 0.5 - signal and controller power	Power stage (H-bridge circuit) is switched on No open load diagnosis active Basic enable conditions met No Pending or Confirmed DTCs	= TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	1.5 sec continuous	1 Trip
	P0245	Diagnoses the Turbine bypass valve H bridge high side driver circuit at out 1 for circuit low fault	Voltage low (indicates short circuit to ground)	= Short to ground: <= - between signal and controller ground	Power stage (H-bridge circuit) is switched on No open load diagnosis active Basic enable conditions met No Pending or Confirmed DTCs	= TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	1.5 sec continuous	1 Trip
	P0243	Diagnoses the Turbine bypass valve H bridge circuit for open circuit fault	Voltage low during driver OFF state (indicates open circuit)	= Open Circuit: >= 200 K - ECU pin and load	Power stage (H-bridge circuit) is switched off Engine speed ((Open Load Diagnosis during temporary Governor OFF: Absolute value of governor deviation Absolute value of desired valve position gradient Spring break detection) OR (Enable Open Load Diagnosis when actuator is deactivated: Soft shut active Actuator temporary active (Engine in Standby mode Engine state before current state afterrun OR Engine state afterrun for time))	= TRUE - <= 350 rpm < 0.0122 % <= 0 %/s = FALSE - = FALSE - = FALSE - = TRUE - = TRUE - = TRUE - >= 0.01 sec	1.5 sec continuous	1 Trip

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
							)							
							Basic enable conditions met	=	see sheet enable tables	-				
							No Pending or Confirmed DTCs	=	see sheet inhibit tables	-				
Turbocharge Wastegate Actuator - H-Bridge Leg 2 - B1	P30E9	Diagnoses the Turbine bypass valve H bridge high side driver circuit at out 2 for circuit high fault	Voltage high (indicates short circuit to battery)	=	Short to power: <= 0.5 signal and controller power	-	Power stage (H-bridge circuit) is switched on	=	TRUE	-	1.5	sec	continuous	1 Trip
							No open load diagnosis active	=	TRUE	-				
							Basic enable conditions met	=	see sheet enable tables	-				
							No Pending or Confirmed DTCs	=	see sheet inhibit tables	-				
	P30E8	Diagnoses the Turbine bypass valve H bridge high side driver circuit at out 2 for circuit low fault	Voltage low (indicates short circuit to ground)	=	Short to ground: <= between signal and controller ground	-	Power stage (H-bridge circuit) is switched on	=	TRUE	-	1.5	sec	continuous	1 Trip
							No open load diagnosis active	=	TRUE	-				
							Basic enable conditions met	=	see sheet enable tables	-				
							No Pending or Confirmed DTCs	=	see sheet inhibit tables	-				
Turbocharge Wastegate Actuator - H-Bridge Leg 1 - B2	P2B94	Monitoring of valve drift at closed position	(				Actuator is completely closed	=	TRUE	-			continuous	2 Trips
			(				(							
			Slope of the sensor	>=	0		Actuator position is set at 0% which means that actuator is closed	=	TRUE	-				
			Actuator position is set at 0% which means that actuator is closed	=	TRUE	-	(							
			(				Current actuator torque (See Look-up table #1)	<=	-134	Ncm				
			Average sensor voltage from turbine bypass valve 1 position sensor	>	2.0026	V	Suspect for reaching mechanical minimum bound of valve	=	TRUE	-				
			OR				(							
			(				Internal desired value for governor	<	0	%				
			Average sensor voltage from turbine bypass valve 1 position sensor	<	0.424	V	Actuator position is unchanged	=	TRUE	-				
			Average sensor voltage from turbine bypass valve 1 position sensor	>=	0.244	V	(							
			)				Absolute value of the gradient of the actuator speed	<	350	mV/s				
			)				for events	=	2	-				
			)				)							
			OR				)							
			(				)							
			Slope of the sensor curve	<	0		for time		0.01	sec				
			Actuator position is set at 0% which means that actuator is closed	=	FALSE	-	OR							
			(				Actuator position is set at 0% which means that actuator is closed	=	FALSE	-				
			Average sensor voltage from turbine bypass valve 1 position sensor	>	2.0026	V	(							
			OR				Current actuator torque (See Look-up table #2)	>=	134	Ncm				
			(				Suspect for reaching mechanical maximum bound of valve	=	TRUE	-				
			Average sensor voltage from turbine bypass valve 1 position sensor	<	0.424	V	(							
			Average sensor voltage from turbine bypass valve 1 position sensor	>=	0.244	V	Internal desired value for governor	>	100	%				
			)				Actuator position is unchanged	=	TRUE	-				
			)				(							
			)				Absolute value of the gradient of the actuator speed	<	350	mV/s				
			OR				for events	=	2	-				
			(				)							
			Slope of the sensor	>=	0		)							
			Actuator position is set at 0% which means that actuator is closed	=	FALSE	-	)							
			(				for time		0.01	sec				
			Average sensor voltage from turbine bypass valve 1 position sensor	<	0.424	V	)							
			OR				Offset learning is active	=	TRUE	-				
			(				(							
			Average sensor voltage from turbine bypass valve 1 position sensor	>	2.0026	V	Battery voltage	>=	9	V				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
			Average sensor voltage from turbine bypass valve 1 position sensor	<=	4.0726	V	Battery voltage	<=	655.34	V				
			)				Environmental pressure[See Look Up Table #3]	>	0	kPa				
			)				Engine is in running state	=	TRUE	-				
			)				for time		0	sec				
			OR				Air temperature	>=	-3549.94	deg C				
			(				Air temperature	<=	143.96	deg C				
			Slope of the sensor	<	0		Exhaust temperature	>=	-40.04	deg C				
			Actuator position is set at 0% which means that actuator is closed	=	TRUE	-	Exhaust temperature	<=	149.96	deg C				
			(				Engine temperature	<=	129.96	deg C				
			Average sensor voltage from turbine bypass valve 1 position sensor	<	0.424	V	Engine temperature	>=	-40.04	deg C				
			OR				Brake is not pressed	=	TRUE	-				
			(				Number of cycles since brake active	<=	0	-				
			Average sensor voltage from turbine bypass valve 1 position sensor	>	2.0026	V	Pressure disturbance	<	3276.7	kPa				
			Average sensor voltage from turbine bypass valve 1 position sensor	<=	4.0726	V	Injection quantity	<	327.67	mg/hub				
			)				Engine speed	<	3000	rpm				
			)				(							
			)				(							
			)				Torque for offset learning based on actuator position	<=	A	%				
			OR				where							
			(				(A) Maximum of minimum torque required to perform offset learning at default position and negation of torque limitation value based on actuator position							
			Raw learned value at the closed mechanical endstop	<=	4.0726	V	)							
			Raw learned value at the closed mechanical endstop	>=	0.244	V	OR							
			(				(							
			Raw learned value at the closed electrical endstop	>	2.0026	V	Torque for offset learning based on actuator position	>=	A	%				
			OR				where							
			Raw learned value at the closed electrical endstop	<	0.244	V	(A) Minimum of minimum torque required to perform offset learning not at default position and torque limitation value based on actuator position							
			)				)							
			)				)							
							Clean and verify function is active	=	TRUE	-				
							Number of clean and verify function completed	>=	1	-				
							)							
							Timer for starting offset learning	>=	0.01	sec				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P25B6	Monitoring of turbine bypass valve 2 jammed at closed position	Actual position of turbine bypass valve 2	>	50	%	(				1	sec	continuous	2 Trips
							Control valve was detected as jammed	=	TRUE	-				
							for time	>	1	sec				
							)							
							Rapid heat-up mode	=	FALSE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P25B5	Monitoring of turbine bypass valve 2 jammed at open position	Actual position of turbine bypass valve 2	<=	50	%	(				1	sec	continuous	2 Trips
							Control valve was detected as jammed	=	TRUE	-				
							for time	>	1	sec				
							)							
							Rapid heat-up mode	=	FALSE	-				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	P2ABE	Diagnoses the Turbine bypass valve H bridge circuit for over current fault	Current flow at any path of the H-bridge	> 5.75 A	Power stage (H-bridge circuit) is switched on No open load diagnosis active Basic enable conditions met No Pending or Confirmed DTCs	= TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	1.5 sec continuous	2 Trips
	P2ABE	Diagnoses the Turbine bypass valve H bridge circuit for over temperature fault	Temperature within the H-bridge powerstage circuit	> 175 deg C	Power stage (H-bridge circuit) is switched on No open load diagnosis active Basic enable conditions met No Pending or Confirmed DTCs	= TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	1 sec continuous	2 Trips
	P10BE	Diagnoses the Turbine bypass valve H bridge circuit for short circuit over load fault	Voltage low between signals H-bridge output 1 + 2 (indicates short circuit over load)	= Short over load: <= - between signal output 1 + 2	Power stage (H-bridge circuit) is switched on No open load diagnosis active Basic enable conditions met No Pending or Confirmed DTCs	= TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	1.5 sec continuous	2 Trips
	P10BD	Diagnoses the Turbine bypass valve H bridge circuit for undervoltage fault	ECM internal voltage supply of turbine bypass valve/control circuit	< 3.1 V	Power stage (H-bridge circuit) is switched on No open load diagnosis active Basic enable conditions met No Pending or Confirmed DTCs	= TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	5 sec continuous	2 Trips
	P0250	Diagnoses the Turbine bypass valve H bridge low side driver circuit at out 2 for circuit high fault	Voltage high (indicates short circuit to battery)	= Short to power <= 0.5 - signal and controller power	Power stage (H-bridge circuit) is switched on No open load diagnosis active Basic enable conditions met No Pending or Confirmed DTCs	= TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	1.5 sec continuous	1 Trip
	P0249	Diagnoses the Turbine bypass valve H bridge high side driver circuit at out 1 for circuit low fault	Voltage low (indicates short circuit to ground)	= Short to ground: <= - between signal and controller ground	Power stage (H-bridge circuit) is switched on No open load diagnosis active Basic enable conditions met No Pending or Confirmed DTCs	= TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	1.5 sec continuous	1 Trip
	P0247	Diagnoses the Turbine bypass valve H bridge circuit for open circuit fault	Voltage low during driver OFF state (indicates open circuit)	= Open Circuit: >= 200 K - ECU pin and load	Power stage (H-bridge circuit) is switched off Engine speed ((Open Load Diagnosis during temporary Governor OFF: Absolute value of governor deviation Absolute value of desired valve position gradient Spring break detection) OR (Enable Open Load Diagnosis when actuator is deactivated: Soft shut active Actuator temporary active (Engine in Standby mode	= TRUE - <= 350 rpm < 0,0122 % <= 0 %/s = FALSE - = FALSE - = FALSE - = TRUE -	1.5 sec continuous	1 Trip

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine state before current state afterrun OR Engine state afterrun for time))) Basic enable conditions met No Pending or Confirmed DTCs	= TRUE - = TRUE - >= 0.01 sec = see sheet enable tables - = see sheet inhibit tables -		
Turbocharge Wastegate Actuator - H-Bridge Leg 2 - B2	P30EB	Diagnoses the Turbine bypass valve H bridge low side driver circuit at out 2 for circuit high fault	Voltage high (indicates short circuit to battery)	= Short to power: <= 0.5 - signal and controller power	Power stage (H-bridge circuit) is switched on No open load diagnosis active Basic enable conditions met No Pending or Confirmed DTCs	= TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	1.5 sec continuous	1 Trip
	P30EA	Diagnoses the Turbine bypass valve H bridge high side driver circuit at out 2 for circuit low fault	Voltage low (indicates short circuit to ground)	= Short to ground: <= - between signal and controller ground	Power stage (H-bridge circuit) is switched on No open load diagnosis active Basic enable conditions met No Pending or Confirmed DTCs	= TRUE - = TRUE - = see sheet enable tables - = see sheet inhibit tables -	1.5 sec continuous	1 Trip
Engine Cooling Fan	P0692	Diagnoses Fan 1 control circuit low side driver circuit for circuit high fault	Voltage high during driver ON state (indicates short circuit to battery)	= Short to power: - between signal and controller power	Battery voltage for time No pending or confirmed DTCs Basic enable conditions met	> 10.9 V >= 0 sec = see sheet inhibit tables - = see sheet enable tables -	2 sec	2 Trips
	P0691	Diagnoses Fan 1 control circuit low side driver circuit for circuit low fault	Voltage low during driver OFF state (indicates short circuit to ground)	= Short to ground: <= - between signal and controller ground	Battery voltage for time No pending or confirmed DTCs Basic enable conditions met	> 10.9 V >= 0 sec = see sheet inhibit tables - = see sheet enable tables -	2 sec	2 Trips
	P0480	**Path 1:** Diagnoses Fan 1 control circuit low side driver circuit for open circuit fault	Voltage low during driver OFF state (indicates open circuit)	= Open Circuit: >= 200 K - ECU pin and load	Battery voltage for time No pending or confirmed DTCs Basic enable conditions met	> 10.9 V >= 0 sec = see sheet inhibit - = see sheet enable tables -	2 sec	1 Trip
	P0480	**Path 2:** Fan 1 control circuit over temperature	Fan 1 control circuit over temperature detected by ECM hardware	= TRUE -	ECM in pre-drive state ECM in post-drive state Battery voltage Battery voltage ECM in Prepare Shutdown state No pending or confirmed DTCs Basic enable conditions met	= FALSE - = FALSE - > 8.9 V < 36 V = FALSE - = see sheet inhibit tables - = see sheet enable tables -	1 sec	
ECM 5 Volt Sensor Reference - 1	P0641	Sensor supply voltage circuit over temperature	Circuit temperature	> 170 deg C	Ignition is ON No pending or confirmed DTCs	= TRUE - = see sheet inhibit tables -	0.5 sec Continous	1 Trip

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Basic enable conditions met	= see sheet enable tables -		
		Sensor supply voltage circuit overvoltage	Voltage ratio between supply voltage output and reference voltage (+5V)	> 1.06 -	Ignition is ON	= TRUE -	0.5 sec	
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
		Sensor supply voltage short circuit to ground	Supply voltage	< 1 V	Ignition is ON	= TRUE -	0.5 sec	
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
		Sensor supply voltage circuit undervoltage	Voltage ratio between supply voltage output and reference voltage (+5V)	< 0.94 -	Ignition is ON	= TRUE -	0.5 sec	
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
ECM 5 Volt Sensor Reference - 2	P0651	Sensor supply voltage circuit over temperature	Circuit Temperature	> 170 deg C	Ignition is ON	= TRUE -	0.5 sec Continous	1 Trip
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
		Sensor supply voltage circuit overvoltage	Voltage ratio between supply voltage output and reference voltage (+5V)	> 1.06 -	Ignition is ON	= TRUE -	0.5 sec	
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
		Sensor supply voltage short circuit to Ground	Supply voltage	< 1 V	Ignition is ON	= TRUE -	0.5 sec	
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
		Sensor supply voltage circuit undervoltage	Voltage ratio between supply voltage output and reference voltage (+5V)	< 0.94 -	Ignition is ON	= TRUE -	0.5 sec	
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
ECM 5 Volt Sensor Reference - 3	P0697	Sensor supply voltage circuit over temperature	Circuit Temperature	> 170 deg C	Ignition is ON	= TRUE -	0.5 sec Continous	1 Trip
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
		Sensor supply voltage circuit overvoltage	Voltage ratio between supply voltage output and reference voltage (+5V)	> 1.06 -	Ignition is ON	= TRUE -	0.5 sec	
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
		Sensor supply voltage short circuit to Ground	Supply voltage	< 1 V	Ignition is ON	= TRUE -	0.5 sec	
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
		Sensor supply voltage circuit undervoltage	Voltage ratio between supply voltage output and reference voltage (+5V)	< 0.94 -	Ignition is ON	= TRUE -	0.5 sec	
					No pending or confirmed DTCs	= see sheet inhibit tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Basic enable conditions met	= see sheet enable tables -		
ECM 5 Volt Sensor Reference - 4	P06A3	Sensor supply voltage circuit over temperature	Circuit Temperature	> 170 deg C	Ignition is ON No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	0.5 sec Continous	1 Trip
		Sensor supply voltage circuit overvoltage	Voltage ratio between supply voltage output and reference voltage (+5V)	> 1.06 -	Ignition is ON No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	0.5 sec	
		Sensor supply voltage short circuit to Ground	Supply voltage	< 1 V	Ignition is ON No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	0.5 sec	
		Sensor supply voltage circuit undervoltage	Voltage ratio between supply voltage output and reference voltage (+5V)	< 0.94 -	Ignition is ON No pending or confirmed DTCs Basic enable conditions met	= TRUE - = see sheet inhibit tables - = see sheet enable tables -	0.5 sec	
FTZM 5 Volt Sensor Reference - 1	P1176	The FTZM raw sensor reference voltage is measured and provided via CAN to the ECM. The ECM monitors value provided from the FTZM and is rationalized for Sensor Supply 1.	Following conditions for time FTZM reference 1 voltage (converted in ECM to percent of reference to rationalize) OR FTZM reference 1 voltage (converted in ECM to percent of reference to rationalize) OR | (a) - (b) | where: (a) is the filtered FTZM supply voltage 1 (b) is FTZM raw supply voltage 1	> 2 sec < 92.24854 % < 86.00006 % > 1.10016 % = calculated parameter - = measured parameter -	Ignition ON ECM and CAN bus awake for transmission (meaning CAN awaken by BCM or ECM) Battery Voltage No pending or confirmed DTCs Basic enabling conditions are met	= FALSE - = TRUE - > 0 V = see sheet inhibit tables - = see sheet enable tables -	40 counts Continuous	1 Trips
FTZM 5 Volt Sensor Reference - 2	P1177	The FTZM raw sensor reference voltage is measured and provided via CAN to the ECM. The ECM monitors value provided from the FTZM and is rationalized for Sensor Supply 2.	Following conditions for time FTZM reference 2 voltage (converted in ECM to percent of reference to rationalize) OR FTZM reference 2 voltage (converted in ECM to percent of reference to rationalize) OR | (a) - (b) | where: (a) is the filtered FTZM supply voltage 2 (b) is FTZM raw supply voltage 2	> 2 sec < 92.24854 % < 86.00006 % > 1.10016 % = calculated parameter - = measured parameter -	Ignition ON ECM and CAN bus awake for transmission (meaning CAN awaken by BCM or ECM) Battery Voltage No pending or confirmed DTCs Basic enabling conditions are met	= FALSE - = TRUE - > 0 V = see sheet inhibit tables - = see sheet enable tables -	40 counts Continuous	1 Trips
FTZM Fuel Level Sensor Reference - 1	P1178	The FTZM raw fuel level sensor 1 voltage is rationalized within the ECM by comparing the raw signal to an upper limit, lower limit, and the difference between the filtered and raw fuel level 1 voltage	Following conditions for time FTZM fuel level sensor 1 reference voltage (converted in ECM to percent of reference to rationalize) OR FTZM fuel level sensor 1 reference voltage (converted in ECM to percent of reference to rationalize) OR | (a) - (b) | where:	> 2 sec < 92.24854 % < 86.00006 % > 1.10016 %	Ignition ON ECM and CAN bus awake for transmission (meaning CAN awaken by BCM or ECM) Battery Voltage No pending or confirmed DTCs Basic enabling conditions are met	= FALSE - = TRUE - > 0 V = see sheet inhibit tables - = see sheet enable tables -	40 counts Continuous	1 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(a) is the filtered FTZM fuel level sensor 1 supply voltage (b) is the raw FTZM fuel level sensor 1 supply voltage	= calculated parameter - = measured parameter -				
FTZM Fuel Level Sensor Reference - 1	P1179	The FTZM raw sensor reference voltage is measured and provided via CAN to the ECM. The ECM monitors value provided from the FTZM and is rationalized for Sensor Supply 2.	Following conditions for time FTZM fuel level sensor 2 reference voltage (converted in ECM to percent of reference to rationalize) OR FTZM fuel level sensor 2 reference voltage (converted in ECM to percent of reference to rationalize) OR | (a) - (b) | where: (a) is the filtered FTZM fuel level sensor 2 supply voltage (b) is the raw FTZM fuel level sensor 2 supply voltage	> 2 sec < 92.24854 % < 86.00006 % > 1.10016 % = calculated parameter - = measured parameter -	Ignition ON ECM and CAN bus awake for transmission (meaning CAN awaken by BCM or ECM) Battery Voltage No pending or confirmed DTCs Basic enabling conditions are met	= FALSE - = TRUE - > 0 V = see sheet inhibit tables - = see sheet enable tables -	40 counts Continuous	1 Trips
ECM Main Relay	P0690	Detection of sticky main realy for non permanently supplied system	ECU is switched on after the Main Relay was not opened ECU was still powered during shutdown for time	= TRUE - > 0.5 sec	Current control state of the Main Relay is set to open Basic enable conditions met No pending or confirmed DTC's	= TRUE - = see sheet enable tables - = see sheet inhibit tables -	Execution Rate Once per driving cycle	1 Trip
	P0689	Monitoring of ECM/PCM Power Relay Circuit Low fault	ECU is switched off before "End of Shutdown" was reached for number of counts	= TRUE - > 3 counts	Engine is in running state End of shutdown was not reached Basic enable conditions met	= TRUE - = TRUE - = see sheet enable tables -	Execution Rate continuous	1 Trip
Auxiliary Coolant Pump Relay	P2603	Diagnoses supplementary coolant pump 1 low side driver circuit for circuit high fault	Output (driver) current	>= 1.2 A	Battery voltage for time Power stage (driver) is switched on No pending or confirmed DTCs Basic enable conditions met	> 10.9 V >= 0 sec = TRUE - = see sheet inhibit tables - = see sheet enable tables -	2 sec	2 Trips
	P2602	Diagnoses supplementary coolant pump 1 low side driver circuit for circuit low fault	Output (driver) voltage	<= 2.74 V	Battery voltage for time Power stage (driver) is switched off No pending or confirmed DTCs Basic enable conditions met	> 10.9 V >= 0 sec = TRUE - = see sheet inhibit tables - = see sheet enable tables -	2 sec	2 Trips
	P2600	Diagnoses supplementary coolant pump 1 low side driver circuit for open circuit fault	Output (driver) voltage Output (driver) voltage	> 3.26 V <= 4.7 V	Battery voltage for time Power stage (driver) is switched off No pending or confirmed DTCs Basic enable conditions met	> 10.9 V >= 0 sec = TRUE - = see sheet inhibit tables - = see sheet enable tables -	2 sec	2 Trips
	P2600	Diagnoses supplementary coolant pump 1 low side driver circuit for overtemperature fault	Low side driver component temperature	>= 165 degC	Battery voltage for time (Power stage (driver) is switched on OR Power stage (driver) is switched off due to overtemperature shutdown) No pending or confirmed DTCs	> 10.9 V >= 0 sec = TRUE - = TRUE - = see sheet inhibit tables -	2 sec	-

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required			MIL Illum.
							Basic enable conditions met	=	see sheet enable tables	-				
Idle Speed Control	P0507	Detects a negative deviation between commanded and current idle speed - engine operation mode: warm operation	(				ECU Sub-State in DRIVE	=	TRUE	-	5	sec	multiple	2 Trips
			Deviation of idle speed precontrol (set point - current) and Engine speed	<	-200	rpm	Engine start has finished	=	TRUE	-				
			Integral part of the idle speed control at its lower limit, which is the following conditions:				(No external torque demand (engine is running in idle))	=	TRUE	-				
			A - (B+C)	<=	3276.7	Nm	for time	>=	10	sec				
			Where: A: Maximum torque of idle speed control				Catalyst heating is active	=	FALSE	-				
			B: Precontrol of the drag torque					=	TRUE	-				
			C: Current idle speed governor torque				Safety fuel cut off is not active	=	TRUE	-				
			)				Valid crankshaft signal is present	=	TRUE	-				
			OR				Altitude correction factor	>	0	-				
			Number of fuel cut-out phases	>=	255	counts	Vehicle speed	=	0	mph				
							Intake air temperature	>	-39.8	deg C				
							Engine coolant temperature	<=	143.3	deg C				
							Engine coolant temperature	>=	-39.8	deg C				
							Time after end of start	>=	0	sec				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enabling conditions are met	=	see sheet enable tables	-				
	P0506	Detects a positive deviation between commanded and current idle speed - engine operation mode: warm operation	Deviation of idle speed precontrol (set point - current) and Engine speed	>	100	rpm	ECU Sub-State in DRIVE	=	TRUE	-	5	sec	multiple	2 Trips
			Integral part of the idle speed control at its upper limit, which is the following conditions:				Engine start has finished	=	TRUE	-				
			(A+B)-C	<=	3276.7	Nm	(No external torque demand (engine is running in idle))	=	TRUE	-				
							for time	>=	10	sec				
			Where: A: Maximum torque of idle speed control				Catalyst heating is active	=	FALSE	-				
			B: Precontrol of the drag torque					=	TRUE	-				
			C: Current idle speed governor torque				Safety fuel cut off is not active	=	TRUE	-				
							Valid crankshaft signal is present	=	TRUE	-				
							Altitude correction factor	>	0	-				
							Vehicle speed	=	0	mph				
							Intake air temperature	>	-39.8	deg C				
							Engine coolant temperature	<=	143.3	deg C				
							Engine coolant temperature	>=	-39.8	deg C				
							Time after end of start	>=	0	sec				
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enabling conditions are met	=	see sheet enable tables	-				
Turbocharger Boost System	P0234	Monitoring of the delta-boost pressure control deviation against rationality threshold for overcharge detection	Delta-boost pressure control deviation (see Look-Up-Table #P0234-1)	>	37.3 to 223.5	kPa	Measured pressure at upstream throttle valve is valid	=	TRUE	-	1.5	sec	Continuous	2 Trips
							No pending or confirmed DTCs	=	see sheet inhibit tables	-				
							Basic enable conditions met	=	see sheet enable tables	-				
	P0299	Monitoring of the delta-boost pressure control deviation against rationality threshold for undercharge detection		>=	30	kPa	((Boost pressure control is active	=	TRUE	-			Continuous	2 Trips
							((Difference between desired pressure of upstream throttle valve of bank 1 and minimum pressure after air filter	>	2	kPa				
							OR Difference between desired pressure of upstream throttle valve of bank 2 and minimum pressure after air filter	>	2	kPa				
							) Engine end of start reached	=	TRUE	-				
							Enabling condition for lifting boost pressure actuator	=	TRUE	-				
							(Vehicle is in idle condition	=	TRUE	-				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					(			
					Difference between propulsion torque of cruise control and driver torque propulsion after step limitation	< 0.5 Nm		
					OR			
					Coordinated status of acceleration request	= FALSE -		
					)			
					Difference between minimum wheel torque with internal combustion engine firing and driver torque value after limitation	>= 0 Nm		
					)			
					Enabling condition to detect DLDR minimum error due to cross effects	= TRUE -		
					(			
					monitoring for bank 1 is active	= FALSE -		
					Limp-home mode request from throttle valve monitoring for bank 1 is active	= FALSE -		
					monitoring for bank 2 is active	= FALSE -		
					Limp-home mode request from throttle valve monitoring for bank 2 is active	= FALSE -		
					Measured pressure upstream throttle valve is valid	= TRUE -		
					Measured pressure of intake manifold is valid	= TRUE -		
					)			
					)			
					Engine speed (see Look-Up-Table #P0299-1)	> 1720 to 2560 rpm		
					Difference between desired pressure of upstream throttle valve and base boost pressure	> 10 kPa		
					Ambient Pressure	> 60 kPa		
					Difference between desired throttle position of bank 1 and the actual throttle angle during which 95% is reached, Wide open throttle is active	> 0 -		
					)			
					for time	>= 1.5 sec		
					)			
					Time counter for delta boost pressure control deviation calculation	> 3 sec		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P02CA	Monitoring of the delta-boost pressure control deviation of bank 2 against rationality threshold for overcharge detection	Delta-boost pressure control deviation of bank 2 (see Look-Up-Table #P02CA-1)	> 33.4 to 201.9 kPa	Measured pressure at upstream throttle valve is valid	= TRUE -	1.5 sec Continuous	2 Trips
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enable conditions met	= see sheet enable tables -		
	P02CB	Monitoring of the delta-boost pressure control deviation of bank 2 against rationality threshold for undercharge detection	bank 2	>= 30 kPa	(		Continuous	2 Trips
					(			
					Boost pressure control is active	= TRUE -		
					(			
					(			
					Difference between desired pressure of upstream throttle valve of bank 1 and minimum pressure after air filter	> 2 kPa		
					OR			
					Difference between desired pressure of upstream throttle valve of bank 2 and minimum pressure after air filter	> 2 kPa		
					)			
					Engine end of start reached	= TRUE -		
					Enabling condition for lifting boost pressure actuator	= TRUE -		
					(			
					Vehicle is in idle condition	= TRUE -		
					(			
					(			
					Difference between propulsion torque of cruise control and driver torque propulsion after step limitation	< 0.5 Nm		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					OR					
					No acceleration request	=	TRUE	-		
					)					
					Difference between minimum wheel torque with internal combustion engine firing and driver torque value after limitation	>=	0	Nm		
					)					
					Enabling condition to detect DLDR minimum error due to cross effects	=	TRUE	-		
					(					
						=	FALSE	-		
					monitoring for bank 1 is active					
					Limp-home mode request from throttle valve monitoring for bank 1 is active	=	FALSE	-		
						=	FALSE	-		
					monitoring for bank 2 is active					
					Limp-home mode request from throttle valve monitoring for bank 2 is active	=	FALSE	-		
					Measured pressure upstream throttle valve is valid	=	TRUE	-		
					Measured pressure of intake manifold is valid	=	TRUE	-		
					)					
					)					
					Engine speed (see Look-Up-Table #P0299-1)	>	1720 to 2560	rpm		
					Difference between desired pressure of upstream throttle valve and base boost pressure	>	10	kPa		
					Ambient Pressure	>	60	kPa		
					Difference between desired throttle position of bank 1 and the actual throttle angle during which 95% is reached, Wide open throttle is active	>	0	-		
					)					
					for time	>=	1.5	sec		
					)					
					Time counter for delta boost pressure control deviation calculation	>	3	sec		
					)					
					No pending or confirmed DTCs	=	see sheet inhibit tables	-		
					Basic enable conditions met	=	see sheet enable tables	-		

End of Table

Table no.	Label	Fault Codes
P0420-1	High window exhaust gas mass flow bank 1	P0420, P0430, P013A, P013E, P2270

rpm	1000	1500	2000	2500	3000	3500
kg/h	80	90	100	100	100	100

Table no.	Label	Fault Codes
P0420-2	Low window exhaust gas mass flow bank 1	P0420, P0430, P013A, P013E, P2270

rpm	1000	1500	2000	2500	3000	3500
kg/h	80	90	100	100	100	100

Table no.	Label	Fault Codes
P0420-3	integrated exhaust gas mass flow bank 2 since engine start	P0420, P0430, P013A, P013B, P013C, P013D, P013E, P013F, P014A, P014B, P2270, P2271, P2273

deg C	-40.04	-20.04	-10.04	19.96	39.96	89.96	119.96
kg	2.85	2.337	2.163	1.919	1.8	1.6	1.6

Table no.	Label	Fault Codes
P0420-4	engine load @ full engine mode	P0420, P0430, P013A, P013E, P2270

rpm	920	1000	1240	1520	1800	2000
%	19.992	15	12	12.492	12.492	12.492

Table no.	Label	Fault Codes
P0420-5	Threshold OSC normalization map bank 1	P0420

kg/h / deg C	450.06	500.06	550.06	600.06	650.06	700.06	750.06	800.06
10	100	100	100	122	146	152	165	165
20	102	102	102	125	146	152	172	172
30	110	110	110	137	160	162	175	175
40	118	118	118	142	168	170	182	182
50	128	128	128	152	175	180	190	190
60	132	132	132	158	180	190	200	200
70	136	136	136	160	185	195	205	205
90	136	136	136	160	190	195	205	205

Table no.	Label	Fault Codes
P0430-1	Threshold OSC normalization map bank 2	P0430

kg/h / deg C	450.06	500.06	550.06	600.06	650.06	700.06	750.06	800.06
10	100	100	100	122	146	152	165	165
20	102	102	102	125	146	152	172	172
30	110	110	110	137	160	162	175	175
40	118	118	118	142	168	170	182	182
50	128	128	128	152	175	180	190	190
60	132	132	132	158	180	190	200	200
70	136	136	136	160	185	195	205	205
90	136	136	136	160	190	195	205	205

Table no.	Label	Fault Codes
P0300-1	Method 1: Angular acceleration of crankshaft in idle state, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire	P0300,P0301,P0302,P0303,P0304,P0305,P0306,P0307,P0308

%	5.00031	6.50024	8.50067	10.00061	13.00049	17.99927
rad/s^2	95	110	140	150	170	180

Table no.	Label	Fault Codes
P0300-2	Method 3: Filtered angular acceleration of crankshaft in idle state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires	P0300,P0301,P0302,P0303,P0304,P0305,P0306,P0307,P0308

%	5.00031	6.50024	8.50067	10.00061	13.00049	17.99927
rad/s^2	105	105	135	135	135	135

Table no.	Label	Fault Codes
P0300-4	Method 1: Angular acceleration of crankshaft in transmission grip state (clutch is engaged), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire	P0300,P0301,P0302,P0303,P0304,P0305,P0306,P0307,P0308

rpm / %	8.00018	14.99939	25.99945	32.00073	39.99939	50	60.00061	69.99969
650	100	225	385	490	550	685	725	750
1200	90	230	395	495	570	700	740	780
1900	90	220	408.313	506.188	613	736	783	800
2700	106.313	198.125	393.438	491.5	597.75	756.125	1000	1050
3500	110	213.75	415	500	603.875	758	1000	1050
4200	115	235.375	410	515	605	704	920	1050
5000	120	241.625	438.063	532.313	649.75	795.75	1000	1050
5800	125	290	500	700	885	1050	1000	1050

Table no.	Label	Fault Codes
P0300-5	Method 3: Filtered angular acceleration of crankshaft in transmission grip state (clutch is engaged), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires	P0300,P0301,P0302,P0303,P0304,P0305,P0306,P0307,P0308

rpm / %	8.00018	14.99939	25.99945	32.00073	39.99939	50	60.00061	69.99969
650	60	90	210	255	250	275	275	275
1200	60	100	235	265	250	275	275	275
1900	80	150	255	285	250	345	345	345
2700	85	170	230	285	325	370	843	843
3500	85	125	240	300	375	375	895	895
4200	85	115	255	310	405	465	843	843
5000	85	165	240	295	405	600	945	945
5800	85	165	320	370	445	815	913.375	913.375

Table no.	Label	Fault Codes
P0300-7	Method 1: Angular acceleration of crankshaft in transmission open state (clutch is disengaged), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire	P0300,P0301,P0302,P0303,P0304,P0305,P0306,P0307,P0308

rpm / %	8.00018	14.99939	25.99945	32.00073	39.99939	50	60.00061	69.99969
650	100	225	385	490	550	685	725	750
1200	113.375	230	395	495	570	700	740	780
1900	110	220	408.313	506.188	613	736	783	800
2700	106.313	198.125	393.438	491.5	597.75	756.125	1000	1050
3500	110	213.75	415	500	603.875	758	1000	1050
4200	115	235.375	410	515	605	704	920	1050
5000	120	241.625	438.063	532.313	649.75	795.75	1000	1050
5800	125	290	500	700	885	1050	1000	1050

Table no.	Label	Fault Codes
P0300-8	Method 3: Filtered angular acceleration of crankshaft in transmission open state (clutch is disengaged), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires	P0300,P0301,P0302,P0303,P0304,P0305,P0306,P0307,P0308

rpm / %	8.00018	14.99939	25.99945	32.00073	39.99939	50	60.00061	69.99969
650	90	90	210	255	250	275	275	275
1200	132	177	235	265	250	275	275	275
1900	162	255	255	285	250	345	345	345
2700	131	230	230	285	325	370	843	843
3500	125	240	240	300	375	375	895	895
4200	165	255	255	310	405	465	843	843
5000	165	240	240	295	405	600	945	945
5800	165	320	320	370	445	815	913.375	913.375

Table no.	Label	Fault Codes
P0300-10	Method 1: Angular acceleration of crankshaft in transmission slip state (clutch is slipping), compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire	P0300,P0301,P0302,P0303,P0304,P0305,P0306,P0307,P0308

rpm / %	8.00018	14.99939	25.99945	32.00073	39.99939	50	60.00061	69.99969
650	100	225	385	490	550	685	725	750
1200	113.375	230	395	495	570	700	740	780
1900	110	220	408.313	506.188	613	736	783	800
2700	106.313	198.125	393.438	491.5	597.75	756.125	1000	1050
3500	110	213.75	415	500	603.875	758	1000	1050
4200	115	235.375	410	515	605	704	920	1050
5000	120	241.625	438.063	532.313	649.75	795.75	1000	1050
5800	125	290	500	700	885	1050	1000	1050

Table no.	Label	Fault Codes
P0300-11	Method 3: Filtered angular acceleration of crankshaft in transmission slip state (clutch is slipping), compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires	P0300,P0301,P0302,P0303,P0304,P0305,P0306,P0307,P0308

rpm / %	8.00018	14.99939	25.99945	32.00073	39.99939	50	60.00061	69.99969
650	60	90	210	255	250	275	275	275
1200	60	100	235	265	250	275	275	275
1900	80	150	255	285	250	345	345	345
2700	85	170	230	285	325	370	843	843
3500	85	125	240	300	375	375	895	895
4200	85	115	255	310	405	465	843	843
5000	85	165	240	295	405	600	945	945
5800	85	165	320	370	445	815	913.375	913.375

Table no.	Label	Fault Codes
P0300-14	Method 1: Angular acceleration of crankshaft in half-engine mode state, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire	P0300,P0301,P0302,P0303,P0304,P0305,P0306,P0307,P0308

rpm / %	5.00031	10.00061	14.99939	17.99927	25	30.00031	35.00061	39.99939
650	74	190	250	300	400	500	2047.938	2047.938
1000	74	190	250	300	400	500	2047.938	2047.938
1500	74	190	293	335	400	500	2047.938	2047.938
2000	66	173	260	331	400	500	2047.938	2047.938
2500	100	173	260	334	400	500	2047.938	2047.938
3000	100	173	260	334	400	500	2047.938	2047.938
3500	2047.938	2047.938	2047.938	2047.938	2047.938	2047.938	2047.938	2047.938
4000	2047.938	2047.938	2047.938	2047.938	2047.938	2047.938	2047.938	2047.938

Table no.	Label	Fault Codes
P0300-15	Method 1: Angular acceleration of crankshaft in catalyst heating, compared to threshold primarily used to detect single random misfire as well as single cylinder continuous misfire	P0300,P0301,P0302,P0303,P0304,P0305,P0306,P0307,P0308

%	2.99988	5.99976	8.99963	11.99951	14.99939	17.99927
rad/s^2	161	165	250	275	275	275

Table no.	Label	Fault Codes
P0300-18	Method 3: Filtered angular acceleration of crankshaft in half-engine mode state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires	P0300,P0301,P0302,P0303,P0304,P0305,P0306,P0307,P0308

rpm / %	5.00031	10.00061	14.99939	17.99927	25	30.00031	35.00061	39.99939
650	100	200	300	400	500	600	2047.938	2047.938
1000	100	200	300	400	500	600	2047.938	2047.938
1500	82.063	200	300	400	500	600	2047.938	2047.938
2000	82.063	190.625	276	400	500	600	2047.938	2047.938
2500	60	190	276.125	400	500	600	2047.938	2047.938
3000	60	190	276.125	400	500	600	2047.938	2047.938
3500	2047.938	2047.938	2047.938	2047.938	2047.938	2047.938	2047.938	2047.938
4000	2047.938	2047.938	2047.938	2047.938	2047.938	2047.938	2047.938	2047.938

Table no.	Label	Fault Codes
P0300-19	Method 3: Filtered angular acceleration of crankshaft in catalyst heating state, compared to threshold primarily used to detect various forms of single cylinder and multiple cylinder continuous misfires	P0300,P0301,P0302,P0303,P0304,P0305,P0306,P0307,P0308

%	2.99988	5.99976	8.99963	11.99951	14.99939	17.99927
rad/s^2	200	262	300	300	335	335

Table no.	Label	Fault Codes
P0300-20	[A] Threshold zero torque at crankshaft, driving state	P0300,P0301,P0302,P0303,P0304,P0305,P0306,P0307,P0308

rpm	650	1500	2000	2500	3000	4000	5000	6000
%	5.32074	6.06995	6.30035	7.09991	7.51038	10.40039	14.05029	16.07971

Table no.	Label	Fault Codes
P0300-23	[D] Threshold zero torque at crankshaft, idle state	P0300,P0301,P0302,P0303,P0304,P0305,P0306,P0307,P0308

rpm	650	1500	2000	2500	3000	4000	5000	6000
%	4.2572	4.85535	5.03998	5.67932	6.00891	6.52008	6.52008	6.52008

Table no.	Label	Fault Codes
P0300-24	[E] Threshold zero torque, half-engine mode state, driving	P0300,P0301,P0302,P0303,P0304,P0305,P0306,P0307,P0308

rpm	650	1500	2000	2500	3000	4000	5000	6000
%	2.00043	4.89044	5.11932	5.52979	5.90057	5.90057	5.90057	5.90057

Table no.	Label	Fault Codes
P0300-25	[F] Threshold zero torque, half-engine mode state, idle	P0300,P0301,P0302,P0303,P0304,P0305,P0306,P0307,P0308

rpm	650	1500	2000	2500	3000	4000	5000	6000
%	2.00043	4.89044	5.11932	5.52979	5.90057	5.90057	5.90057	5.90057

Table no.	Label	Fault Codes
P0300-26	Map for zero torque correction, engine speed and altitude dependant	P0300,P0301,P0302,P0303,P0304,P0305,P0306,P0307,P0308

- / rpm / %	650	1500	2500	3000	4000
0.641	-1.58081	-1.26953	-0.90027	-0.99945	-1.66016
0.953	0	0	0	0	0

Table no.	Label	Fault Codes
P0422-1	Difference between max. tank differential pressure & min. tank differential pressure (A-B)	P0442

l / °C	-7.5	-2.3	3.8	9	14.3	20.3	25.5	30.8	36.8
8	5.50049	5.50049	5.50049	5.50049	5.50049	5.50049	5.50049	5.50049	5.50049

Table no. **Label** **Fault Codes**

15	4.49951	4.49951	4.49951	4.49951	4.49951	4.49951	4.49951	4.49951	4.49951
22	4.00024	4.00024	4.00024	4.00024	4.00024	4.00024	4.00024	4.00024	4.00024
29	3.49976	3.49976	3.49976	3.49976	3.49976	3.49976	3.49976	3.49976	3.49976
36	5	5	5	5	5	5	5	5	5
43	5	5	5	5	5	5	5	5	5
50	3.49976	3.49976	3.49976	3.49976	3.49976	3.49976	3.49976	3.49976	3.49976
57	3.00049	3.00049	3.00049	3.00049	3.00049	3.00049	3.00049	3.00049	3.00049
64	3.00049	3.00049	3.00049	3.00049	3.00049	3.00049	3.00049	3.00049	3.00049

P0422-2 Tank pressure gradient — P0442

L	7.5	14	20.5	27	33.5	40	46.5	53	59.5	66
hPa/sec	0.004196	0.005984	0.009608	0.009608	0.009608	0.009608	0.014997	0.018001	0.018001	0.018001

P2177-1 Torque commanded to charge control — P2177, P2178, P2179, P2180, P2187, P2188, P2189, P2190

Engine Speed (rpm)	0	4160	4800	4840
Torque change (%)	44.99969	44.99969	39.99939	0

P2177-2 Torque commanded to charge control — P2177, P2178, P2179, P2180, P2187, P2188, P2189, P2190

Engine Speed (rpm)	760	920	1120	6000
Torque change (%)	99.98932	35.00061	8.00018	8.00018

P2177-5 Blocking time for activation LC after acceleration enrichment — P2177, P2178, P2179, P2180, P2E68, P2E69, P2E6A, P2E6B, P2187, P2188, P2189, P2190

Temperature (Grad C)	-39.8	-20.3	-9.8	0	20.3	39.8	60	90
Time (s)	1	1	1	1	0.5	0.4	0.3	0.3

P2177-6 Blocking time for activation LC after deceleration enleanment — P2177, P2178, P2179, P2180, P2E68, P2E69, P2E6A, P2E6B, P2187, P2188, P2189, P2190

Temperature (Grad C)	-39.8	-20.3	-9.8	0	20.3	39.8	60	90
Time (s)	1	1	1	1	0.5	0.5	0.5	0.5

P2E68-1 Torque commanded to charge control — P2E68, P2E69, P2E6A, P2E6B

Engine Speed (rpm)	1000	1160	2320	2520
Torque change (%)	0	30.00031	30.00031	2.99988

P2E68-2 Torque commanded to charge control — P2E68, P2E69, P2E6A, P2E6B

Engine Speed (rpm)	1000	1200	1400	2520
Torque change (%)	99.98932	8.99963	3.99933	3.99933

P2187-1 Torque commanded to charge control — P2187, P2188, P2189, P2190

rpm	0	800	920	960
%	14.99939	14.99939	11.99951	0

P2187-2 Torque commanded to charge control — P2187, P2188, P2189, P2190

rpm	440	480	600	6000
%	99.98932	3.99933	3.99933	3.99933

P2096-2 Relative air mass — P2096, P2097, P2098, P2099, P2195, P2196, P2197, P2198

rpm	800	1000	1200	1400	1800	2400	2600	3600
%	90	90	80.3	75	60	50.3	39.8	30

P2096-3 Relative air mass — P2096, P2097, P2098, P2099, P2195, P2196, P2197, P2198

rpm	800	1000	1200	1400	1800	2400	2600	3600
%	20.3	20.3	20.3	20.3	20.3	20.3	24.8	24.8

P2096-4 Relative air mass — P2096, P2097, P2098, P2099, P2195, P2196, P2197, P2198

rpm	800	1000	1200	1400	1800	2400	2600	3600
%	90	90	87	87	84.8	75	40.5	30

P2096-5 Relative air mass — P2096, P2097, P2098, P2099, P2195, P2196, P2197, P2198

rpm	800	1000	1200	1400	1800	2400	2600	3600

Table no.	Label	Fault Codes						
%	15	15	15	15	15	20.3	20.3	20.3

P2237-1 Ratio of heat quantity for dew-point end detection sensor 1 and heat quantity threshold for dew-point end detection sensor 1 bank 1 — P2237

deg C / deg C	-40.04	-10.04	-0.04	9.96	19.96	59.96	99.96
-40.04	0.40625	0.203125	0.203125	0	0	0	0
-10.04	0.203125	0.203125	0.101563	0	0	0	0
-0.04	0.203125	0.101563	0.101563	0	0	0	0
9.96	0	0	0	0	0	0	0
19.96	0	0	0	0	0	0	0
59.96	0	0	0	0	0	0	0
99.96	0	0	0	0	0	0	0

P2240-1 Ratio of heat quantity for dew-point end detection sensor 1 and heat quantity threshold for dew-point end detection sensor 1 bank 2 — P2240

deg C / deg C	-40.04	-10.04	-0.04	9.96	19.96	59.96	99.96
-40.04	0.40625	0.203125	0.203125	0	0	0	0
-10.04	0.203125	0.203125	0.101563	0	0	0	0
-0.04	0.203125	0.101563	0.101563	0	0	0	0
9.96	0	0	0	0	0	0	0
19.96	0	0	0	0	0	0	0
59.96	0	0	0	0	0	0	0
99.96	0	0	0	0	0	0	0

P0138-1 (b) Downstream O2 sensor heat threshold for release of heating (kJ) — P0138, P0036, P0037, P0038

deg C / deg C	-40.04	-10.04	-5.04	-0.04	9.96	19.96	29.96	44.96	59.96	99.96
-40.04	120	120	108	100	80	80	72	60	53	40
-10.04	120	80	72	68	64	64	58	48	43	32
-5.04	120	80	68	64	60	58	56	47	41	31
-0.04	120	80	64	62	58	56	54	45	40	30
9.96	120	80	62	60	48	48	43	36	32	24
19.96	120	72	56	54	43	36	35	29	26	20
29.96	120	64	50	48	38	31	27	24	9	9
59.96	120	64	46	42	34	27	21	15	0	0
79.96	120	64	40	36	29	23	18	9	0	0
99.96	120	60	40	36	29	23	18	9	0	0

P0138-2 (c) adjustment factor — P0138, P0036, P0037, P0038

deg C	-20.04	-0.04	19.96	54.96
-	0.4	0.5	0.25	0

P0138-3 (b) Downstream O2 sensor heat threshold for release of heating (kJ) — P0138, P0036, P0037, P0038

deg C / deg C	-40.04	-10.04	-5.04	-0.04	9.96	19.96	29.96	44.96	59.96	99.96
-40.04	96	88	84	80	74	74	74	74	68	64
-10.04	96	64	57	54	52	52	52	50	36	32
-5.04	96	64	52	48	47	45	45	42	30	25
-0.04	96	64	50	42	40	38	36	34	27	20
9.96	96	60	48	40	36	33	30	24	18	12
19.96	96	60	48	39	34	28	24	20	12	4
29.96	96	60	48	39	34	26	21	15	0	0
59.96	96	56	46	39	33	24	20	12	0	0
79.96	96	56	46	39	32	22	18	9	0	0
99.96	96	54	46	39	29	21	15	6	0	0

P0138-4 (c) adjustment factor — P0138, P0036, P0037, P0038

deg C	-20.04	-0.04	19.96	54.96
-	0.4	0.5	0.25	0

P0158-1 (b) Downstream O2 sensor heat threshold for release of heating (kJ) — P0158, P0056, P0057, P0058

deg C / deg C	-40.04	-10.04	-5.04	-0.04	9.96	19.96	29.96	44.96	59.96	99.96
-40.04	120	120	108	100	80	80	72	60	53	40
-10.04	120	80	72	68	64	64	58	48	43	32
-5.04	120	80	68	64	60	58	56	47	41	31
-0.04	120	80	64	62	58	56	54	45	40	30
9.96	120	80	62	60	48	48	43	36	32	24
19.96	120	72	56	54	43	36	35	29	26	20
29.96	120	64	50	48	38	31	27	24	9	9
59.96	120	64	46	42	34	27	21	15	0	0
79.96	120	64	40	36	29	23	18	9	0	0
99.96	120	60	40	36	29	23	18	9	0	0

Table no.	Label	Fault Codes
P0158-2	(c) adjustment factor	P0158. P0056. P0057. P0058

deg C	-20.04	-0.04	19.96	54.96
-	0.4	0.5	0.25	0

Table no.	Label	Fault Codes
P0158-3	(b) Downstream O2 sensor heat threshold for release of heating (kJ)	P0158, P0056, P0057, P0058

deg C / deg C	-40.04	-10.04	-5.04	-0.04	9.96	19.96	29.96	44.96	59.96	99.96
-40.04	96	88	84	80	74	74	74	74	68	64
-10.04	96	64	57	54	52	52	52	50	36	32
-5.04	96	64	52	48	47	45	45	42	30	25
-0.04	96	64	50	42	40	38	36	34	27	20
9.96	96	60	48	40	36	33	30	24	18	12
19.96	96	60	48	39	34	28	24	20	12	4
29.96	96	60	48	39	34	26	21	15	0	0
59.96	96	56	46	39	33	24	20	12	0	0
79.96	96	56	46	39	32	22	18	9	0	0
99.96	96	54	46	39	29	21	15	6	0	0

Table no.	Label	Fault Codes
P0158-4	(c) adjustment factor	P0158. P0056. P0057. P0058

deg C	-20.04	-0.04	19.96	54.96
-	0.4	0.5	0.25	0

Table no.	Label	Fault Codes
P013A-1	(b) Exhaust mass flow dependent correction for transition response time of secondary O2 S2B1 Lean to Rich	,

kg/h	10	30	40	60	80	120
s	0.06	0.06	0.06	0.07	0.07	0.07

Table no.	Label	Fault Codes
P013A-2	(b) Exhaust mass flow dependent correction for transition response time of secondary O2 S2B1 Rich to Lean	,

kg/h	10	30	40	60	80	120
s	0.05	0.07	0.07	0.1	0.1	0.1

Table no.	Label	Fault Codes
P0141-1	Internal resistance of Secondary O2 HEGO sensor bank 1	P0141,

- / °C	350.006	500.006	599.991	699.998	849.998
0.6	10000	3500	3150	3000	3000
0.65	1000	850	750	650	500
0.7	1000	850	750	650	500
0.85	1000	850	750	650	500
1	1000	850	750	650	500

Table no.	Label	Fault Codes
P0141-2	engine speed for normal, non-repeated, key starts	,

hPa / deg C	-40.04	-0.04	39.96	79.96
800	700	600	600	600
900	700	600	600	600
1000	700	600	600	600
1100	700	600	600	600

Table no.	Label	Fault Codes
P0141-3	engine speed fo rrepeated key starts and Stop-Start	,

hPa / deg C	-40.04	-0.04	39.96	79.96
800	700	600	500	500
900	700	600	500	500
1000	700	600	500	500
1100	700	600	500	500

Table no.	Label	Fault Codes
P0141-4	detection of end of start by engine speed threshold and injection counts	,

deg C	-40.04	-0.04	39.96	79.96
-	32	16	4	4

Table no.	Label	Fault Codes
P0161-1	Internal resistance of Secondary O2 HEGO sensor bank 2	P0161,

- / °C	350.006	500.006	599.991	699.998	849.998
0.6	10000	3500	3150	3000	3000
0.65	1000	850	750	650	500
0.7	1000	850	750	650	500
0.85	1000	850	750	650	500
1	1000	850	750	650	500

Table no.	Label		Fault Codes
P04DB-1	Charge pressure and air mass-dependent characteristic curve for calculating the monitoring limit of crankcase differential pressure		P04DB

kg/h / hPa	1045	1050	1450	1455	1877.969	1880	2580	2600
204	10	10	10	10	10	10	10	10
208	10	-1.95	-1.95	10	10	10	10	10
355	10	-1.95	-1.95	10	10	10	10	10
360	10	10	10	10	10	10	10	10
548	10	10	10	10	10	10	10	10
550	10	10	10	10	10	-4.2	-4.2	10
790	10	10	10	10	10	-4.2	-4.2	10
850	10	10	10	10	10	10	10	10

P04DB-2	Charge pressure and air mass-dependent characteristic diagram for the upper limit of the throttle valve to enable crankcase ventilation monitoring	AirMon_ratCrkcsVentDiagRelPosnThrVlvThdHi_M	P04DB

kg/h / hPa	1045	1050	1450	1455	1877.969	1880	2580	2600
204	0	0	0	0	0	0	0	0
208	0	101	101	0	0	0	0	0
355	0	101	101	0	0	0	0	0
360	0	0	0	0	0	0	0	0
548	0	0	0	0	0	0	0	0
550	0	0	0	0	0	101	101	0
790	0	0	0	0	0	101	101	0
850	0	0	0	0	0	0	0	0

P04DB-3	Charge pressure and air mass-dependent characteristic diagram for the lower limit of the throttle valve to enable crankcase ventilation monitoring	AirMon_ratCrkcsVentDiagRelPosnThrVlvThdLo_M	P04DB

kg/h / hPa	1045	1050	1450	1455	1877.969	1880	2580	2600
204	101	101	101	101	101	101	101	101
208	101	40	44	101	101	101	101	101
355	101	43	48	101	101	101	101	101
360	101	101	101	101	101	101	101	101
548	101	101	101	101	101	101	101	101
550	101	101	101	101	101	90	90	101
790	101	101	101	101	101	90	90	101
850	101	101	101	101	101	101	101	101

P0128-1	(d1) temperatue model correction dependent on vehicle speed and ambient temperature		,

km/h / deg C	-40.04	-15.04	-10.04	-0.04	19.96	39.96	59.96	79.96
0	-0.0000488	-0.0000488	-0.0000488	-0.0000488	-0.0000488	-0.0000488	-0.0000488	-0.0000488
30	-0.0370605	-0.0360596	-0.0350586	-0.0330566	-0.0310547	-0.0300537	-0.0290527	-0.0280518
50	-0.0520508	-0.0510498	-0.0500488	-0.0480469	-0.0460449	-0.0450439	-0.044043	-0.043042
80	-0.0570557	-0.0560547	-0.0550537	-0.0530518	-0.0510498	-0.0500488	-0.0490479	-0.0480469
120	-0.0630371	-0.0620605	-0.0610596	-0.0590576	-0.0570557	-0.0560547	-0.0550537	-0.0540527
150	-0.069043	-0.068042	-0.067041	-0.0650391	-0.0630371	-0.0620605	-0.0610596	-0.0600586
180	-0.0750488	-0.0740479	-0.0730469	-0.0710449	-0.069043	-0.068042	-0.067041	-0.06604
200	-0.0810547	-0.0800537	-0.0790527	-0.0770508	-0.0750488	-0.0740479	-0.0730469	-0.0720459

P0128-2	(c) correction factor for temperature difference over the radiator		,

K	-20	-10	0	5	10	15	20	25	30	35	40	50	60	75	90
deg C/s	0	0	0	0	0	0	0	0	0	0	0.0179932	0.0300049	0.05	0.075	0.1

P0128-3	(a) temperature increment depending on inner torque and ambient temperature		,

deg C / W	0	508.9	2507	4995.1	7502.1	10009.1	35003.6	70007.3	99996.9	150004.8	199993.8	250001.7
-5.04	0	0.0050049	0.05	0.075	0.0824951	0.0899902	0.1050049	0.125	0.15	0.1800049	0.2	0.2199951
29.96	0	0.0050049	0.051001	0.0764893	0.0841553	0.0917969	0.1071045	0.1274902	0.1530029	0.1835938	0.2040039	0.2243896

P0128-4	(b) Correction factor dependent on vehicle speed and ambient temperature		,

deg C / km/h	0	4	7	10	20	40	60	80	90	100	120	160
-40.04	1	1	1	1	1.040039	1.060059	1.089966	1.109985	1.130005	1.140015	1.150024	1.160034
-10.04	1	1	1	1	1.030029	1.050049	1.074951	1.094971	1.11499	1.125	1.13501	1.14502
9.96	1	1	1	1	1.02002	1.040039	1.060059	1.079956	1.099976	1.109985	1.119995	1.130005
29.96	1	1	1	1	1.001953	1.021973	1.041992	1.062012	1.082031	1.092041	1.102051	1.112061
39.96	1	1	1	1	1.000977	1.020996	1.041016	1.061035	1.081055	1.090942	1.100952	1.110962
69.96	1	1	1	1	1	1.02002	1.040039	1.060059	1.079956	1.089966	1.099976	1.109985

P0128-5	monitoring delay time since engine start		.

K	-40	-10	0	10	30	50	70	90
s	60	45	25	15	10	10	10	10

P050A-1	Temperature inside first brick of front catalyst during start		,

Table no. | **Label** | **Fault Codes**

-	0.200012	0.5	0.700012	1
deg C	439.96	429.96	419.96	399.96

P050B-1 Maximum time for active catalyst heating in dependence from altitude and engine start temperature — P050B, P053F, P05CC , P05CD

- / °C	-15.04	-10.04	-0.04	9.96	19.96	39.96
0.700012	45	45	42.5	40	40	25
0.799988	42.5	42.5	40	37.5	35	25
0.900024	40	40	37.5	35	30	25
1	40	40	35	30	25	25

P05CC-1 for time — P05CC , P05CD

deg C	-20.04	-0.04	19.96	39.96	59.96	79.96
s	4	4	3	2	2	2

P05CC-2 Engine Speed — P05CC , P05CD

deg C	-20.04	-0.04	119.96	139.96
rpm	1150	1000	1000	1000

P0111-1 Integrated Air mass flow — P0111

deg C	-30.04	-20.04	-0.04
kg	20.02	8.01	0.46

P0111-2 Difference between the maximum and the minimum intake air temperature values — P0111

deg C	-48.04	-39.74	-30.04	-20.24	-9.74	-0.04	9.76	24.76	39.76	50.26	59.96	69.76	80.26	89.96	99.76	110.26	119.96	129.76	140.26	143.26
deg C	1.56	1.56	1.56	1.36	1.16	0.66	0.36	0.36	0.36	0.46	0.56	0.76	0.96	1.06	1.16	1.16	1.16	1.16	1.16	1.16

P00AB-1 Integrated Air mass flow — P00AB

deg C	-30.04	-20.04	-0.04
kg	20.02	8.01	0.46

P00AB-2 Difference between the maximum and the minimum intake air temperature values — P00AB

deg C	-48.04	-39.74	-30.04	-20.24	-9.74	-0.04	9.76	24.76	39.76	50.26	59.96	69.76	80.26	89.96	99.76	110.26	119.96	129.76	140.26	143.26
deg C	1.56	1.56	1.56	1.36	1.16	0.66	0.36	0.36	0.36	0.46	0.56	0.76	0.96	1.06	1.16	1.16	1.16	1.16	1.16	1.16

P0096-1 Integrated Air mass flow — P0096

Deg C	-30.04	-20.04	-0.04
Kg	20.02	8.01	0.46

P0096-2 Difference between the maximum and the minimum intake air temperature values — P0096

deg C	-48.04	-39.74	-30.04	-20.24	-9.74	-0.04	9.76	24.76	39.76	50.26	59.96	69.76	80.26	89.96	99.76	110.26	119.96	129.76	140.26	143.26
deg C	1.96	1.96	1.96	1.76	1.56	1.06	0.76	0.76	0.76	0.86	0.96	1.16	1.36	1.46	1.56	1.56	1.56	1.56	1.56	1.56

P00A6-1 Integrated Air mass flow — P00A6

Deg C	-30.04	-20.04	-0.04
Kg	20.02	8.01	0.46

P00A6-2 Difference between the maximum and the minimum intake air temperature values — P00A6

deg C	-48.04	-39.74	-30.04	-20.24	-9.74	-0.04	9.76	24.76	39.76	50.26	59.96	69.76	80.26	89.96	99.76	110.26	119.96	129.76	140.26	143.26
deg C	1.96	1.96	1.96	1.76	1.56	1.06	0.76	0.76	0.76	0.86	0.96	1.16	1.36	1.46	1.56	1.56	1.56	1.56	1.56	1.56

P057B-1 difference of the brake sensor voltage corresponds to a corrected value of — ,

mV	0	34.6	35	40	45	51	51.2	4999	5000
-	0	0	0	0	0	0	1	1	1

P0191-1 difference threshold for plausibility error detection high pressure dual sensor — ,

-	0	1000	2000	3000	4000
-	241	241	250	260	290

Table no.	Label	Fault Codes
P0326-1		P0326, P0331, P032B, P033B

Engine Speed (rpm)	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500
Lower Threshold (V*ms)	0.525	0.675	0.75	0.825	0.9	0.975	0.9	0.975	1.05	1.125	1.2	1.275	1.35

Table no.	Label	Fault Codes
P0326-2		P0325, P0326, P032A, P032B, P0330, P0331, P033A, P033B, P06B6

Threshold (%) \ Engine Speed (rpm)	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500
45	120	120	120	120	120	120	120	100	100	100	100	100	100
60	120	120	120	120	120	120	120	100	100	100	100	100	100
100	120	120	120	120	120	120	120	100	100	100	100	100	100
140	240	240	240	240	240	240	240	200	200	200	200	200	200

Table no.	Label	Fault Codes
P2138-1	Curve to calculate permitted maximum for difference of signal voltages of Accelerator pedal sensor 1 and sensor 2	P2138

Accelerator Pedal Voltage (mV)	500	2100	2100.2
Permitted difference signal voltage between Accelerator Pedal sensor 1 and sensor 2 (mV)	120	180	180

Table no.	Label	Fault Codes
P0121-1	Absolute difference between relative actual angle calculated based on voltages from sensor 1 and sensor 2	P0121, P0221

%	0	5	10	15	100
%	5	5	6.25	6.25	6.25

Table no.	Label	Fault Codes
P0226-1	Absolute difference between relative actual angle calculated based on voltages from sensor 1 and sensor 2	P0226, P212B

%	0	5	10	15	100
%	5	5	6.25	6.25	6.25

Table no.	Label	Fault Codes
P0524-1	minimal required oil pressure depending on operation point	P0524

Engine coolant temp (degC)/Engine speed (rpm)	100	600	2500	3000	3500	4000	5000	6000
-0.04	-70	35	35	49	66	86	130	182
19.96	-70	35	35	49	66	86	130	182
39.96	-70	35	35	49	66	86	130	182
59.96	-70	35	35	49	66	86	130	182
79.96	-70	35	35	49	66	86	130	182
99.96	-70	35	35	49	66	86	130	182
119.96	-70	35	35	49	66	86	130	182
139.96	-70	35	35	49	66	86	130	182

Table no.	Label	Fault Codes
P0524-2	debounce time for low oil pressure warning	P0524

deg C	-40.04	-0.04	80.06	100.06
s	15	10	10	6

Table no.	Label	Fault Codes
P06DD-1	maximum threshold oil pressure control	P06DD

Engine coolant temp (degC)/Engine speed (rpm)	0	400	550	800	2400	2800	4000	4800	5400	6000
-40.04	800	800	300	300	300	300	300	300	300	300
-10.04	800	800	300	300	300	300	300	300	300	300
-0.04	800	800	100	100	100	100	100	100	100	100
19.96	800	800	100	100	100	100	100	100	100	100
39.96	800	800	100	100	100	100	100	100	100	100
59.96	800	800	100	100	100	100	100	100	100	100
79.96	800	800	100	100	100	100	100	100	100	100
99.96	800	800	100	100	100	100	100	100	100	100
119.96	800	800	100	100	100	100	100	100	100	100
149.96	800	800	100	100	100	100	100	100	100	100

Table no.	Label	Fault Codes
P06DD-2	minimum threshold oil pressure control	P06DD

Engine coolant temp (degC)/Engine speed (rpm)	0	400	550	800	2400	2800	4000	4800	5400	6000
-40.04	-800	-800	-300	-300	-300	-300	-300	-300	-300	-300
-10.04	-800	-800	-300	-300	-300	-300	-300	-300	-300	-300
-0.04	-800	-800	-70	-70	-70	-70	-70	-70	-70	-70
19.96	-800	-800	-70	-70	-70	-70	-70	-70	-70	-70
39.96	-800	-800	-70	-70	-70	-70	-70	-70	-70	-70
59.96	-800	-800	-50	-70	-70	-70	-70	-70	-70	-70
79.96	-800	-800	-50	-70	-70	-70	-70	-70	-70	-70
99.96	-800	-800	-40	-70	-70	-70	-70	-70	-70	-70

Table no.	Label	Fault Codes								
	119.96	-800	-800	-40	-70	-70	-70	-70	-70	-70	-70
	149.96	-800	-800	-40	-70	-70	-70	-70	-70	-70	-70

P0616-1 dynamic thresholds for SCG detection — P0616, P26E5

mV	4000	5000	6000	7000	8000	9000
mV	1950	2500	2950	3350	4000	4500

P2261-1 Ratio pressure downstream to upstream compressor — P2261,P00C4

dm^3/s	17.625	34.969	67.844	118.094	155.813	228.094
-	1.069946	1.50293	2.302979	2.735962	3.259033	3.445923

P2261-2 Ratio pressure downstream to upstream compressor (bank 2) — P2261,P00C4

dm^3/s	18.25	32.688	68.156	89.875	150.688	227.094
-	1.069946	1.505005	2.296997	2.69397	3.220947	3.407959

P2261-3 Set intake manifold pressure — P2261,P00C4

rpm	1000	2000	4000	6000
hPa	0	100	250	350

P3499-1 for time .

rpm	650	1000	1500	2000	2500	3000	4000
s	0.84	0.78	0.62	0.54	0.5	0.46	0.42

P3499-2 for time) ,

rpm	650	1000	1500	2000	2500	3000	4000
s	0.85	0.77	0.65	0.6	0.6	0.6	0.6

P3499-3 Characteristic line of debounce counter for error suspicion of undesired camshaft switch event ,

rpm	500	1000	1500	2000	2500	3000	4000
factor	6	6	7	8	9	10	10

P00C6-1 Fuel rail pressure

deg C	-40.04	-20.04	-10.04	-0.04	19.96	59.96	89.96	109.96
MPa	12	12	7	7	7	7	7	7

P00C6-2 for number of synchronous counts

deg C	-30.04	-20.04	-0.04	19.96	59.96	89.96
-	48	40	16	16	16	16

P00C6-3 for time

deg C	-30.04	-20.04	-0.04	19.96	59.96	89.96
s	6	5	4	3	2	2

P00C6-4 A: Number of working cycle during preinjection

deg C	-40.04	-10.04	-5.04
-	1	1	0

P0234-1 Delta-boost pressure control deviation

hPa	-600	-250	100	500	800	900	1000	1050
hPa	2235	1730	1376.016	607.031	372.969	515	515	402.969

P02CA-1 Delta-boost pressure control deviation of bank 2

hPa	-400	100	300	700	800	900	1000	1100
hPa	2018.984	1740	1350	570	375	375	333.984	452.031

P0171-1 Canister purge mass flow

-	0	0.25	0.5	1
kg/h	3	1	0.5	0

Table no.	Label	Fault Codes

P0299-1 Engine speed

hPa	650	980
rpm	2560	1720

P0628-1 Pre Supply Pump output voltage

mV	4000	5000	6000	7000	8000	9000
mV	1950	2500	2950	3350	4000	4500

P262B-4 Accumulated ecu-on-time since last ignition-off event

-	0	0.049805	0.100098	0.200195	0.299805	0.399902	0.5	0.600098	0.700195	0.799805	0.899902	1
s	120	180	240	600	1200	2400	3600	4800	6000	7200	8400	9600

P262B-2 Accumulated ecu-on-time since last ignition-off event

-	0	0.049805	0.100098	0.200195	0.299805	0.399902	0.5	0.600098	0.700195	0.799805	0.899902	1
s	120	180	240	600	1200	2400	3600	4800	6000	7200	8400	9600

P262B-3 Threshold value of calculated engine off time

-	0	0.0498	0.1001	0.1499	0.2002	0.2998	0.3999	0.5	0.6001	0.7002	0.7998	1
min	60	90	120	180	240	300	400	550	700	900	1200	2000

P262B-1 Threshold value of calculated engine off time

-	0	0.0498	0.1001	0.1499	0.2002	0.2998	0.3999	0.5	0.6001	0.7002	0.7998	1
min	0	0	0	10	20	40	80	160	240	300	360	420

P16D8-1 Power stage feedback voltage

mV	4000	5000	6000	7000	8000	9000
mV	1950	2500	2950	3350	4000	4500

Inhibit Matrix for Diagnostic System Manager

Note: If the same DTC appears in the 'Inhibited DTC' column and again the 'Fault Active DTCs' list, this indicates that the test is stopped for the remainder of the current drive cycle after test completion or fault detection occurs.

The DTCs in this column is inhibited by the DTCs listed to the right	The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left
Inhibited DTC	Fault Active DTCs						Fault Active DTCs						Fault Active DTCs						Fault Active DTCs
B071F - Transmission Range Indicator	END																		
B2A00 - Door Open Switch Signal - Door Ajar Switch Signal Correlation	END																		
B2B0D - Central Gateway Module Ignition Switch Run/Start Position Circuit Low	END																		
B2B0E - Central Gateway Module Ignition Switch Run/Start Position Circuit High	END																		
B2B11 - Central Gateway Module System Voltage Low	END																		
B2B12 - Central Gateway Module Control Module Memory	END																		
B2B13 - Central Gateway Module Control Module Internal Performance	END																		
P000A - Camshaft Position System Slow Response Bank 1	P0010 - Camshaft Position Actuator Control Circuit Open	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P0341 - Camshaft Position Sensor Performance	P0342 - Camshaft Position Sensor Circuit Low	P0343 - Camshaft Position Sensor Circuit High	P0346 - Intake Camshaft Position Sensor Performance Bank 2	P0347 - Intake Camshaft Position Sensor Circuit Low Bank 2	P0348 - Intake Camshaft Position Sensor Circuit High Bank 2	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0641 - Sensor Reference Voltage 1 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	END
P000B - Exhaust Camshaft Position System Slow Response Bank 1	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0366 - Exhaust Camshaft Position Sensor Performance Bank 1	P0367 - Exhaust Camshaft Position Sensor Circuit Low Bank 1	P0368 - Exhaust Camshaft Position Sensor Circuit High Bank 1	P0391 - Exhaust Camshaft Position Sensor Performance Bank 2	P0392 - Exhaust Camshaft Position Sensor Circuit Low Bank 2	P0393 - Exhaust Camshaft Position Sensor Circuit High Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	END
P000C - Intake Camshaft Position System Slow Response Bank 2	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P0341 - Camshaft Position Sensor Performance	P0342 - Camshaft Position Sensor Circuit Low	P0343 - Camshaft Position Sensor Circuit High	P0346 - Intake Camshaft Position Sensor Performance Bank 2	P0347 - Intake Camshaft Position Sensor Circuit Low Bank 2	P0348 - Intake Camshaft Position Sensor Circuit High Bank 2	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0641 - Sensor Reference Voltage 1 Circuit Open	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	END
P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0366 - Exhaust Camshaft Position Sensor Performance Bank 1	P0367 - Exhaust Camshaft Position Sensor Circuit Low Bank 1	P0368 - Exhaust Camshaft Position Sensor Circuit High Bank 1	P0391 - Exhaust Camshaft Position Sensor Performance Bank 2	P0392 - Exhaust Camshaft Position Sensor Circuit Low Bank 2	P0393 - Exhaust Camshaft Position Sensor Circuit High Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	END
P0010 - Camshaft Position Actuator Control Circuit Open	P0010 - Camshaft Position Actuator Control Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	END															
P0011 - Camshaft Position System Performance	P0010 - Camshaft Position Actuator Control Circuit Open	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P0341 - Camshaft Position Sensor Performance	P0342 - Camshaft Position Sensor Circuit Low	P0343 - Camshaft Position Sensor Circuit High	P0346 - Intake Camshaft Position Sensor Performance Bank 2	P0347 - Intake Camshaft Position Sensor Circuit Low Bank 2	P0348 - Intake Camshaft Position Sensor Circuit High Bank 2	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0641 - Sensor Reference Voltage 1 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	END
P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	END															
P0014 - Exhaust Camshaft Position System Performance Bank 1	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0366 - Exhaust Camshaft Position Sensor Performance Bank 1	P0367 - Exhaust Camshaft Position Sensor Circuit Low Bank 1	P0368 - Exhaust Camshaft Position Sensor Circuit High Bank 1	P0391 - Exhaust Camshaft Position Sensor Performance Bank 2	P0392 - Exhaust Camshaft Position Sensor Circuit Low Bank 2	P0393 - Exhaust Camshaft Position Sensor Circuit High Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	END
P0016 - Crankshaft to Camshaft Correlation	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P0341 - Camshaft Position Sensor Performance	P0342 - Camshaft Position Sensor Circuit Low	P0343 - Camshaft Position Sensor Circuit High	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	END									
P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0366 - Exhaust Camshaft Position Sensor Performance Bank 1	P0367 - Exhaust Camshaft Position Sensor Circuit Low Bank 1	P0368 - Exhaust Camshaft Position Sensor Circuit High Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	END									
P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P0346 - Intake Camshaft Position Sensor Performance Bank 2	P0347 - Intake Camshaft Position Sensor Circuit Low Bank 2	P0348 - Intake Camshaft Position Sensor Circuit High Bank 2	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	END									
P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0391 - Exhaust Camshaft Position Sensor Performance Bank 2	P0392 - Exhaust Camshaft Position Sensor Circuit Low Bank 2	P0393 - Exhaust Camshaft Position Sensor Circuit High Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	END									
P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	END															
P0021 - Intake Camshaft Position System Performance Bank 2	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P0341 - Camshaft Position Sensor Performance	P0342 - Camshaft Position Sensor Circuit Low	P0343 - Camshaft Position Sensor Circuit High	P0346 - Intake Camshaft Position Sensor Performance Bank 2	P0347 - Intake Camshaft Position Sensor Circuit Low Bank 2	P0348 - Intake Camshaft Position Sensor Circuit High Bank 2	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0641 - Sensor Reference Voltage 1 Circuit Open	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	END
P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	END															
P0024 - Exhaust Camshaft Position System Performance Bank 2	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0366 - Exhaust Camshaft Position Sensor Performance Bank 1	P0367 - Exhaust Camshaft Position Sensor Circuit Low Bank 1	P0368 - Exhaust Camshaft Position Sensor Circuit High Bank 1	P0391 - Exhaust Camshaft Position Sensor Performance Bank 2	P0392 - Exhaust Camshaft Position Sensor Circuit Low Bank 2	P0393 - Exhaust Camshaft Position Sensor Circuit High Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	END
P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	END																		
P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	END																		
P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	END																		
P0033 - Boost Bypass Valve A Control Circuit Open	END																		
P0034 - Boost Bypass Valve A Control Circuit Low	END																		
P0035 - Boost Bypass Valve A Control Circuit High	END																		
P0036 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 2	END																		
P0037 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 2	END																		
P0038 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 2	END																		
P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	END																		
P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	END																		
P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	END																		
P0056 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 2	END																		
P0057 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 2	END																		
P0058 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 2	END																		
P0071 - Ambient Air Temperature Sensor Performance	P0072 - Ambient Air Temperature Sensor Circuit Low	P0073 - Ambient Air Temperature Sensor Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	END												
P0072 - Ambient Air Temperature Sensor Circuit Low	END																		
P0073 - Ambient Air Temperature Sensor Circuit High	END																		
P0074 - Ambient Air Temperature Sensor Circuit Intermittent	P0072 - Ambient Air Temperature Sensor Circuit Low	P0073 - Ambient Air Temperature Sensor Circuit High	END																
P0089 - Fuel Pressure Regulator Performance	P0090 - Fuel Pressure Regulator Control Circuit Open	P0191 - Fuel Rail Pressure Sensor Performance	P10E8 - Fuel Pressure Regulator High Control Circuit Shorted to Control Circuit	P228C - Fuel Pressure Regulator Exceeded Control Limits - Pressure Too Low	P228D - Fuel Pressure Regulator Exceeded Control Limits - Pressure Too High	P2C02 - Fuel Pressure Regulator Control Circuit Open Bank 2	P313A - Fuel Pressure Regulator High Control Circuit Shorted to Control Circuit Bank 2	END											
P0090 - Fuel Pressure Regulator Control Circuit Open	END																		
P0091 - Fuel Pressure Regulator Control Circuit Low	END																		
P0092 - Fuel Pressure Regulator Control Circuit High	END																		

The DTCs in this column is inhibited by the DTCs listed to the right	The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left				
Inhibited DTC	Fault Active DTCs						Fault Active DTCs						Fault Active DTCs						Fault Active DTCs				
P0096 - Intake Air Temperature Sensor 2 Performance	P0097 - Intake Air Temperature Sensor 2 Circuit Low	P0098 - Intake Air Temperature Sensor 2 Circuit High	P0099 - Intake Air Temperature Sensor 2 Circuit Erratic	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	END			
P0097 - Intake Air Temperature Sensor 2 Circuit Low	END																						
P0098 - Intake Air Temperature Sensor 2 Circuit High	END																						
P0099 - Intake Air Temperature Sensor 2 Circuit Erratic	END																						
P00A6 - Intake Air Temperature Sensor 2 Performance Bank 2	P00A7 - Intake Air Temperature Sensor 2 Circuit Low Bank 2	P00A8 - Intake Air Temperature Sensor 2 Circuit High Bank 2	P00A9 - Intake Air Temperature Sensor 2 Circuit Erratic Bank 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	END			
P00A7 - Intake Air Temperature Sensor 2 Circuit Low Bank 2	END																						
P00A8 - Intake Air Temperature Sensor 2 Circuit High Bank 2	END																						
P00A9 - Intake Air Temperature Sensor 2 Circuit Erratic Bank 2	END																						
P00AB - Intake Air Temperature Sensor 1 Performance Bank 2	P00AC - Intake Air Temperature Sensor 1 Circuit Low Bank 2	P00AD - Intake Air Temperature Sensor 1 Circuit High Bank 2	P00AE - Intake Air Temperature Sensor 1 Circuit Erratic Bank 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0606 - Control Module Internal Performance	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	U0612 - Lost Communication With Intake Air Temperature Sensor Bank 2 Sensor 1	U1349 - Engine Control Module LIN Bus 5	CONTINUED NEXT LINE
	U1372 - Invalid Data Received From Intake Air Temperature Sensor Bank 2 Sensor 1	END																					
P00AC - Intake Air Temperature Sensor 1 Circuit Low Bank 2	END																						
P00AD - Intake Air Temperature Sensor 1 Circuit High Bank 2	END																						
P00AE - Intake Air Temperature Sensor 1 Circuit Erratic Bank 2	P00AC - Intake Air Temperature Sensor 1 Circuit Low Bank 2	P00AD - Intake Air Temperature Sensor 1 Circuit High Bank 2	P0606 - Control Module Internal Performance	U0612 - Lost Communication With Intake Air Temperature Sensor Bank 2 Sensor 1	U1349 - Engine Control Module LIN Bus 5	U1372 - Invalid Data Received From Intake Air Temperature Sensor Bank 2 Sensor 1	END																
P00C0 - Boost Bypass Valve B Control Circuit Open	END																						
P00C1 - Boost Bypass Valve B Control Circuit Low	END																						
P00C2 - Boost Bypass Valve B Control Circuit High	END																						
P00C6 - Fuel Rail Pressure Low During Engine Cranking	P0090 - Fuel Pressure Regulator Control Circuit Open	P0191 - Fuel Rail Pressure Sensor Performance	P10E8 - Fuel Pressure Regulator High Control Circuit Shorted to Control Circuit	P2C02 - Fuel Pressure Regulator Control Circuit Open Bank 2	P313A - Fuel Pressure Regulator High Control Circuit Shorted to Control Circuit Bank 2	END																	
P00C9 - Fuel Pressure Regulator High Control Circuit Low	END																						
P00CA - Fuel Pressure Regulator High Control Circuit High	END																						
P0101 - Mass Air Flow Sensor Performance	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0121 - Throttle Position Sensor Performance	CONTINUED NEXT LINE
	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0236 - Turbocharger Boost Sensor Performance	P0237 - Turbocharger Boost Sensor Circuit Low	P0238 - Turbocharger Boost Sensor Circuit High	P0240 - Turbocharger Boost Sensor Performance Bank 2	P0241 - Turbocharger Boost Sensor Circuit Low Bank 2	P0242 - Turbocharger Boost Sensor Circuit High Bank 2	P0638 - Throttle Actuator Control Command Performance	P0639 - Throttle Actuator Control Command Performance Bank 2	P1551 - Throttle Rest Position Not Reached During Learn	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	CONTINUED NEXT LINE
	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2100 - Throttle Actuator Control Motor Control Circuit Open	P2101 - Throttle Actuator Position Performance	P210A - Throttle Actuator Control Motor Control Circuit Open Bank 2	P210B - Throttle Actuator Position Performance Bank 2	P2119 - Throttle Closed Position Performance	P211D - Throttle Closed Position Performance Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2176 - Minimum Throttle Position Not Learned	P218A - Minimum Throttle Position Not Learned Bank 2	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	P222B - Barometric Pressure Sensor Performance Bank 2 Sensor 1	P222C - Barometric Pressure Sensor Circuit Low Bank 2 Sensor 1	P222D - Barometric Pressure Sensor Circuit High Bank 2 Sensor 1	P227B - Barometric Pressure Sensor Performance Bank 1 Sensor 2	P227C - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 2	CONTINUED NEXT LINE
	P227D - Barometric Pressure Sensor Circuit High Bank 1 Sensor 2	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P30D6 - Control Module Processor Serial Peripheral Interface Bus 1	P30D7 - Control Module Processor Serial Peripheral Interface Bus 2	P30E3 - Closed Throttle Position Exceeded Maximum Learning Limit	P30E4 - Closed Throttle Position Exceeded Minimum Learning Limit	P30E5 - Closed Throttle Position Exceeded Maximum Learning Limit Bank 2	P30E6 - Closed Throttle Position Exceeded Minimum Learning Limit Bank 2	P30E7 - Throttle Rest Position Not Reached During Learn Bank 2	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END							
P0102 - Mass Air Flow Sensor Circuit Low	END																						
P0103 - Mass Air Flow Sensor Circuit High	END																						
P0106 - Manifold Absolute Pressure Sensor Performance	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0096 - Intake Air Temperature Sensor 2 Performance	P0097 - Intake Air Temperature Sensor 2 Circuit Low	P0098 - Intake Air Temperature Sensor 2 Circuit High	P0099 - Intake Air Temperature Sensor 2 Circuit Erratic	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	CONTINUED NEXT LINE
	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0236 - Turbocharger Boost Sensor Performance	P0237 - Turbocharger Boost Sensor Circuit Low	P0238 - Turbocharger Boost Sensor Circuit High	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2176 - Minimum Throttle Position Not Learned	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	CONTINUED NEXT LINE
	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	END																				
P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0641 - Sensor Reference Voltage 1 Circuit Open	END																					
P0108 - Manifold Absolute Pressure Sensor Circuit High	P0641 - Sensor Reference Voltage 1 Circuit Open	END																					
P010B - Mass Air Flow Sensor 2 Performance	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0121 - Throttle Position Sensor Performance	CONTINUED NEXT LINE
	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0236 - Turbocharger Boost Sensor Performance	P0237 - Turbocharger Boost Sensor Circuit Low	P0238 - Turbocharger Boost Sensor Circuit High	P0240 - Turbocharger Boost Sensor Performance Bank 2	P0241 - Turbocharger Boost Sensor Circuit Low Bank 2	P0242 - Turbocharger Boost Sensor Circuit High Bank 2	P0638 - Throttle Actuator Control Command Performance	P0639 - Throttle Actuator Control Command Performance Bank 2	P1551 - Throttle Rest Position Not Reached During Learn	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	CONTINUED NEXT LINE
	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2100 - Throttle Actuator Control Motor Control Circuit Open	P2101 - Throttle Actuator Position Performance	P210A - Throttle Actuator Control Motor Control Circuit Open Bank 2	P210B - Throttle Actuator Position Performance Bank 2	P2119 - Throttle Closed Position Performance	P211D - Throttle Closed Position Performance Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2176 - Minimum Throttle Position Not Learned	P218A - Minimum Throttle Position Not Learned Bank 2	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	P222B - Barometric Pressure Sensor Performance Bank 2 Sensor 1	P222C - Barometric Pressure Sensor Circuit Low Bank 2 Sensor 1	P222D - Barometric Pressure Sensor Circuit High Bank 2 Sensor 1	P227B - Barometric Pressure Sensor Performance Bank 1 Sensor 2	P227C - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 2	CONTINUED NEXT LINE
	P227D - Barometric Pressure Sensor Circuit High Bank 1 Sensor 2	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P30D6 - Control Module Processor Serial Peripheral Interface Bus 1	P30D7 - Control Module Processor Serial Peripheral Interface Bus 2	P30E3 - Closed Throttle Position Exceeded Maximum Learning Limit	P30E4 - Closed Throttle Position Exceeded Minimum Learning Limit	P30E5 - Closed Throttle Position Exceeded Maximum Learning Limit Bank 2	P30E6 - Closed Throttle Position Exceeded Minimum Learning Limit Bank 2	P30E7 - Throttle Rest Position Not Reached During Learn Bank 2	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END							
P010C - Mass Air Flow Sensor 2 Circuit Low	END																						
P010D - Mass Air Flow Sensor 2 Circuit High	END																						
P0111 - Intake Air Temperature Sensor Performance	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0112 - Intake Air Temperature Sensor Circuit Low	P0113 - Intake Air Temperature Sensor Circuit High	P0114 - Intake Air Temperature Sensor Circuit Erratic	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0606 - Control Module Internal Performance	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	U0611 - Lost Communication With Intake Air Temperature Sensor Bank 1 Sensor 1	U1346 - Engine Control Module LIN Bus 2	CONTINUED NEXT LINE
	U1370 - Invalid Data Received From Intake Air Temperature Sensor 1	END																					
P0112 - Intake Air Temperature Sensor Circuit Low	END																						
P0113 - Intake Air Temperature Sensor Circuit High	END																						
P0114 - Intake Air Temperature Sensor Circuit Erratic	P0112 - Intake Air Temperature Sensor Circuit Low	P0113 - Intake Air Temperature Sensor Circuit High	P0606 - Control Module Internal Performance	U0611 - Lost Communication With Intake Air Temperature Sensor Bank 1 Sensor 1	U1346 - Engine Control Module LIN Bus 2	U1370 - Invalid Data Received From Intake Air Temperature Sensor 1	END																
P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	END																			
P0117 - Engine Coolant Temperature Sensor Circuit Low	END																						
P0118 - Engine Coolant Temperature Sensor Circuit High	END																						
P0119 - Engine Coolant Temperature Sensor Circuit Erratic	END																						
P0121 - Throttle Position Sensor Performance	P0641 - Sensor Reference Voltage 1 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	END																				
P0122 - Throttle Position Sensor Circuit Low	P0641 - Sensor Reference Voltage 1 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	END																				
P0123 - Throttle Position Sensor Circuit High	P0641 - Sensor Reference Voltage 1 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	END																				

The DTCs in this column is inhibited by the DTCs listed to the right	The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left				
Inhibited DTC	Fault Active DTCs						Fault Active DTCs						Fault Active DTCs						Fault Active DTCs				
P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P0071 - Ambient Air Temperature Sensor Performance	P0072 - Ambient Air Temperature Sensor Circuit Low	P0073 - Ambient Air Temperature Sensor Circuit High	P0074 - Ambient Air Temperature Sensor Circuit Intermittent	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	END														
P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	END										
P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	END										
P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0036 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 2	P0037 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 2	P0038 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0137 - Oxygen Sensor Circuit Low Bank 1 Sensor 2	P0138 - Oxygen Sensor Circuit High Bank 1 Sensor 2	P013A - Oxygen Sensor Slow Response - Rich to Lean Bank 1 Sensor 2	P013B - Oxygen Sensor Slow Response - Lean to Rich Bank 1 Sensor 2	P013E - Oxygen Sensor Delayed Response - Rich to Lean Bank 1 Sensor 2	CONTINUED NEXT LINE
	P013F - Oxygen Sensor Delayed Response - Lean to Rich Bank 1 Sensor 2	P0140 - Oxygen Sensor Circuit Insufficient Activity Bank 1 Sensor 2	P0141 - Oxygen Sensor Heater Performance Bank 1 Sensor 2	P0171 - Fuel Trim System Lean Bank 1	P0172 - Fuel Trim System Rich Bank 1	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	CONTINUED NEXT LINE
	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2177 - Fuel Trim System Lean Off Idle Bank 1	P2178 - Fuel Trim System Rich Off Idle Bank 1	P2187 - Fuel Trim System Lean at Idle Bank 1	P2188 - Fuel Trim System Rich at Idle Bank 1	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2232 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 2	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2270 - Oxygen Sensor Signal Stuck Lean Bank 1 Sensor 2	P2271 - Oxygen Sensor Signal Stuck Rich Bank 1 Sensor 2	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E68 - Fuel Trim System Lean During Cylinder Deactivation Bank 1	CONTINUED NEXT LINE
	P2E69 - Fuel Trim System Rich During Cylinder Deactivation Bank 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	CONTINUED NEXT LINE
	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END																		
P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P262B - Control Module Power Off Timer Performance	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	END
P0137 - Oxygen Sensor Circuit Low Bank 1 Sensor 2	END																						
P0138 - Oxygen Sensor Circuit High Bank 1 Sensor 2	P0036 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 2	P0037 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 2	P0038 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 2	END																			
P013A - Oxygen Sensor Slow Response - Rich to Lean Bank 1 Sensor 2	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0036 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 2	P0037 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 2	P0038 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0137 - Oxygen Sensor Circuit Low Bank 1 Sensor 2	P0138 - Oxygen Sensor Circuit High Bank 1 Sensor 2	P013A - Oxygen Sensor Slow Response - Rich to Lean Bank 1 Sensor 2	P013B - Oxygen Sensor Slow Response - Lean to Rich Bank 1 Sensor 2	P013E - Oxygen Sensor Delayed Response - Rich to Lean Bank 1 Sensor 2	P013F - Oxygen Sensor Delayed Response - Lean to Rich Bank 1 Sensor 2	P0140 - Oxygen Sensor Circuit Insufficient Activity Bank 1 Sensor 2	CONTINUED NEXT LINE
	P0141 - Oxygen Sensor Heater Performance Bank 1 Sensor 2	P0171 - Fuel Trim System Lean Bank 1	P0172 - Fuel Trim System Rich Bank 1	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	CONTINUED NEXT LINE
	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	CONTINUED NEXT LINE
	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2177 - Fuel Trim System Lean Off Idle Bank 1	P2178 - Fuel Trim System Rich Off Idle Bank 1	P2187 - Fuel Trim System Lean at Idle Bank 1	P2188 - Fuel Trim System Rich at Idle Bank 1	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2232 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 2	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2270 - Oxygen Sensor Signal Stuck Lean Bank 1 Sensor 2	P2271 - Oxygen Sensor Signal Stuck Rich Bank 1 Sensor 2	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E68 - Fuel Trim System Lean During Cylinder Deactivation Bank 1	P2E69 - Fuel Trim System Rich During Cylinder Deactivation Bank 1	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END				
P013B - Oxygen Sensor Slow Response - Lean to Rich Bank 1 Sensor 2	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0036 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 2	P0037 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 2	P0038 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0137 - Oxygen Sensor Circuit Low Bank 1 Sensor 2	P0138 - Oxygen Sensor Circuit High Bank 1 Sensor 2	P013A - Oxygen Sensor Slow Response - Rich to Lean Bank 1 Sensor 2	P013B - Oxygen Sensor Slow Response - Lean to Rich Bank 1 Sensor 2	P013E - Oxygen Sensor Delayed Response - Rich to Lean Bank 1 Sensor 2	CONTINUED NEXT LINE
	P013F - Oxygen Sensor Delayed Response - Lean to Rich Bank 1 Sensor 2	P0140 - Oxygen Sensor Circuit Insufficient Activity Bank 1 Sensor 2	P0141 - Oxygen Sensor Heater Performance Bank 1 Sensor 2	P0171 - Fuel Trim System Lean Bank 1	P0172 - Fuel Trim System Rich Bank 1	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	CONTINUED NEXT LINE
	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2177 - Fuel Trim System Lean Off Idle Bank 1	P2178 - Fuel Trim System Rich Off Idle Bank 1	P2187 - Fuel Trim System Lean at Idle Bank 1	P2188 - Fuel Trim System Rich at Idle Bank 1	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2232 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 2	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2270 - Oxygen Sensor Signal Stuck Lean Bank 1 Sensor 2	P2271 - Oxygen Sensor Signal Stuck Rich Bank 1 Sensor 2	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E68 - Fuel Trim System Lean During Cylinder Deactivation Bank 1	CONTINUED NEXT LINE
	P2E69 - Fuel Trim System Rich During Cylinder Deactivation Bank 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	CONTINUED NEXT LINE
	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END																		
P013C - Oxygen Sensor Slow Response - Rich to Lean Bank 2 Sensor 2	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0056 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 2	P0057 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 2	P0058 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P013C - Oxygen Sensor Slow Response - Rich to Lean Bank 2 Sensor 2	P013D - Oxygen Sensor Slow Response - Lean to Rich Bank 2 Sensor 2	P014A - Oxygen Sensor Delayed Response - Rich to Lean Bank 2 Sensor 2	P014B - Oxygen Sensor Delayed Response - Lean to Rich Bank 2 Sensor 2	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0157 - Oxygen Sensor Circuit Low Bank 2 Sensor 2	P0158 - Oxygen Sensor Circuit High Bank 2 Sensor 2	P0160 - Oxygen Sensor Circuit Insufficient Activity Bank 2 Sensor 2	CONTINUED NEXT LINE
	P0161 - Oxygen Sensor Heater Performance Bank 2 Sensor 2	P0174 - Fuel Trim System Lean Bank 2	P0175 - Fuel Trim System Rich Bank 2	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	CONTINUED NEXT LINE
	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	CONTINUED NEXT LINE
	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2179 - Fuel Trim System Lean Off Idle Bank 2	P2180 - Fuel Trim System Rich Off Idle Bank 2	P2189 - Fuel Trim System Lean at Idle Bank 2	P2190 - Fuel Trim System Rich at Idle Bank 2	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2235 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 2 Sensor 2	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2272 - Oxygen Sensor Signal Stuck Lean Bank 2 Sensor 2	P2273 - Oxygen Sensor Signal Stuck Rich Bank 2 Sensor 2	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E6A - Fuel Trim System Lean During Cylinder Deactivation Bank 2	P2E6B - Fuel Trim System Rich During Cylinder Deactivation Bank 2	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END				
P013D - Oxygen Sensor Slow Response - Lean to Rich Bank 2 Sensor 2	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0056 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 2	P0057 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 2	P0058 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P013C - Oxygen Sensor Slow Response - Rich to Lean Bank 2 Sensor 2	P013D - Oxygen Sensor Slow Response - Lean to Rich Bank 2 Sensor 2	P014A - Oxygen Sensor Delayed Response - Rich to Lean Bank 2 Sensor 2	P014B - Oxygen Sensor Delayed Response - Lean to Rich Bank 2 Sensor 2	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0157 - Oxygen Sensor Circuit Low Bank 2 Sensor 2	CONTINUED NEXT LINE
	P0158 - Oxygen Sensor Circuit High Bank 2 Sensor 2	P0160 - Oxygen Sensor Circuit Insufficient Activity Bank 2 Sensor 2	P0161 - Oxygen Sensor Heater Performance Bank 2 Sensor 2	P0174 - Fuel Trim System Lean Bank 2	P0175 - Fuel Trim System Rich Bank 2	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	CONTINUED NEXT LINE
	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2179 - Fuel Trim System Lean Off Idle Bank 2	P2180 - Fuel Trim System Rich Off Idle Bank 2	P2189 - Fuel Trim System Lean at Idle Bank 2	P2190 - Fuel Trim System Rich at Idle Bank 2	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2235 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 2 Sensor 2	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2272 - Oxygen Sensor Signal Stuck Lean Bank 2 Sensor 2	P2273 - Oxygen Sensor Signal Stuck Rich Bank 2 Sensor 2	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E6A - Fuel Trim System Lean During Cylinder Deactivation Bank 2	CONTINUED NEXT LINE
	P2E6B - Fuel Trim System Rich During Cylinder Deactivation Bank 2	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	CONTINUED NEXT LINE
	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END																		
P013E - Oxygen Sensor Delayed Response - Rich to Lean Bank 1 Sensor 2	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0036 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 2	P0037 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 2	P0038 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0137 - Oxygen Sensor Circuit Low Bank 1 Sensor 2	P0138 - Oxygen Sensor Circuit High Bank 1 Sensor 2	P013A - Oxygen Sensor Slow Response - Rich to Lean Bank 1 Sensor 2	P013B - Oxygen Sensor Slow Response - Lean to Rich Bank 1 Sensor 2	P013E - Oxygen Sensor Delayed Response - Rich to Lean Bank 1 Sensor 2	P013F - Oxygen Sensor Delayed Response - Lean to Rich Bank 1 Sensor 2	P0140 - Oxygen Sensor Circuit Insufficient Activity Bank 1 Sensor 2	CONTINUED NEXT LINE
	P0141 - Oxygen Sensor Heater Performance Bank 1 Sensor 2	P0171 - Fuel Trim System Lean Bank 1	P0172 - Fuel Trim System Rich Bank 1	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	CONTINUED NEXT LINE
	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	CONTINUED NEXT LINE
	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2177 - Fuel Trim System Lean Off Idle Bank 1	P2178 - Fuel Trim System Rich Off Idle Bank 1	P2187 - Fuel Trim System Lean at Idle Bank 1	P2188 - Fuel Trim System Rich at Idle Bank 1	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2232 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 2	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2270 - Oxygen Sensor Signal Stuck Lean Bank 1 Sensor 2	P2271 - Oxygen Sensor Signal Stuck Rich Bank 1 Sensor 2	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E68 - Fuel Trim System Lean During Cylinder Deactivation Bank 1	P2E69 - Fuel Trim System Rich During Cylinder Deactivation Bank 1	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END				

The DTCs in this column is inhibited by the DTCs listed to the right	The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left				
Inhibited DTC	Fault Active DTCs						Fault Active DTCs						Fault Active DTCs						Fault Active DTCs				
P013F - Oxygen Sensor Delayed Response - Lean to Rich Bank 1 Sensor 2	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0036 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 2	P0037 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 2	P0038 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0137 - Oxygen Sensor Circuit Low Bank 1 Sensor 2	P0138 - Oxygen Sensor Circuit High Bank 1 Sensor 2	P013A - Oxygen Sensor Slow Response - Rich to Lean Bank 1 Sensor 2	P013B - Oxygen Sensor Slow Response - Lean to Rich Bank 1 Sensor 2	P013E - Oxygen Sensor Delayed Response - Rich to Lean Bank 1 Sensor 2	P013F - Oxygen Sensor Delayed Response - Lean to Rich Bank 1 Sensor 2	P0140 - Oxygen Sensor Circuit Insufficient Activity Bank 1 Sensor 2	CONTINUED NEXT LINE
	P0141 - Oxygen Sensor Heater Performance Bank 1 Sensor 2	P0171 - Fuel Trim System Lean Bank 1	P0172 - Fuel Trim System Rich Bank 1	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	CONTINUED NEXT LINE
	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	CONTINUED NEXT LINE
	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2177 - Fuel Trim System Lean Off Idle Bank 1	P2178 - Fuel Trim System Rich Off Idle Bank 1	P2187 - Fuel Trim System Lean at Idle Bank 1	P2188 - Fuel Trim System Rich at Idle Bank 1	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2232 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 2	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2270 - Oxygen Sensor Signal Stuck Lean Bank 1 Sensor 2	P2271 - Oxygen Sensor Signal Stuck Rich Bank 1 Sensor 2	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E68 - Fuel Trim System Lean During Cylinder Deactivation Bank 1	P2E69 - Fuel Trim System Rich During Cylinder Deactivation Bank 1	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END				
P0140 - Oxygen Sensor Circuit Insufficient Activity Bank 1 Sensor 2	P0036 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 2	P0037 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 2	P0038 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 2	END																			
P0141 - Oxygen Sensor Heater Performance Bank 1 Sensor 2	P0036 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 2	P0037 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 2	P0038 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 2	END																			
P014A - Oxygen Sensor Delayed Response - Rich to Lean Bank 2 Sensor 2	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0056 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 2	P0057 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 2	P0058 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P013C - Oxygen Sensor Slow Response - Rich to Lean Bank 2 Sensor 2	P013D - Oxygen Sensor Slow Response - Lean to Rich Bank 2 Sensor 2	P014A - Oxygen Sensor Delayed Response - Rich to Lean Bank 2 Sensor 2	P014B - Oxygen Sensor Delayed Response - Lean to Rich Bank 2 Sensor 2	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0157 - Oxygen Sensor Circuit Low Bank 2 Sensor 2	P0158 - Oxygen Sensor Circuit High Bank 2 Sensor 2	P0160 - Oxygen Sensor Circuit Insufficient Activity Bank 2 Sensor 2	CONTINUED NEXT LINE
	P0161 - Oxygen Sensor Heater Performance Bank 2 Sensor 2	P0174 - Fuel Trim System Lean Bank 2	P0175 - Fuel Trim System Rich Bank 2	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	CONTINUED NEXT LINE
	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	CONTINUED NEXT LINE
	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2179 - Fuel Trim System Lean Off Idle Bank 2	P2180 - Fuel Trim System Rich Off Idle Bank 2	P2189 - Fuel Trim System Lean at Idle Bank 2	P2190 - Fuel Trim System Rich at Idle Bank 2	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2235 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 2 Sensor 2	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2272 - Oxygen Sensor Signal Stuck Lean Bank 2 Sensor 2	P2273 - Oxygen Sensor Signal Stuck Rich Bank 2 Sensor 2	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E6A - Fuel Trim System Lean During Cylinder Deactivation Bank 2	P2E6B - Fuel Trim System Rich During Cylinder Deactivation Bank 2	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END				
P014B - Oxygen Sensor Delayed Response - Lean to Rich Bank 2 Sensor 2	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0056 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 2	P0057 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 2	P0058 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P013C - Oxygen Sensor Slow Response - Rich to Lean Bank 2 Sensor 2	P013D - Oxygen Sensor Slow Response - Lean to Rich Bank 2 Sensor 2	P014A - Oxygen Sensor Delayed Response - Rich to Lean Bank 2 Sensor 2	P014B - Oxygen Sensor Delayed Response - Lean to Rich Bank 2 Sensor 2	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0157 - Oxygen Sensor Circuit Low Bank 2 Sensor 2	P0158 - Oxygen Sensor Circuit High Bank 2 Sensor 2	P0160 - Oxygen Sensor Circuit Insufficient Activity Bank 2 Sensor 2	CONTINUED NEXT LINE
	P0161 - Oxygen Sensor Heater Performance Bank 2 Sensor 2	P0174 - Fuel Trim System Lean Bank 2	P0175 - Fuel Trim System Rich Bank 2	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	CONTINUED NEXT LINE
	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	CONTINUED NEXT LINE
	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2179 - Fuel Trim System Lean Off Idle Bank 2	P2180 - Fuel Trim System Rich Off Idle Bank 2	P2189 - Fuel Trim System Lean at Idle Bank 2	P2190 - Fuel Trim System Rich at Idle Bank 2	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2235 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 2 Sensor 2	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2272 - Oxygen Sensor Signal Stuck Lean Bank 2 Sensor 2	P2273 - Oxygen Sensor Signal Stuck Rich Bank 2 Sensor 2	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E6A - Fuel Trim System Lean During Cylinder Deactivation Bank 2	P2E6B - Fuel Trim System Rich During Cylinder Deactivation Bank 2	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END				
P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	END										
P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	END										
P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0056 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 2	P0057 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 2	P0058 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P013C - Oxygen Sensor Slow Response - Rich to Lean Bank 2 Sensor 2	P013D - Oxygen Sensor Slow Response - Lean to Rich Bank 2 Sensor 2	P014A - Oxygen Sensor Delayed Response - Rich to Lean Bank 2 Sensor 2	P014B - Oxygen Sensor Delayed Response - Lean to Rich Bank 2 Sensor 2	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0157 - Oxygen Sensor Circuit Low Bank 2 Sensor 2	CONTINUED NEXT LINE
	P0158 - Oxygen Sensor Circuit High Bank 2 Sensor 2	P0160 - Oxygen Sensor Circuit Insufficient Activity Bank 2 Sensor 2	P0161 - Oxygen Sensor Heater Performance Bank 2 Sensor 2	P0174 - Fuel Trim System Lean Bank 2	P0175 - Fuel Trim System Rich Bank 2	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	CONTINUED NEXT LINE
	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2179 - Fuel Trim System Lean Off Idle Bank 2	P2180 - Fuel Trim System Rich Off Idle Bank 2	P2189 - Fuel Trim System Lean at Idle Bank 2	P2190 - Fuel Trim System Rich at Idle Bank 2	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2235 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 2 Sensor 2	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2272 - Oxygen Sensor Signal Stuck Lean Bank 2 Sensor 2	P2273 - Oxygen Sensor Signal Stuck Rich Bank 2 Sensor 2	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E6A - Fuel Trim System Lean During Cylinder Deactivation Bank 2	CONTINUED NEXT LINE
	P2E6B - Fuel Trim System Rich During Cylinder Deactivation Bank 2	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	CONTINUED NEXT LINE
	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END																		
P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P262B - Control Module Power Off Timer Performance	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	END
P0157 - Oxygen Sensor Circuit Low Bank 2 Sensor 2	END																						
P0158 - Oxygen Sensor Circuit High Bank 2 Sensor 2	P0056 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 2	P0057 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 2	P0058 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 2	END																			
P0160 - Oxygen Sensor Circuit Insufficient Activity Bank 2 Sensor 2	P0056 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 2	P0057 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 2	P0058 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 2	END																			
P0161 - Oxygen Sensor Heater Performance Bank 2 Sensor 2	P0056 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 2	P0057 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 2	P0058 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 2	END																			
P0171 - Fuel Trim System Lean Bank 1	END																						
P0172 - Fuel Trim System Rich Bank 1	END																						
P0174 - Fuel Trim System Lean Bank 2	END																						
P0175 - Fuel Trim System Rich Bank 2	END																						
P018B - Fuel Pressure Sensor Performance	P018C - Fuel Pressure Sensor Circuit Low	P018D - Fuel Pressure Sensor Circuit High	P0641 - Sensor Reference Voltage 1 Circuit Open	END																			
P018C - Fuel Pressure Sensor Circuit Low	P0641 - Sensor Reference Voltage 1 Circuit Open	END																					
P018D - Fuel Pressure Sensor Circuit High	P0641 - Sensor Reference Voltage 1 Circuit Open	END																					
P0191 - Fuel Rail Pressure Sensor Performance	P0191 - Fuel Rail Pressure Sensor Performance	P0651 - Sensor Reference Voltage 2 Circuit Open	P128A - Fuel Rail Pressure Sensor Internal Performance Bank 1 Sensor 1	P128B - Fuel Rail Pressure Sensor Internal Performance Bank 1 Sensor 2	U101B - Lost Communication With Fuel Rail Pressure Sensor Bank 1 Sensor 2	U1375 - Invalid Data Received From Fuel Rail Pressure Sensor 2	END																
P0196 - Engine Oil Temperature Sensor Performance	P0071 - Ambient Air Temperature Sensor Performance	P0072 - Ambient Air Temperature Sensor Circuit Low	P0073 - Ambient Air Temperature Sensor Circuit High	P0197 - Engine Oil Temperature Sensor Circuit Low	P0198 - Engine Oil Temperature Sensor Circuit High	P0199 - Engine Oil Temperature Sensor Erratic	END																
P0197 - Engine Oil Temperature Sensor Circuit Low	END																						
P0198 - Engine Oil Temperature Sensor Circuit High	END																						
P0199 - Engine Oil Temperature Sensor Erratic	END																						
P0201 - Fuel Injector 1 Control Circuit Open	END																						
P0202 - Fuel Injector 2 Control Circuit Open	END																						

The DTCs in this column is inhibited by the DTCs listed to the right	The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left				
Inhibited DTC	Fault Active DTCs						Fault Active DTCs						Fault Active DTCs						Fault Active DTCs				
P0203 - Fuel Injector 3 Control Circuit Open	END																						
P0204 - Fuel Injector 4 Control Circuit Open	END																						
P0205 - Fuel Injector 5 Control Circuit Open	END																						
P0206 - Fuel Injector 6 Control Circuit Open	END																						
P0207 - Fuel Injector 7 Control Circuit Open	END																						
P0208 - Fuel Injector 8 Control Circuit Open	END																						
P0221 - Throttle Position Sensor 2 Performance	P0641 - Sensor Reference Voltage 1 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	END																				
P0222 - Throttle Position Sensor 2 Circuit Low	P0641 - Sensor Reference Voltage 1 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	END																				
P0223 - Throttle Position Sensor 2 Circuit High	P0641 - Sensor Reference Voltage 1 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	END																				
P0226 - Throttle Position Sensor Performance Bank 2	P0697 - Sensor Reference Voltage 3 Circuit Open	END																					
P0227 - Throttle Position Sensor Circuit Low Bank 2	P0697 - Sensor Reference Voltage 3 Circuit Open	END																					
P0228 - Throttle Position Sensor Circuit High Bank 2	P0697 - Sensor Reference Voltage 3 Circuit Open	END																					
P0234 - Boost System A Overboost Condition	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P0234 - Boost System A Overboost Condition	P0236 - Turbocharger Boost Sensor Performance	P0237 - Turbocharger Boost Sensor Circuit Low	P0238 - Turbocharger Boost Sensor Circuit High	P0240 - Turbocharger Boost Sensor Performance Bank 2	P0241 - Turbocharger Boost Sensor Circuit Low Bank 2	P0242 - Turbocharger Boost Sensor Circuit High Bank 2	P0243 - Turbocharger A Wastegate Control Circuit Open	P0245 - Turbocharger A Wastegate Control Circuit Low	P0246 - Turbocharger A Wastegate Control Circuit High	P0247 - Turbocharger B Wastegate Control Circuit Open	P0249 - Turbocharger B Wastegate Control Circuit Low	P0250 - Turbocharger B Wastegate Control Circuit High	P0299 - Boost System A Underboost Condition	P02CA - Boost System B Overboost Condition	P02CB - Boost System B Underboost Condition	P1038 - Turbocharger A Wastegate Actuator Supply Voltage Circuit Low	P103A - Turbocharger A Wastegate Control Circuit Shorted	P10BD - Turbocharger B Wastegate Actuator Supply Voltage Circuit Low	CONTINUED NEXT LINE
	P10BE - Turbocharger B Wastegate Control Circuit Shorted	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2ABD - Turbocharger Wastegate Actuator A Driver Current/Temperature Too High	P2ABE - Turbocharger Wastegate Actuator B Driver Current/Temperature Too High	P30E8 - Turbocharger A Wastegate Control Circuit 2 Low	P30E9 - Turbocharger A Wastegate Control Circuit 2 High	P30EA - Turbocharger B Wastegate Control Circuit 2 Low	P30EB - Turbocharger B Wastegate Control Circuit 2 High	END									
P0236 - Turbocharger Boost Sensor Performance	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0237 - Turbocharger Boost Sensor Circuit Low	P0238 - Turbocharger Boost Sensor Circuit High	P2176 - Minimum Throttle Position Not Learned	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	END								
P0237 - Turbocharger Boost Sensor Circuit Low	P0651 - Sensor Reference Voltage 2 Circuit Open	END																					
P0238 - Turbocharger Boost Sensor Circuit High	P0651 - Sensor Reference Voltage 2 Circuit Open	END																					
P0240 - Turbocharger Boost Sensor Performance Bank 2	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0241 - Turbocharger Boost Sensor Circuit Low Bank 2	P0242 - Turbocharger Boost Sensor Circuit High Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P218A - Minimum Throttle Position Not Learned Bank 2	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END								
P0241 - Turbocharger Boost Sensor Circuit Low Bank 2	P0651 - Sensor Reference Voltage 2 Circuit Open	END																					
P0242 - Turbocharger Boost Sensor Circuit High Bank 2	P0651 - Sensor Reference Voltage 2 Circuit Open	END																					
P0243 - Turbocharger A Wastegate Control Circuit Open	P2B81 - Turbocharger A Wastegate Position Sensor Performance	P2B93 - Turbocharger A Wastegate Position Sensor Exceeded Learning Limit	END																				
P0245 - Turbocharger A Wastegate Control Circuit Low	END																						
P0246 - Turbocharger A Wastegate Control Circuit High	END																						
P0247 - Turbocharger B Wastegate Control Circuit Open	P2B82 - Turbocharger B Wastegate Position Sensor Performance	P2B94 - Turbocharger B Wastegate Position Sensor Exceeded Learning Limit	END																				
P0249 - Turbocharger B Wastegate Control Circuit Low	END																						
P0250 - Turbocharger B Wastegate Control Circuit High	END																						
P0299 - Boost System A Underboost Condition	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P0234 - Boost System A Overboost Condition	P0236 - Turbocharger Boost Sensor Performance	P0237 - Turbocharger Boost Sensor Circuit Low	P0238 - Turbocharger Boost Sensor Circuit High	P0240 - Turbocharger Boost Sensor Performance Bank 2	P0241 - Turbocharger Boost Sensor Circuit Low Bank 2	P0242 - Turbocharger Boost Sensor Circuit High Bank 2	P0243 - Turbocharger A Wastegate Control Circuit Open	P0245 - Turbocharger A Wastegate Control Circuit Low	P0246 - Turbocharger A Wastegate Control Circuit High	P0247 - Turbocharger B Wastegate Control Circuit Open	P0249 - Turbocharger B Wastegate Control Circuit Low	P0250 - Turbocharger B Wastegate Control Circuit High	P0299 - Boost System A Underboost Condition	P02CA - Boost System B Overboost Condition	P02CB - Boost System B Underboost Condition	P1038 - Turbocharger A Wastegate Actuator Supply Voltage Circuit Low	P103A - Turbocharger A Wastegate Control Circuit Shorted	P10BD - Turbocharger B Wastegate Actuator Supply Voltage Circuit Low	CONTINUED NEXT LINE
	P10BE - Turbocharger B Wastegate Control Circuit Shorted	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2ABD - Turbocharger Wastegate Actuator A Driver Current/Temperature Too High	P2ABE - Turbocharger Wastegate Actuator B Driver Current/Temperature Too High	P30E8 - Turbocharger A Wastegate Control Circuit 2 Low	P30E9 - Turbocharger A Wastegate Control Circuit 2 High	P30EA - Turbocharger B Wastegate Control Circuit 2 Low	P30EB - Turbocharger B Wastegate Control Circuit 2 High	END									
P029D - Fuel Injector 1 Leak	END																						
P02A1 - Fuel Injector 2 Leak	END																						
P02A5 - Fuel Injector 3 Leak	END																						
P02A9 - Fuel Injector 4 Leak	END																						
P02AD - Fuel Injector 5 Leak	END																						
P02B1 - Fuel Injector 6 Leak	END																						
P02B5 - Fuel Injector 7 Leak	END																						
P02B9 - Fuel Injector 8 Leak	END																						
P02CA - Boost System B Overboost Condition	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P0234 - Boost System A Overboost Condition	P0236 - Turbocharger Boost Sensor Performance	P0237 - Turbocharger Boost Sensor Circuit Low	P0238 - Turbocharger Boost Sensor Circuit High	P0240 - Turbocharger Boost Sensor Performance Bank 2	P0241 - Turbocharger Boost Sensor Circuit Low Bank 2	P0242 - Turbocharger Boost Sensor Circuit High Bank 2	P0243 - Turbocharger A Wastegate Control Circuit Open	P0245 - Turbocharger A Wastegate Control Circuit Low	P0246 - Turbocharger A Wastegate Control Circuit High	P0247 - Turbocharger B Wastegate Control Circuit Open	P0249 - Turbocharger B Wastegate Control Circuit Low	P0250 - Turbocharger B Wastegate Control Circuit High	P0299 - Boost System A Underboost Condition	P02CA - Boost System B Overboost Condition	P02CB - Boost System B Underboost Condition	P1038 - Turbocharger A Wastegate Actuator Supply Voltage Circuit Low	P103A - Turbocharger A Wastegate Control Circuit Shorted	P10BD - Turbocharger B Wastegate Actuator Supply Voltage Circuit Low	CONTINUED NEXT LINE
	P10BE - Turbocharger B Wastegate Control Circuit Shorted	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2ABD - Turbocharger Wastegate Actuator A Driver Current/Temperature Too High	P2ABE - Turbocharger Wastegate Actuator B Driver Current/Temperature Too High	P30E8 - Turbocharger A Wastegate Control Circuit 2 Low	P30E9 - Turbocharger A Wastegate Control Circuit 2 High	P30EA - Turbocharger B Wastegate Control Circuit 2 Low	P30EB - Turbocharger B Wastegate Control Circuit 2 High	END									
P02CB - Boost System B Underboost Condition	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P0234 - Boost System A Overboost Condition	P0236 - Turbocharger Boost Sensor Performance	P0237 - Turbocharger Boost Sensor Circuit Low	P0238 - Turbocharger Boost Sensor Circuit High	P0240 - Turbocharger Boost Sensor Performance Bank 2	P0241 - Turbocharger Boost Sensor Circuit Low Bank 2	P0242 - Turbocharger Boost Sensor Circuit High Bank 2	P0243 - Turbocharger A Wastegate Control Circuit Open	P0245 - Turbocharger A Wastegate Control Circuit Low	P0246 - Turbocharger A Wastegate Control Circuit High	P0247 - Turbocharger B Wastegate Control Circuit Open	P0249 - Turbocharger B Wastegate Control Circuit Low	P0250 - Turbocharger B Wastegate Control Circuit High	P0299 - Boost System A Underboost Condition	P02CA - Boost System B Overboost Condition	P02CB - Boost System B Underboost Condition	P1038 - Turbocharger A Wastegate Actuator Supply Voltage Circuit Low	P103A - Turbocharger A Wastegate Control Circuit Shorted	P10BD - Turbocharger B Wastegate Actuator Supply Voltage Circuit Low	CONTINUED NEXT LINE
	P10BE - Turbocharger B Wastegate Control Circuit Shorted	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2ABD - Turbocharger Wastegate Actuator A Driver Current/Temperature Too High	P2ABE - Turbocharger Wastegate Actuator B Driver Current/Temperature Too High	P30E8 - Turbocharger A Wastegate Control Circuit 2 Low	P30E9 - Turbocharger A Wastegate Control Circuit 2 High	P30EA - Turbocharger B Wastegate Control Circuit 2 Low	P30EB - Turbocharger B Wastegate Control Circuit 2 High	END									
P02EE - Cylinder 1 Injector Control Performance	END																						
P02EF - Cylinder 2 Injector Control Performance	END																						
P02F0 - Cylinder 3 Injector Control Performance	END																						
P02F1 - Cylinder 4 Injector Control Performance	END																						
P02F2 - Cylinder 5 Injector Control Performance	END																						
P02F3 - Cylinder 6 Injector Control Performance	END																						
P02F4 - Cylinder 7 Injector Control Performance	END																						
P02F5 - Cylinder 8 Injector Control Performance	END																						

The DTCs in this column is inhibited by the DTCs listed to the right	The DTCs in these columns inhibit the DTC to the left				The DTCs in these columns inhibit the DTC to the left				The DTCs in these columns inhibit the DTC to the left
Inhibited DTC	Fault Active DTCs				Fault Active DTCs				Fault Active DTCs
P0300 - Engine Misfire Detected	END								
P0301 - Cylinder 1 Misfire Detected	END								
P0302 - Cylinder 2 Misfire Detected	END								
P0303 - Cylinder 3 Misfire Detected	END								
P0304 - Cylinder 4 Misfire Detected	END								
P0305 - Cylinder 5 Misfire Detected	END								
P0306 - Cylinder 6 Misfire Detected	END								
P0307 - Cylinder 7 Misfire Detected	END								
P0308 - Cylinder 8 Misfire Detected	END								
P0315 - Crankshaft Position System Variation Not Learned	END								
P0325 - Knock Sensor Circuit Open	END								
P0326 - Knock Sensor Performance	END								
P0327 - Knock Sensor Circuit Low	END								
P0328 - Knock Sensor Circuit High	END								
P032A - Knock Sensor 3 Circuit Open	END								
P032B - Knock Sensor 3 Performance	END								
P032C - Knock Sensor 3 Circuit Low	END								
P032D - Knock Sensor 3 Circuit High	END								
P0330 - Knock Sensor 2 Circuit Open	END								
P0331 - Knock Sensor 2 Performance	END								
P0332 - Knock Sensor 2 Circuit Low	END								
P0333 - Knock Sensor 2 Circuit High	END								
P0335 - Crankshaft Position Sensor Circuit	P0651 - Sensor Reference Voltage 2 Circuit Open	END							
P0336 - Crankshaft Position Sensor Performance	P0651 - Sensor Reference Voltage 2 Circuit Open	END							
P033A - Knock Sensor 4 Circuit Open	END								
P033B - Knock Sensor 4 Performance	END								
P033C - Knock Sensor 4 Circuit Low	END								
P033D - Knock Sensor 4 Circuit High	END								
P0341 - Camshaft Position Sensor Performance	P0010 - Camshaft Position Actuator Control Circuit Open	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0641 - Sensor Reference Voltage 1 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	END
P0342 - Camshaft Position Sensor Circuit Low	P0010 - Camshaft Position Actuator Control Circuit Open	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0641 - Sensor Reference Voltage 1 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	END
P0343 - Camshaft Position Sensor Circuit High	P0010 - Camshaft Position Actuator Control Circuit Open	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0641 - Sensor Reference Voltage 1 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	END
P0346 - Intake Camshaft Position Sensor Performance Bank 2	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0641 - Sensor Reference Voltage 1 Circuit Open	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	END
P0347 - Intake Camshaft Position Sensor Circuit Low Bank 2	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0641 - Sensor Reference Voltage 1 Circuit Open	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	END
P0348 - Intake Camshaft Position Sensor Circuit High Bank 2	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0641 - Sensor Reference Voltage 1 Circuit Open	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	END
P034A - Crankshaft Position Sensor Start Position Incorrect	END								
P034B - Crankshaft Position Sensor Direction Incorrect	END								
P0351 - Ignition Coil 1 Control Circuit Open	END								
P0352 - Ignition Coil 2 Control Circuit Open	END								
P0353 - Ignition Coil 3 Control Circuit Open	END								
P0354 - Ignition Coil 4 Control Circuit Open	END								
P0355 - Ignition Coil 5 Control Circuit Open	END								
P0356 - Ignition Coil 6 Control Circuit Open	END								
P0357 - Ignition Coil 7 Control Circuit Open	END								
P0358 - Ignition Coil 8 Control Circuit Open	END								
P0366 - Exhaust Camshaft Position Sensor Performance Bank 1	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0641 - Sensor Reference Voltage 1 Circuit Open	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	END
P0367 - Exhaust Camshaft Position Sensor Circuit Low Bank 1	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0641 - Sensor Reference Voltage 1 Circuit Open	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	END
P0368 - Exhaust Camshaft Position Sensor Circuit High Bank 1	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0641 - Sensor Reference Voltage 1 Circuit Open	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	END
P0391 - Exhaust Camshaft Position Sensor Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0641 - Sensor Reference Voltage 1 Circuit Open	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	END

The DTCs in this column is inhibited by the DTCs listed to the right	The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left				
Inhibited DTC	Fault Active DTCs						Fault Active DTCs						Fault Active DTCs						Fault Active DTCs				
P0392 - Exhaust Camshaft Position Sensor Circuit Low Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0641 - Sensor Reference Voltage 1 Circuit Open	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	END														
P0393 - Exhaust Camshaft Position Sensor Circuit High Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0641 - Sensor Reference Voltage 1 Circuit Open	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	END														
P0420 - Catalyst System Low Efficiency	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0036 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 2	P0037 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 2	P0038 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0137 - Oxygen Sensor Circuit Low Bank 1 Sensor 2	P0138 - Oxygen Sensor Circuit High Bank 1 Sensor 2	P013A - Oxygen Sensor Slow Response - Rich to Lean Bank 1 Sensor 2	P013B - Oxygen Sensor Slow Response - Lean to Rich Bank 1 Sensor 2	P013E - Oxygen Sensor Delayed Response - Rich to Lean Bank 1 Sensor 2	CONTINUED NEXT LINE
	P013F - Oxygen Sensor Delayed Response - Lean to Rich Bank 1 Sensor 2	P0140 - Oxygen Sensor Circuit Insufficient Activity Bank 1 Sensor 2	P0141 - Oxygen Sensor Heater Performance Bank 1 Sensor 2	P0171 - Fuel Trim System Lean Bank 1	P0172 - Fuel Trim System Rich Bank 1	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	CONTINUED NEXT LINE
	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2177 - Fuel Trim System Lean Off Idle Bank 1	P2178 - Fuel Trim System Rich Off Idle Bank 1	P2187 - Fuel Trim System Lean at Idle Bank 1	P2188 - Fuel Trim System Rich at Idle Bank 1	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2232 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 2	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2270 - Oxygen Sensor Signal Stuck Lean Bank 1 Sensor 2	P2271 - Oxygen Sensor Signal Stuck Rich Bank 1 Sensor 2	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E68 - Fuel Trim System Lean During Cylinder Deactivation Bank 1	CONTINUED NEXT LINE
	P2E69 - Fuel Trim System Rich During Cylinder Deactivation Bank 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	CONTINUED NEXT LINE
	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END																		
P0430 - Catalyst System Low Efficiency Bank 2	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0056 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 2	P0057 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 2	P0058 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P013C - Oxygen Sensor Slow Response - Rich to Lean Bank 2 Sensor 2	P013D - Oxygen Sensor Slow Response - Lean to Rich Bank 2 Sensor 2	P014A - Oxygen Sensor Delayed Response - Rich to Lean Bank 2 Sensor 2	P014B - Oxygen Sensor Delayed Response - Lean to Rich Bank 2 Sensor 2	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0157 - Oxygen Sensor Circuit Low Bank 2 Sensor 2	CONTINUED NEXT LINE
	P0158 - Oxygen Sensor Circuit High Bank 2 Sensor 2	P0160 - Oxygen Sensor Circuit Insufficient Activity Bank 2 Sensor 2	P0161 - Oxygen Sensor Heater Performance Bank 2 Sensor 2	P0174 - Fuel Trim System Lean Bank 2	P0175 - Fuel Trim System Rich Bank 2	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	CONTINUED NEXT LINE
	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2179 - Fuel Trim System Lean Off Idle Bank 2	P2180 - Fuel Trim System Rich Off Idle Bank 2	P2189 - Fuel Trim System Lean at Idle Bank 2	P2190 - Fuel Trim System Rich at Idle Bank 2	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2235 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 2 Sensor 2	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2272 - Oxygen Sensor Signal Stuck Lean Bank 2 Sensor 2	P2273 - Oxygen Sensor Signal Stuck Rich Bank 2 Sensor 2	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E6A - Fuel Trim System Lean During Cylinder Deactivation Bank 2	CONTINUED NEXT LINE
	P2E6B - Fuel Trim System Rich During Cylinder Deactivation Bank 2	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	CONTINUED NEXT LINE
	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END																		
P0442 - Evaporative Emission System Small Leak Detected	P0071 - Ambient Air Temperature Sensor Performance	P0072 - Ambient Air Temperature Sensor Circuit Low	P0073 - Ambient Air Temperature Sensor Circuit High	P0074 - Ambient Air Temperature Sensor Circuit Intermittent	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0446 - Evaporative Emission Vent System Performance	P0449 - Evaporative Emission Vent Solenoid Control Circuit Open	P0451 - Fuel Tank Pressure Sensor Performance	P0452 - Fuel Tank Pressure Sensor Circuit Low	P0453 - Fuel Tank Pressure Sensor Circuit High	P0454 - Fuel Tank Pressure Sensor Circuit Intermittent	P0455 - Evaporative Emission System Large Leak Detected	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P0497 - Evaporative Emission System No Flow During Purge	P0498 - Evaporative Emission Vent Solenoid Control Circuit Low	P0499 - Evaporative Emission Vent Solenoid Control Circuit High	CONTINUED NEXT LINE
	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P1176 - Fuel Pump Driver Control Module 5V Reference 1 Circuit	U0073 - Control Module Communication High Speed CAN Bus Off	U0076 - Control Module Communication Powertrain Sensor CAN Bus Off	U131D - Invalid Data Received From Fuel Pump Driver Control Module	U18A2 - Lost Communication With Fuel Pump Driver Control Module	END												
P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	END																						
P0446 - Evaporative Emission Vent System Performance	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0451 - Fuel Tank Pressure Sensor Performance	P0452 - Fuel Tank Pressure Sensor Circuit Low	P0453 - Fuel Tank Pressure Sensor Circuit High	P0454 - Fuel Tank Pressure Sensor Circuit Intermittent	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	CONTINUED NEXT LINE
	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	END																					
P0449 - Evaporative Emission Vent Solenoid Control Circuit Open	END																						
P0451 - Fuel Tank Pressure Sensor Performance	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0446 - Evaporative Emission Vent System Performance	P0449 - Evaporative Emission Vent Solenoid Control Circuit Open	P0452 - Fuel Tank Pressure Sensor Circuit Low	P0453 - Fuel Tank Pressure Sensor Circuit High	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P0497 - Evaporative Emission System No Flow During Purge	P0498 - Evaporative Emission Vent Solenoid Control Circuit Low	P0499 - Evaporative Emission Vent Solenoid Control Circuit High	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	CONTINUED NEXT LINE
	P06A3 - Sensor Reference Voltage 4 Circuit Open	P1176 - Fuel Pump Driver Control Module 5V Reference 1 Circuit	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	U0073 - Control Module Communication High Speed CAN Bus Off	U0076 - Control Module Communication Powertrain Sensor CAN Bus Off	U131D - Invalid Data Received From Fuel Pump Driver Control Module	U18A2 - Lost Communication With Fuel Pump Driver Control Module	END										
P0452 - Fuel Tank Pressure Sensor Circuit Low	END																						
P0453 - Fuel Tank Pressure Sensor Circuit High	END																						
P0454 - Fuel Tank Pressure Sensor Circuit Intermittent	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0449 - Evaporative Emission Vent Solenoid Control Circuit Open	P0452 - Fuel Tank Pressure Sensor Circuit Low	P0453 - Fuel Tank Pressure Sensor Circuit High	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P0497 - Evaporative Emission System No Flow During Purge	P0498 - Evaporative Emission Vent Solenoid Control Circuit Low	P0499 - Evaporative Emission Vent Solenoid Control Circuit High	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	CONTINUED NEXT LINE
	P1176 - Fuel Pump Driver Control Module 5V Reference 1 Circuit	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	U0073 - Control Module Communication High Speed CAN Bus Off	U0076 - Control Module Communication Powertrain Sensor CAN Bus Off	U131D - Invalid Data Received From Fuel Pump Driver Control Module	U18A2 - Lost Communication With Fuel Pump Driver Control Module	END											
P0455 - Evaporative Emission System Large Leak Detected	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0446 - Evaporative Emission Vent System Performance	P0451 - Fuel Tank Pressure Sensor Performance	P0452 - Fuel Tank Pressure Sensor Circuit Low	P0453 - Fuel Tank Pressure Sensor Circuit High	P0454 - Fuel Tank Pressure Sensor Circuit Intermittent	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	CONTINUED NEXT LINE
	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	END																	
P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	END																						
P0459 - Evaporative Emission Purge Solenoid Control Circuit High	END																						
P0461 - Fuel Level Sensor Performance	P0462 - Fuel Level Sensor Circuit Low	P0463 - Fuel Level Sensor Circuit High	P1178 - Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit	P1179 - Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit	U131D - Invalid Data Received From Fuel Pump Driver Control Module	U18A2 - Lost Communication With Fuel Pump Driver Control Module	END																
P0462 - Fuel Level Sensor Circuit Low	P1178 - Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit	P1179 - Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit	U131D - Invalid Data Received From Fuel Pump Driver Control Module	U18A2 - Lost Communication With Fuel Pump Driver Control Module	END																		
P0463 - Fuel Level Sensor Circuit High	P1178 - Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit	P1179 - Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit	U131D - Invalid Data Received From Fuel Pump Driver Control Module	U18A2 - Lost Communication With Fuel Pump Driver Control Module	END																		
P0480 - Cooling Fan Relay 1 Control Circuit Open	END																						
P0496 - Evaporative Emission System Flow During Non-Purge	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0449 - Evaporative Emission Vent Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0498 - Evaporative Emission Vent Solenoid Control Circuit Low	P0499 - Evaporative Emission Vent Solenoid Control Circuit High	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P0506 - Idle Speed Low	P0507 - Idle Speed High	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	END		
P0497 - Evaporative Emission System No Flow During Purge	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0449 - Evaporative Emission Vent Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0498 - Evaporative Emission Vent Solenoid Control Circuit Low	P0499 - Evaporative Emission Vent Solenoid Control Circuit High	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P0506 - Idle Speed Low	P0507 - Idle Speed High	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	END		
P0498 - Evaporative Emission Vent Solenoid Control Circuit Low	END																						
P0499 - Evaporative Emission Vent Solenoid Control Circuit High	END																						
P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	END																						
P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	END																						
P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	END																						
P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	CONTINUED NEXT LINE
	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	END																			

The DTCs in this column is inhibited by the DTCs listed to the right	The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left				
Inhibited DTC	Fault Active DTCs						Fault Active DTCs						Fault Active DTCs						Fault Active DTCs				
P04DB - Crankcase Ventilation System Disconnected	P0071 - Ambient Air Temperature Sensor Performance	P0072 - Ambient Air Temperature Sensor Circuit Low	P0073 - Ambient Air Temperature Sensor Circuit High	P0074 - Ambient Air Temperature Sensor Circuit Intermittent	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	CONTINUED NEXT LINE
	P0228 - Throttle Position Sensor Circuit High Bank 2	P0236 - Turbocharger Boost Sensor Performance	P0237 - Turbocharger Boost Sensor Circuit Low	P0238 - Turbocharger Boost Sensor Circuit High	P0240 - Turbocharger Boost Sensor Performance Bank 2	P0241 - Turbocharger Boost Sensor Circuit Low Bank 2	P0242 - Turbocharger Boost Sensor Circuit High Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P04DB - Crankcase Ventilation System Disconnected	P051B - Crankcase Vapor Pressure Sensor Performance	P051C - Crankcase Vapor Pressure Sensor Circuit Low	P051D - Crankcase Vapor Pressure Sensor Circuit High	P0638 - Throttle Actuator Control Command Performance	P0639 - Throttle Actuator Control Command Performance Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P1551 - Throttle Rest Position Not Reached During Learn	CONTINUED NEXT LINE
	P2100 - Throttle Actuator Control Motor Control Circuit Open	P2101 - Throttle Actuator Position Performance	P210A - Throttle Actuator Control Motor Control Circuit Open Bank 2	P210B - Throttle Actuator Position Performance Bank 2	P2119 - Throttle Closed Position Performance	P211D - Throttle Closed Position Performance Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2176 - Minimum Throttle Position Not Learned	P218A - Minimum Throttle Position Not Learned Bank 2	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	P30D6 - Control Module Processor Serial Peripheral Interface Bus 1	P30D7 - Control Module Processor Serial Peripheral Interface Bus 2	P30E3 - Closed Throttle Position Exceeded Maximum Learning Limit	P30E4 - Closed Throttle Position Exceeded Minimum Learning Limit	P30E5 - Closed Throttle Position Exceeded Maximum Learning Limit Bank 2	P30E6 - Closed Throttle Position Exceeded Minimum Learning Limit Bank 2	P30E7 - Throttle Rest Position Not Reached During Learn Bank 2	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	CONTINUED NEXT LINE
	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END																			
P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	CONTINUED NEXT LINE
	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	END															
P0506 - Idle Speed Low	P0096 - Intake Air Temperature Sensor 2 Performance	P0097 - Intake Air Temperature Sensor 2 Circuit Low	P0098 - Intake Air Temperature Sensor 2 Circuit High	P0099 - Intake Air Temperature Sensor 2 Circuit Erratic	P00A6 - Intake Air Temperature Sensor 2 Performance Bank 2	P00A7 - Intake Air Temperature Sensor 2 Circuit Low Bank 2	P00A8 - Intake Air Temperature Sensor 2 Circuit High Bank 2	P00A9 - Intake Air Temperature Sensor 2 Circuit Erratic Bank 2	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	CONTINUED NEXT LINE
	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P0638 - Throttle Actuator Control Command Performance	P0639 - Throttle Actuator Control Command Performance Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P1551 - Throttle Rest Position Not Reached During Learn	P2100 - Throttle Actuator Control Motor Control Circuit Open	P2101 - Throttle Actuator Position Performance	P210A - Throttle Actuator Control Motor Control Circuit Open Bank 2	P210B - Throttle Actuator Position Performance Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2176 - Minimum Throttle Position Not Learned	P218A - Minimum Throttle Position Not Learned Bank 2	P30D6 - Control Module Processor Serial Peripheral Interface Bus 1	CONTINUED NEXT LINE
	P30D7 - Control Module Processor Serial Peripheral Interface Bus 2	P30E3 - Closed Throttle Position Exceeded Maximum Learning Limit	P30E4 - Closed Throttle Position Exceeded Minimum Learning Limit	P30E5 - Closed Throttle Position Exceeded Maximum Learning Limit Bank 2	P30E6 - Closed Throttle Position Exceeded Minimum Learning Limit Bank 2	P30E7 - Throttle Rest Position Not Reached During Learn Bank 2	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END												
P0507 - Idle Speed High	P0096 - Intake Air Temperature Sensor 2 Performance	P0097 - Intake Air Temperature Sensor 2 Circuit Low	P0098 - Intake Air Temperature Sensor 2 Circuit High	P0099 - Intake Air Temperature Sensor 2 Circuit Erratic	P00A6 - Intake Air Temperature Sensor 2 Performance Bank 2	P00A7 - Intake Air Temperature Sensor 2 Circuit Low Bank 2	P00A8 - Intake Air Temperature Sensor 2 Circuit High Bank 2	P00A9 - Intake Air Temperature Sensor 2 Circuit Erratic Bank 2	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	CONTINUED NEXT LINE
	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P0638 - Throttle Actuator Control Command Performance	P0639 - Throttle Actuator Control Command Performance Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P1551 - Throttle Rest Position Not Reached During Learn	P2100 - Throttle Actuator Control Motor Control Circuit Open	P2101 - Throttle Actuator Position Performance	P210A - Throttle Actuator Control Motor Control Circuit Open Bank 2	P210B - Throttle Actuator Position Performance Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2176 - Minimum Throttle Position Not Learned	P218A - Minimum Throttle Position Not Learned Bank 2	P30D6 - Control Module Processor Serial Peripheral Interface Bus 1	CONTINUED NEXT LINE
	P30D7 - Control Module Processor Serial Peripheral Interface Bus 2	P30E3 - Closed Throttle Position Exceeded Maximum Learning Limit	P30E4 - Closed Throttle Position Exceeded Minimum Learning Limit	P30E5 - Closed Throttle Position Exceeded Maximum Learning Limit Bank 2	P30E6 - Closed Throttle Position Exceeded Minimum Learning Limit Bank 2	P30E7 - Throttle Rest Position Not Reached During Learn Bank 2	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END												
P050A - Cold Start Idle Speed System	P0096 - Intake Air Temperature Sensor 2 Performance	P0097 - Intake Air Temperature Sensor 2 Circuit Low	P0098 - Intake Air Temperature Sensor 2 Circuit High	P0099 - Intake Air Temperature Sensor 2 Circuit Erratic	P00A6 - Intake Air Temperature Sensor 2 Performance Bank 2	P00A7 - Intake Air Temperature Sensor 2 Circuit Low Bank 2	P00A8 - Intake Air Temperature Sensor 2 Circuit High Bank 2	P00A9 - Intake Air Temperature Sensor 2 Circuit Erratic Bank 2	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	CONTINUED NEXT LINE
	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P0638 - Throttle Actuator Control Command Performance	P0639 - Throttle Actuator Control Command Performance Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P1551 - Throttle Rest Position Not Reached During Learn	P2100 - Throttle Actuator Control Motor Control Circuit Open	P2101 - Throttle Actuator Position Performance	P210A - Throttle Actuator Control Motor Control Circuit Open Bank 2	P210B - Throttle Actuator Position Performance Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2176 - Minimum Throttle Position Not Learned	P218A - Minimum Throttle Position Not Learned Bank 2	P30D6 - Control Module Processor Serial Peripheral Interface Bus 1	CONTINUED NEXT LINE
	P30D7 - Control Module Processor Serial Peripheral Interface Bus 2	P30E3 - Closed Throttle Position Exceeded Maximum Learning Limit	P30E4 - Closed Throttle Position Exceeded Minimum Learning Limit	P30E5 - Closed Throttle Position Exceeded Maximum Learning Limit Bank 2	P30E6 - Closed Throttle Position Exceeded Minimum Learning Limit Bank 2	P30E7 - Throttle Rest Position Not Reached During Learn Bank 2	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END												
P050B - Cold Start Ignition Timing System	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	END																			
P0513 - Theft Deterrent Key Incorrect	END																						
P051B - Crankcase Vapor Pressure Sensor Performance	P051C - Crankcase Vapor Pressure Sensor Circuit Low	P051D - Crankcase Vapor Pressure Sensor Circuit High	END																				
P051C - Crankcase Vapor Pressure Sensor Circuit Low	END																						
P051D - Crankcase Vapor Pressure Sensor Circuit High	END																						
P0521 - Engine Oil Pressure Sensor 1 Performance	P0522 - Engine Oil Pressure Sensor 1 Circuit Low	P0523 - Engine Oil Pressure Sensor 1 Circuit High	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	END																		
P0522 - Engine Oil Pressure Sensor 1 Circuit Low	P0651 - Sensor Reference Voltage 2 Circuit Open	END																					
P0523 - Engine Oil Pressure Sensor 1 Circuit High	P0651 - Sensor Reference Voltage 2 Circuit Open	END																					
P0524 - Engine Oil Pressure Too Low	P0521 - Engine Oil Pressure Sensor 1 Performance	P0522 - Engine Oil Pressure Sensor 1 Circuit Low	P0651 - Sensor Reference Voltage 2 Circuit Open	END																			
P0532 - Air Conditioning Refrigerant Pressure Sensor Circuit Low	END																						
P0533 - Air Conditioning Refrigerant Pressure Sensor Circuit High	END																						
P053F - Cold Start Fuel Pressure Performance	P0090 - Fuel Pressure Regulator Control Circuit Open	P0191 - Fuel Rail Pressure Sensor Performance	P10E8 - Fuel Pressure Regulator High Control Circuit Shorted to Control Circuit	P2C02 - Fuel Pressure Regulator Control Circuit Open Bank 2	P313A - Fuel Pressure Regulator High Control Circuit Shorted to Control Circuit Bank 2	END																	
P0562 - System Voltage Low	END																						
P0563 - System Voltage High	END																						
P0564 - Cruise Control Multi-Function Switch 1 Circuit	U0140 - Lost Communication With Body Control Module	U0422 - Invalid Data Received From Body Control Module	END																				
P0565 - Cruise Control Switch Circuit	U0140 - Lost Communication With Body Control Module	U0422 - Invalid Data Received From Body Control Module	END																				
P0567 - Cruise Control Resume Switch 1 Circuit	U0140 - Lost Communication With Body Control Module	U0422 - Invalid Data Received From Body Control Module	END																				
P0568 - Cruise Control Set Switch 1 Circuit	U0140 - Lost Communication With Body Control Module	U0422 - Invalid Data Received From Body Control Module	END																				
P056C - Cruise Control Cancel Switch Circuit	U0140 - Lost Communication With Body Control Module	U0422 - Invalid Data Received From Body Control Module	END																				
P0572 - Brake Switch Circuit 1 Low	END																						
P0573 - Brake Switch Circuit 1 High	END																						
P057B - Brake Pedal Position Sensor Performance	P057B - Brake Pedal Position Sensor Performance	P057C - Brake Pedal Position Sensor Circuit Low	P057D - Brake Pedal Position Sensor Circuit High	END																			
P057C - Brake Pedal Position Sensor Circuit Low	END																						
P057D - Brake Pedal Position Sensor Circuit High	END																						
P0580 - Cruise Control Multi-Function Switch 1 Circuit Low	END																						
P0581 - Cruise Control Multi-Function Switch 1 Circuit High	U0140 - Lost Communication With Body Control Module	U0422 - Invalid Data Received From Body Control Module	END																				
P0589 - Cruise Control Multi-Function Switch 2 Circuit	END																						
P058A - Battery Sensor Module Performance	END																						
P058B - Battery Sensor Module Current Sensor Performance	END																						
P058C - Battery Sensor Module Temperature Sensor Performance	END																						
P058D - Battery Sensor Module Voltage Sensing Performance	END																						
P058E - Battery Sensor Module Temperature High	END																						
P058F - Battery Sensor Module Temperature Low	END																						

The DTCs in this column is inhibited by the DTCs listed to the right	The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left
Inhibited DTC	Fault Active DTCs						Fault Active DTCs						Fault Active DTCs						Fault Active DTCs
P0592 - Cruise Control Multi-Function Switch 2 Circuit Low	END																		
P0593 - Cruise Control Multi-Function Switch 2 Circuit High	END																		
P05CC - Cold Start Intake Camshaft Position System Performance Bank 1	P05CC - Cold Start Intake Camshaft Position System Performance Bank 1	END																	
P05CD - Cold Start Intake Camshaft Position System Performance Bank 2	P05CD - Cold Start Intake Camshaft Position System Performance Bank 2	END																	
P05D1 - Driver Mode Select Switch Circuit Low	END																		
P05D2 - Driver Mode Select Switch Circuit High	END																		
P05D3 - Driver Mode Select Switch Performance	END																		
P0602 - Control Module Not Programmed	END																		
P0603 - Control Module Long Term Memory Reset	END																		
P0604 - Control Module Random Access Memory	END																		
P0606 - Control Module Internal Performance	END																		
P0607 - Control Module Internal Performance	END																		
P060A - Control Module Monitoring Processor Performance	END																		
P060B - Control Module Analog to Digital Performance	END																		
P060D - Control Module Accelerator Pedal Position System Performance	END																		
P0615 - Starter Relay Control Circuit Open	END																		
P0616 - Starter Relay Control Circuit Low	END																		
P0617 - Starter Relay Control Circuit High	END																		
P061C - Control Module Engine Speed Performance	END																		
P0621 - Generator L-Terminal Circuit Open	END																		
P0625 - Generator F-Terminal Circuit Low	END																		
P0626 - Generator F-Terminal Circuit High	END																		
P0627 - Fuel Pump Relay Control Circuit Open	END																		
P0628 - Fuel Pump Relay Control Circuit Low	END																		
P0629 - Fuel Pump Relay Control Circuit High	END																		
P062B - Control Module Fuel Injector Control Performance	END																		
P0630 - VIN Not Programmed or Mismatched - Engine Control Module	END																		
P0633 - Theft Deterrent Key Not Programmed	END																		
P0638 - Throttle Actuator Control Command Performance	END																		
P0639 - Throttle Actuator Control Command Performance Bank 2	END																		
P0641 - Sensor Reference Voltage 1 Circuit Open	END																		
P0645 - Air Conditioning Clutch Relay Control Circuit Open	END																		
P0646 - Air Conditioning Clutch Relay Control Circuit Low	END																		
P0647 - Air Conditioning Clutch Relay Control Circuit High	END																		
P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	END										
P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	END										
P0650 - Malfunction Indicator Lamp Control Circuit Open	END																		
P0651 - Sensor Reference Voltage 2 Circuit Open	END																		
P0689 - Engine Controls Ignition Relay Feedback Circuit Low	END																		
P0690 - Engine Controls Ignition Relay Feedback Circuit High	END																		
P0691 - Cooling Fan Relay 1 Control Circuit Low	END																		
P0692 - Cooling Fan Relay 1 Control Circuit High	END																		
P0697 - Sensor Reference Voltage 3 Circuit Open	END																		
P06A3 - Sensor Reference Voltage 4 Circuit Open	END																		
P06AF - Torque Management System - Forced Engine Shutdown	END																		
P06B6 - Control Module Knock Sensor Processor 1 Performance	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0651 - Sensor Reference Voltage 2 Circuit Open	END													
P06D1 - Control Module Ignition Coil Internal Circuit	END																		
P06DA - Engine Oil Pressure Control Circuit Open	END																		

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Inhibited DTC	Fault Active DTCs						Fault Active DTCs						Fault Active DTCs						Fault Active DTCs				
P06DB - Engine Oil Pressure Control Circuit Low	END																						
P06DC - Engine Oil Pressure Control Circuit High	END																						
P06DD - Engine Oil Pressure Control Performance	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0521 - Engine Oil Pressure Sensor 1 Performance	P0524 - Engine Oil Pressure Too Low	P06DD - Engine Oil Pressure Control Performance	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	END												
P06E9 - Starter Performance	END																						
P0700 - Transmission Control Module Requested Malfunction Indicator Lamp Illumination	END																						
P073D - Unable to Engage Neutral	END																						
P073E - Unable to Engage Reverse	END																						
P07B3 - Transmission Range Selector Park Position Switch 1 Circuit Low	END																						
P07B4 - Transmission Range Selector Park Position Switch 1 Circuit High	END																						
P07B5 - Transmission Range Selector Park Position Switch 1 Performance	END																						
P07B9 - Transmission Range Selector Park Position Switch 2 Circuit Low	END																						
P07BA - Transmission Range Selector Park Position Switch 2 Circuit High	END																						
P07BB - Transmission Range Selector Park Position Switch 2 Circuit Performance	END																						
P07BE - Transmission Range Selector Park Position Switch 1/2 Correlation	END																						
P07E4 - Unable to Engage Park	END																						
P07E5 - Unable to Engage Drive	END																						
P082A - Transmission Range Selector X-Axis Position Sensor 1 Performance	END																						
P082B - Transmission Range Selector X-Axis Position Sensor 1 Circuit Low	END																						
P082C - Transmission Range Selector X-Axis Position Sensor 1 Circuit High	END																						
P082D - Transmission Range Selector Y-Axis Position Sensor 1 Performance	END																						
P082E - Transmission Range Selector Y-Axis Position Sensor 1 Circuit Low	END																						
P082F - Transmission Range Selector Y-Axis Position Sensor 1 Circuit High	END																						
P089B - Transmission Range Selector X-Axis Position Sensor 2 Performance	END																						
P089C - Transmission Range Selector X-Axis Position Sensor 2 Circuit Low	END																						
P089D - Transmission Range Selector X-Axis Position Sensor 2 Circuit High	END																						
P08A0 - Transmission Range Selector Y-Axis Position Sensor 2 Performance	END																						
P08A1 - Transmission Range Selector Y-Axis Position Sensor 2 Circuit Low	END																						
P08A2 - Transmission Range Selector Y-Axis Position Sensor 2 Circuit High	END																						
P1002 - Fuel Pump Driver Control Module System Voltage Performance	END																						
P1005 - Fuel Pump Driver Control Module Too Many Resets	END																						
P1007 - Fuel Pump Driver Control Module Ignition On/Start Switch Circuit High	END																						
P100C - Battery Sensor Module Temperature Erratic	END																						
P100D - Battery Sensor Module Internal Temperature Circuit Erratic	END																						
P1011 - Camshaft Position Actuator Park Position	P000A - Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P0341 - Camshaft Position Sensor Performance	P0342 - Camshaft Position Sensor Circuit Low	P0343 - Camshaft Position Sensor Circuit High	P0346 - Intake Camshaft Position Sensor Performance Bank 2	P0347 - Intake Camshaft Position Sensor Circuit Low Bank 2	P0348 - Intake Camshaft Position Sensor Circuit High Bank 2	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0641 - Sensor Reference Voltage 1 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	END
P1012 - Exhaust Camshaft Position Actuator Park Position Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0366 - Exhaust Camshaft Position Sensor Performance Bank 1	P0367 - Exhaust Camshaft Position Sensor Circuit Low Bank 1	P0368 - Exhaust Camshaft Position Sensor Circuit High Bank 1	P0391 - Exhaust Camshaft Position Sensor Performance Bank 2	P0392 - Exhaust Camshaft Position Sensor Circuit Low Bank 2	P0393 - Exhaust Camshaft Position Sensor Circuit High Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	END
P1013 - Intake Camshaft Position Actuator Park Position Bank 2	P000A - Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P0011 - Camshaft Position System Performance	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P0341 - Camshaft Position Sensor Performance	P0342 - Camshaft Position Sensor Circuit Low	P0343 - Camshaft Position Sensor Circuit High	P0346 - Intake Camshaft Position Sensor Performance Bank 2	P0347 - Intake Camshaft Position Sensor Circuit Low Bank 2	P0348 - Intake Camshaft Position Sensor Circuit High Bank 2	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0641 - Sensor Reference Voltage 1 Circuit Open	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	END
P1014 - Exhaust Camshaft Position Actuator Park Position Bank 2	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0366 - Exhaust Camshaft Position Sensor Performance Bank 1	P0367 - Exhaust Camshaft Position Sensor Circuit Low Bank 1	P0368 - Exhaust Camshaft Position Sensor Circuit High Bank 1	P0391 - Exhaust Camshaft Position Sensor Performance Bank 2	P0392 - Exhaust Camshaft Position Sensor Circuit Low Bank 2	P0393 - Exhaust Camshaft Position Sensor Circuit High Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	END
P1029 - Fuel Pump Phase U-V-W Circuits Open	END																						
P102A - Fuel Pump Phase U-V-W Circuits Low	END																						
P102B - Fuel Pump Phase U-V-W Circuits High	END																						
P102C - Fuel Pump Phase U-V-W Circuits Shorted	END																						
P1038 - Turbocharger A Wastegate Actuator Supply Voltage Circuit Low	END																						
P103A - Turbocharger A Wastegate Control Circuit Shorted	END																						
P10A3 - Cylinder 1 Injection Pulse Offset Exceeded Minimum Learning Limit	END																						
P10A4 - Cylinder 1 Injection Pulse Offset Exceeded Maximum Learning Limit	END																						
P10A5 - Cylinder 2 Injection Pulse Offset Exceeded Minimum Learning Limit	END																						
P10A6 - Cylinder 2 Injection Pulse Offset Exceeded Maximum Learning Limit	END																						
P10A7 - Cylinder 3 Injection Pulse Offset Exceeded Minimum Learning Limit	END																						

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Inhibited DTC	Fault Active DTCs						Fault Active DTCs						Fault Active DTCs	Fault Active DTCs
P10A8 - Cylinder 3 Injection Pulse Offset Exceeded Maximum Learning Limit	END													
P10A9 - Cylinder 4 Injection Pulse Offset Exceeded Minimum Learning Limit	END													
P10AA - Cylinder 4 Injection Pulse Offset Exceeded Maximum Learning Limit	END													
P10AB - Cylinder 5 Injection Pulse Offset Exceeded Minimum Learning Limit	END													
P10AC - Cylinder 5 Injection Pulse Offset Exceeded Maximum Learning Limit	END													
P10AD - Cylinder 6 Injection Pulse Offset Exceeded Minimum Learning Limit	END													
P10AE - Cylinder 6 Injection Pulse Offset Exceeded Maximum Learning Limit	END													
P10AF - Cylinder 7 Injection Pulse Offset Exceeded Minimum Learning Limit	END													
P10B0 - Cylinder 7 Injection Pulse Offset Exceeded Maximum Learning Limit	END													
P10B1 - Cylinder 8 Injection Pulse Offset Exceeded Minimum Learning Limit	END													
P10B2 - Cylinder 8 Injection Pulse Offset Exceeded Maximum Learning Limit	END													
P10BD - Turbocharger B Wastegate Actuator Supply Voltage Circuit Low	END													
P10BE - Turbocharger B Wastegate Control Circuit Shorted	END													
P10E8 - Fuel Pressure Regulator High Control Circuit Shorted to Control Circuit	END													
P1176 - Fuel Pump Driver Control Module 5V Reference 1 Circuit	END													
P1177 - Fuel Pump Driver Control Module 5V Reference 2 Circuit	END													
P1178 - Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit	END													
P1179 - Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit	END													
P1248 - Fuel Injector 1 High Control Circuit Shorted to Control Circuit	END													
P1249 - Fuel Injector 2 High Control Circuit Shorted to Control Circuit	END													
P124A - Fuel Injector 3 High Control Circuit Shorted to Control Circuit	END													
P124B - Fuel Injector 4 High Control Circuit Shorted to Control Circuit	END													
P124C - Fuel Injector 5 High Control Circuit Shorted to Control Circuit	END													
P124D - Fuel Injector 6 High Control Circuit Shorted to Control Circuit	END													
P124E - Fuel Injector 7 High Control Circuit Shorted to Control Circuit	END													
P124F - Fuel Injector 8 High Control Circuit Shorted to Control Circuit	END													
P1255 - Fuel Pump Control Module Driver High Temperature	END													
P128A - Fuel Rail Pressure Sensor Internal Performance Bank 1 Sensor 1	P0651 - Sensor Reference Voltage 2 Circuit Open	END												
P128B - Fuel Rail Pressure Sensor Internal Performance Bank 1 Sensor 2	P0651 - Sensor Reference Voltage 2 Circuit Open	END												
P129B - Fuel Pump Driver Control Module System Voltage Low	END													
P129C - Fuel Pump Driver Control Module System Voltage High	END													
P129D - Fuel Pump Driver Control Module Ignition On/Start Switch Circuit Low	END													
P129F - Fuel Pump Driver Control Module Fuel Pump Speed Signal Incorrect	P0627 - Fuel Pump Relay Control Circuit Open	P0628 - Fuel Pump Relay Control Circuit Low	P0629 - Fuel Pump Relay Control Circuit High	P1029 - Fuel Pump Phase U-V-W Circuits Open	P102A - Fuel Pump Phase U-V-W Circuits Low	P102B - Fuel Pump Phase U-V-W Circuits High	P102C - Fuel Pump Phase U-V-W Circuits Shorted	P1255 - Fuel Pump Control Module Driver High Temperature	END					
P12A6 - Fuel Pump Driver Control Module Enable Circuit Performance	P0627 - Fuel Pump Relay Control Circuit Open	P0628 - Fuel Pump Relay Control Circuit Low	P0629 - Fuel Pump Relay Control Circuit High	P1029 - Fuel Pump Phase U-V-W Circuits Open	P102A - Fuel Pump Phase U-V-W Circuits Low	P102B - Fuel Pump Phase U-V-W Circuits High	P102C - Fuel Pump Phase U-V-W Circuits Shorted	P1255 - Fuel Pump Control Module Driver High Temperature	END					
P135A - Ignition Coil Supply Voltage Circuit Bank 1	END													
P135B - Ignition Coil Supply Voltage Circuit Bank 2	END													
P138B - Brake Pedal Position Sensor "A" Exceeded Learning Limit	END													
P1434 - Fuel Level Sensor 1 Reference Feedback Performance	END													
P143E - Fuel Level Sensor 2 Reference Feedback Performance	END													
P1551 - Throttle Rest Position Not Reached During Learn	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0638 - Throttle Actuator Control Command Performance	P2100 - Throttle Actuator Control Motor Control Circuit Open	P2101 - Throttle Actuator Position Performance	P30D6 - Control Module Processor Serial Peripheral Interface Bus 1	END			
P155A - Cruise Control Switch State Undetermined	U0140 - Lost Communication With Body Control Module	U0422 - Invalid Data Received From Body Control Module	END											
P155B - Cruise Control Set Switch 2 Circuit	END													
P155C - Cruise Control Resume Switch 2 Circuit	END													
P1589 - Cruise Control Lane Center Switch Circuit	END													
P1631 - Theft Deterrent Fuel Enable Signal Not Correct	END													
P1649 - Theft Deterrent Security Code Not Programmed	END													
P16D4 - Battery Sensor Module Voltage Sensing Circuit Low	END													
P16D5 - Battery Sensor Module Voltage Sensing Circuit High	END													

The DTCs in this column is inhibited by the DTCs listed to the right Inhibited DTC	The DTCs in these columns inhibit the DTC to the left Fault Active DTCs						The DTCs in these columns inhibit the DTC to the left Fault Active DTCs	The DTCs in these columns inhibit the DTC to the left Fault Active DTCs	The DTCs in these columns inhibit the DTC to the left Fault Active DTCs
P16D6 - Battery Sensor Module Current Sensor Low	END								
P16D7 - Sensor Supply Voltage Relay Control Circuit Open	END								
P16D8 - Sensor Supply Voltage Relay Control Circuit Low	END								
P16D9 - Sensor Supply Voltage Relay Control Circuit High	END								
P16DD - Battery Sensor Module Current Sensor High	END								
P16DE - Battery Sensor Module Internal Temperature Circuit Low	END								
P16DF - Battery Sensor Module Internal Temperature Circuit High	END								
P16E1 - Battery Sensor Module Random Access Memory	END								
P16E2 - Battery Sensor Module Read Only Memory	END								
P16E3 - Battery Sensor Module Calibration Incorrect	END								
P16F3 - Control Module Redundant Memory Performance	END								
P16F4 - Internal Control Module Transmission Range Control Performance	END								
P1787 - Unexpected Range Change Detected	END								
P1789 - Current Transmission Range Unknown	END								
P17A3 - Transmission Range Selector Shift Interlock Switch 1 Circuit Low	END								
P17A4 - Transmission Range Selector Shift Interlock Switch 1 Circuit High	END								
P17A5 - Transmission Range Selector Shift Interlock Switch 1 Performance	END								
P17A6 - Transmission Range Selector Shift Interlock Switch 1/2 Correlation	END								
P17A7 - Transmission Range Selector Shift Interlock Switch 2 Circuit Low	END								
P17A8 - Transmission Range Selector Shift Interlock Switch 2 Circuit High	END								
P17A9 - Transmission Range Selector Shift Interlock Switch 2 Performance	END								
P17D8 - Transmission Range Selector Control Module Memory Checksum Error	END								
P17D9 - Transmission Range Selector Control Module Read Only Memory (ROM) Error	END								
P17DA - Transmission Range Selector Control Module Internal Random Access Memory (RAM) Error	END								
P17DB - Transmission Range Selector Control Module Processor	END								
P17DD - Transmission Range Selector Control Module System Voltage Low	END								
P17DE - Transmission Range Selector Control Module System Voltage High	END								
P17DF - Transmission Range Selector Control Module System Voltage Performance	END								
P17E0 - Transmission Range Selector Control Module Ignition On/Start Switch Circuit Low	END								
P17E1 - Transmission Range Selector Control Module Ignition On/Start Switch Circuit High	END								
P17E2 - Transmission Range Selector Control Module Ignition Accessory Circuit Low	END								
P17F3 - Transmission Range Selector Park Position Switch 1/2 Stuck On	END								
P17F4 - Transmission Range Selector Shift Interlock Switch 1/2 Stuck On	END								
P189D - Transmission Range Selector Park Position Switch 1/2 Stuck Off	END								
P2066 - Fuel Level Sensor 2 Performance	P1178 - Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit	P1179 - Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit	P2067 - Fuel Level Sensor 2 Circuit Low	P2068 - Fuel Level Sensor 2 Circuit High	U131D - Invalid Data Received From Fuel Pump Driver Control Module	U18A2 - Lost Communication With Fuel Pump Driver Control Module	END		
P2067 - Fuel Level Sensor 2 Circuit Low	P1178 - Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit	P1179 - Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit	U131D - Invalid Data Received From Fuel Pump Driver Control Module	U18A2 - Lost Communication With Fuel Pump Driver Control Module	END				
P2068 - Fuel Level Sensor 2 Circuit High	P1178 - Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit	P1179 - Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit	U131D - Invalid Data Received From Fuel Pump Driver Control Module	U18A2 - Lost Communication With Fuel Pump Driver Control Module	END				
P2088 - Camshaft Position Actuator Control Circuit Low	P0010 - Camshaft Position Actuator Control Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	END					
P2089 - Camshaft Position Actuator Control Circuit High	P0010 - Camshaft Position Actuator Control Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	END					
P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	END					
P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	END					
P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	END					
P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	END					
P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	END					
P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	END					

The DTCs in this column is inhibited by the DTCs listed to the right	The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left				
Inhibited DTC	Fault Active DTCs						Fault Active DTCs						Fault Active DTCs						Fault Active DTCs				
P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0036 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 2	P0037 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 2	P0038 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0137 - Oxygen Sensor Circuit Low Bank 1 Sensor 2	P0138 - Oxygen Sensor Circuit High Bank 1 Sensor 2	P0140 - Oxygen Sensor Circuit Insufficient Activity Bank 1 Sensor 2	CONTINUED NEXT LINE
	P0141 - Oxygen Sensor Heater Performance Bank 1 Sensor 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	CONTINUED NEXT LINE
	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2232 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 2	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2270 - Oxygen Sensor Signal Stuck Lean Bank 1 Sensor 2	P2271 - Oxygen Sensor Signal Stuck Rich Bank 1 Sensor 2	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	CONTINUED NEXT LINE
	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	END									
P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0036 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 2	P0037 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 2	P0038 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0137 - Oxygen Sensor Circuit Low Bank 1 Sensor 2	P0138 - Oxygen Sensor Circuit High Bank 1 Sensor 2	P0140 - Oxygen Sensor Circuit Insufficient Activity Bank 1 Sensor 2	CONTINUED NEXT LINE
	P0141 - Oxygen Sensor Heater Performance Bank 1 Sensor 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	CONTINUED NEXT LINE
	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2232 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 2	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2270 - Oxygen Sensor Signal Stuck Lean Bank 1 Sensor 2	P2271 - Oxygen Sensor Signal Stuck Rich Bank 1 Sensor 2	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	CONTINUED NEXT LINE
	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	END									
P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0056 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 2	P0057 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 2	P0058 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0157 - Oxygen Sensor Circuit Low Bank 2 Sensor 2	P0158 - Oxygen Sensor Circuit High Bank 2 Sensor 2	P0160 - Oxygen Sensor Circuit Insufficient Activity Bank 2 Sensor 2	CONTINUED NEXT LINE
	P0161 - Oxygen Sensor Heater Performance Bank 2 Sensor 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	CONTINUED NEXT LINE
	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2235 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 2 Sensor 2	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2272 - Oxygen Sensor Signal Stuck Lean Bank 2 Sensor 2	P2273 - Oxygen Sensor Signal Stuck Rich Bank 2 Sensor 2	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	CONTINUED NEXT LINE
	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	END									
P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0056 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 2	P0057 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 2	P0058 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0157 - Oxygen Sensor Circuit Low Bank 2 Sensor 2	P0158 - Oxygen Sensor Circuit High Bank 2 Sensor 2	P0160 - Oxygen Sensor Circuit Insufficient Activity Bank 2 Sensor 2	CONTINUED NEXT LINE
	P0161 - Oxygen Sensor Heater Performance Bank 2 Sensor 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	CONTINUED NEXT LINE
	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2235 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 2 Sensor 2	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2272 - Oxygen Sensor Signal Stuck Lean Bank 2 Sensor 2	P2273 - Oxygen Sensor Signal Stuck Rich Bank 2 Sensor 2	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	CONTINUED NEXT LINE
	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	END									
P2100 - Throttle Actuator Control Motor Control Circuit Open	END																						
P2101 - Throttle Actuator Position Performance	END																						
P210A - Throttle Actuator Control Motor Control Circuit Open Bank 2	END																						
P210B - Throttle Actuator Position Performance Bank 2	END																						
P2119 - Throttle Closed Position Performance	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0638 - Throttle Actuator Control Command Performance	P2100 - Throttle Actuator Control Motor Control Circuit Open	P2101 - Throttle Actuator Position Performance	P30D6 - Control Module Processor Serial Peripheral Interface Bus 1	END												
P211D - Throttle Closed Position Performance Bank 2	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0639 - Throttle Actuator Control Command Performance Bank 2	P210A - Throttle Actuator Control Motor Control Circuit Open Bank 2	P210B - Throttle Actuator Position Performance Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P30D7 - Control Module Processor Serial Peripheral Interface Bus 2	END												
P2122 - Accelerator Pedal Position Sensor 1 Circuit Low	P06A3 - Sensor Reference Voltage 4 Circuit Open	END																					
P2123 - Accelerator Pedal Position Sensor 1 Circuit High	P06A3 - Sensor Reference Voltage 4 Circuit Open	END																					
P2127 - Accelerator Pedal Position Sensor 2 Circuit Low	P0697 - Sensor Reference Voltage 3 Circuit Open	END																					
P2128 - Accelerator Pedal Position Sensor 2 Circuit High	P0697 - Sensor Reference Voltage 3 Circuit Open	END																					
P212B - Throttle Position Sensor 2 Performance Bank 2	P0697 - Sensor Reference Voltage 3 Circuit Open	END																					
P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P0697 - Sensor Reference Voltage 3 Circuit Open	END																					
P212D - Throttle Position Sensor 2 Circuit High Bank 2	P0697 - Sensor Reference Voltage 3 Circuit Open	END																					
P2138 - Accelerator Pedal Position Sensor 1-2 Correlation	END																						
P2146 - Fuel Injector High Control Circuit 1 Open	END																						
P2149 - Fuel Injector High Control Circuit 2 Open	END																						
P2152 - Fuel Injector High Control Circuit 3 Open	END																						
P2155 - Fuel Injector High Control Circuit 4 Open	END																						
P216A - Fuel Injector High Control Circuit 5 Open	END																						
P216D - Fuel Injector High Control Circuit 6 Open	END																						
P2176 - Minimum Throttle Position Not Learned	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0638 - Throttle Actuator Control Command Performance	P2100 - Throttle Actuator Control Motor Control Circuit Open	P2101 - Throttle Actuator Position Performance	P30D6 - Control Module Processor Serial Peripheral Interface Bus 1	END												
P2177 - Fuel Trim System Lean Off Idle Bank 1	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	CONTINUED NEXT LINE
	P0096 - Intake Air Temperature Sensor 2 Performance	P0097 - Intake Air Temperature Sensor 2 Circuit Low	P0098 - Intake Air Temperature Sensor 2 Circuit High	P0099 - Intake Air Temperature Sensor 2 Circuit Erratic	P00A6 - Intake Air Temperature Sensor 2 Performance Bank 2	P00A7 - Intake Air Temperature Sensor 2 Circuit Low Bank 2	P00A8 - Intake Air Temperature Sensor 2 Circuit High Bank 2	P00A9 - Intake Air Temperature Sensor 2 Circuit Erratic Bank 2	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	CONTINUED NEXT LINE
	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P05CC - Cold Start Intake Camshaft Position System Performance Bank 1	P05CD - Cold Start Intake Camshaft Position System Performance Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	CONTINUED NEXT LINE
	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2176 - Minimum Throttle Position Not Learned	P218A - Minimum Throttle Position Not Learned Bank 2	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	CONTINUED NEXT LINE
	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END														

The DTCs in this column is inhibited by the DTCs listed to the right	The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left				
Inhibited DTC	Fault Active DTCs						Fault Active DTCs						Fault Active DTCs						Fault Active DTCs				
P2178 - Fuel Trim System Rich Off Idle Bank 1	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	CONTINUED NEXT LINE
	P0096 - Intake Air Temperature Sensor 2 Performance	P0097 - Intake Air Temperature Sensor 2 Circuit Low	P0098 - Intake Air Temperature Sensor 2 Circuit High	P0099 - Intake Air Temperature Sensor 2 Circuit Erratic	P00A6 - Intake Air Temperature Sensor 2 Performance Bank 2	P00A7 - Intake Air Temperature Sensor 2 Circuit Low Bank 2	P00A8 - Intake Air Temperature Sensor 2 Circuit High Bank 2	P00A9 - Intake Air Temperature Sensor 2 Circuit Erratic Bank 2	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	CONTINUED NEXT LINE
	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P05CC - Cold Start Intake Camshaft Position System Performance Bank 1	P05CD - Cold Start Intake Camshaft Position System Performance Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	CONTINUED NEXT LINE
	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2176 - Minimum Throttle Position Not Learned	P218A - Minimum Throttle Position Not Learned Bank 2	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	CONTINUED NEXT LINE
	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END														
P2179 - Fuel Trim System Lean Off Idle Bank 2	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	CONTINUED NEXT LINE
	P0096 - Intake Air Temperature Sensor 2 Performance	P0097 - Intake Air Temperature Sensor 2 Circuit Low	P0098 - Intake Air Temperature Sensor 2 Circuit High	P0099 - Intake Air Temperature Sensor 2 Circuit Erratic	P00A6 - Intake Air Temperature Sensor 2 Performance Bank 2	P00A7 - Intake Air Temperature Sensor 2 Circuit Low Bank 2	P00A8 - Intake Air Temperature Sensor 2 Circuit High Bank 2	P00A9 - Intake Air Temperature Sensor 2 Circuit Erratic Bank 2	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	CONTINUED NEXT LINE
	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P05CC - Cold Start Intake Camshaft Position System Performance Bank 1	P05CD - Cold Start Intake Camshaft Position System Performance Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	CONTINUED NEXT LINE
	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2176 - Minimum Throttle Position Not Learned	P218A - Minimum Throttle Position Not Learned Bank 2	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	CONTINUED NEXT LINE
	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END														
P217A - Fuel Injector High Control Circuit 7 Open	END																						
P217D - Fuel Injector High Control Circuit 8 Open	END																						
P2180 - Fuel Trim System Rich Off Idle Bank 2	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	CONTINUED NEXT LINE
	P0096 - Intake Air Temperature Sensor 2 Performance	P0097 - Intake Air Temperature Sensor 2 Circuit Low	P0098 - Intake Air Temperature Sensor 2 Circuit High	P0099 - Intake Air Temperature Sensor 2 Circuit Erratic	P00A6 - Intake Air Temperature Sensor 2 Performance Bank 2	P00A7 - Intake Air Temperature Sensor 2 Circuit Low Bank 2	P00A8 - Intake Air Temperature Sensor 2 Circuit High Bank 2	P00A9 - Intake Air Temperature Sensor 2 Circuit Erratic Bank 2	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	CONTINUED NEXT LINE
	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P05CC - Cold Start Intake Camshaft Position System Performance Bank 1	P05CD - Cold Start Intake Camshaft Position System Performance Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	CONTINUED NEXT LINE
	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2176 - Minimum Throttle Position Not Learned	P218A - Minimum Throttle Position Not Learned Bank 2	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	CONTINUED NEXT LINE
	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END														
P2187 - Fuel Trim System Lean at Idle Bank 1	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	CONTINUED NEXT LINE
	P0096 - Intake Air Temperature Sensor 2 Performance	P0097 - Intake Air Temperature Sensor 2 Circuit Low	P0098 - Intake Air Temperature Sensor 2 Circuit High	P0099 - Intake Air Temperature Sensor 2 Circuit Erratic	P00A6 - Intake Air Temperature Sensor 2 Performance Bank 2	P00A7 - Intake Air Temperature Sensor 2 Circuit Low Bank 2	P00A8 - Intake Air Temperature Sensor 2 Circuit High Bank 2	P00A9 - Intake Air Temperature Sensor 2 Circuit Erratic Bank 2	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	CONTINUED NEXT LINE
	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P05CC - Cold Start Intake Camshaft Position System Performance Bank 1	P05CD - Cold Start Intake Camshaft Position System Performance Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	CONTINUED NEXT LINE
	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2176 - Minimum Throttle Position Not Learned	P218A - Minimum Throttle Position Not Learned Bank 2	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	CONTINUED NEXT LINE
	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END														
P2188 - Fuel Trim System Rich at Idle Bank 1	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	CONTINUED NEXT LINE
	P0096 - Intake Air Temperature Sensor 2 Performance	P0097 - Intake Air Temperature Sensor 2 Circuit Low	P0098 - Intake Air Temperature Sensor 2 Circuit High	P0099 - Intake Air Temperature Sensor 2 Circuit Erratic	P00A6 - Intake Air Temperature Sensor 2 Performance Bank 2	P00A7 - Intake Air Temperature Sensor 2 Circuit Low Bank 2	P00A8 - Intake Air Temperature Sensor 2 Circuit High Bank 2	P00A9 - Intake Air Temperature Sensor 2 Circuit Erratic Bank 2	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	CONTINUED NEXT LINE
	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P05CC - Cold Start Intake Camshaft Position System Performance Bank 1	P05CD - Cold Start Intake Camshaft Position System Performance Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	CONTINUED NEXT LINE
	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2176 - Minimum Throttle Position Not Learned	P218A - Minimum Throttle Position Not Learned Bank 2	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	CONTINUED NEXT LINE
	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END														
P2189 - Fuel Trim System Lean at Idle Bank 2	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	CONTINUED NEXT LINE
	P0096 - Intake Air Temperature Sensor 2 Performance	P0097 - Intake Air Temperature Sensor 2 Circuit Low	P0098 - Intake Air Temperature Sensor 2 Circuit High	P0099 - Intake Air Temperature Sensor 2 Circuit Erratic	P00A6 - Intake Air Temperature Sensor 2 Performance Bank 2	P00A7 - Intake Air Temperature Sensor 2 Circuit Low Bank 2	P00A8 - Intake Air Temperature Sensor 2 Circuit High Bank 2	P00A9 - Intake Air Temperature Sensor 2 Circuit Erratic Bank 2	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	CONTINUED NEXT LINE
	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P05CC - Cold Start Intake Camshaft Position System Performance Bank 1	P05CD - Cold Start Intake Camshaft Position System Performance Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	CONTINUED NEXT LINE
	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2176 - Minimum Throttle Position Not Learned	P218A - Minimum Throttle Position Not Learned Bank 2	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	CONTINUED NEXT LINE
	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END														
P218A - Minimum Throttle Position Not Learned Bank 2	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0639 - Throttle Actuator Control Command Performance Bank 2	P210A - Throttle Actuator Control Motor Control Circuit Open Bank 2	P210B - Throttle Actuator Position Performance Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P30D7 - Control Module Processor Serial Peripheral Interface Bus 2	END												
P2190 - Fuel Trim System Rich at Idle Bank 2	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	CONTINUED NEXT LINE
	P0096 - Intake Air Temperature Sensor 2 Performance	P0097 - Intake Air Temperature Sensor 2 Circuit Low	P0098 - Intake Air Temperature Sensor 2 Circuit High	P0099 - Intake Air Temperature Sensor 2 Circuit Erratic	P00A6 - Intake Air Temperature Sensor 2 Performance Bank 2	P00A7 - Intake Air Temperature Sensor 2 Circuit Low Bank 2	P00A8 - Intake Air Temperature Sensor 2 Circuit High Bank 2	P00A9 - Intake Air Temperature Sensor 2 Circuit Erratic Bank 2	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	CONTINUED NEXT LINE
	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P05CC - Cold Start Intake Camshaft Position System Performance Bank 1	P05CD - Cold Start Intake Camshaft Position System Performance Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	CONTINUED NEXT LINE
	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2176 - Minimum Throttle Position Not Learned	P218A - Minimum Throttle Position Not Learned Bank 2	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	CONTINUED NEXT LINE
	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END														

The DTCs in this column is inhibited by the DTCs listed to the right	The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left				
Inhibited DTC	Fault Active DTCs						Fault Active DTCs						Fault Active DTCs						Fault Active DTCs				
P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0036 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 2	P0037 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 2	P0038 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0137 - Oxygen Sensor Circuit Low Bank 1 Sensor 2	P0138 - Oxygen Sensor Circuit High Bank 1 Sensor 2	P0140 - Oxygen Sensor Circuit Insufficient Activity Bank 1 Sensor 2	CONTINUED NEXT LINE
	P0141 - Oxygen Sensor Heater Performance Bank 1 Sensor 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	CONTINUED NEXT LINE
	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2232 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 2	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2270 - Oxygen Sensor Signal Stuck Lean Bank 1 Sensor 2	P2271 - Oxygen Sensor Signal Stuck Rich Bank 1 Sensor 2	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	CONTINUED NEXT LINE
	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	END									
P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0036 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 2	P0037 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 2	P0038 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0137 - Oxygen Sensor Circuit Low Bank 1 Sensor 2	P0138 - Oxygen Sensor Circuit High Bank 1 Sensor 2	P0140 - Oxygen Sensor Circuit Insufficient Activity Bank 1 Sensor 2	CONTINUED NEXT LINE
	P0141 - Oxygen Sensor Heater Performance Bank 1 Sensor 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	CONTINUED NEXT LINE
	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2232 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 2	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2270 - Oxygen Sensor Signal Stuck Lean Bank 1 Sensor 2	P2271 - Oxygen Sensor Signal Stuck Rich Bank 1 Sensor 2	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	CONTINUED NEXT LINE
	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	END									
P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0056 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 2	P0057 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 2	P0058 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0157 - Oxygen Sensor Circuit Low Bank 2 Sensor 2	P0158 - Oxygen Sensor Circuit High Bank 2 Sensor 2	P0160 - Oxygen Sensor Circuit Insufficient Activity Bank 2 Sensor 2	CONTINUED NEXT LINE
	P0161 - Oxygen Sensor Heater Performance Bank 2 Sensor 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	CONTINUED NEXT LINE
	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2235 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 2 Sensor 2	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2272 - Oxygen Sensor Signal Stuck Lean Bank 2 Sensor 2	P2273 - Oxygen Sensor Signal Stuck Rich Bank 2 Sensor 2	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	CONTINUED NEXT LINE
	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	END									
P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0056 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 2	P0057 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 2	P0058 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0157 - Oxygen Sensor Circuit Low Bank 2 Sensor 2	P0158 - Oxygen Sensor Circuit High Bank 2 Sensor 2	P0160 - Oxygen Sensor Circuit Insufficient Activity Bank 2 Sensor 2	CONTINUED NEXT LINE
	P0161 - Oxygen Sensor Heater Performance Bank 2 Sensor 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	CONTINUED NEXT LINE
	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2235 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 2 Sensor 2	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2272 - Oxygen Sensor Signal Stuck Lean Bank 2 Sensor 2	P2273 - Oxygen Sensor Signal Stuck Rich Bank 2 Sensor 2	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	CONTINUED NEXT LINE
	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	END									
P219C - Cylinder 1 Fuel Trim Cylinder Balance	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0171 - Fuel Trim System Lean Bank 1	P0172 - Fuel Trim System Rich Bank 1	P0174 - Fuel Trim System Lean Bank 2	P0175 - Fuel Trim System Rich Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	CONTINUED NEXT LINE
	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	CONTINUED NEXT LINE
	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P2177 - Fuel Trim System Lean Off Idle Bank 1	P2178 - Fuel Trim System Rich Off Idle Bank 1	P2179 - Fuel Trim System Lean Off Idle Bank 2	P2180 - Fuel Trim System Rich Off Idle Bank 2	P2187 - Fuel Trim System Lean at Idle Bank 1	P2188 - Fuel Trim System Rich at Idle Bank 1	P2189 - Fuel Trim System Lean at Idle Bank 2	P2190 - Fuel Trim System Rich at Idle Bank 2	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	CONTINUED NEXT LINE
	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E68 - Fuel Trim System Lean During Cylinder Deactivation Bank 1	P2E69 - Fuel Trim System Rich During Cylinder Deactivation Bank 1	P2E6A - Fuel Trim System Lean During Cylinder Deactivation Bank 2	P2E6B - Fuel Trim System Rich During Cylinder Deactivation Bank 2	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	END												
P219D - Cylinder 2 Fuel Trim Cylinder Balance	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0171 - Fuel Trim System Lean Bank 1	P0172 - Fuel Trim System Rich Bank 1	P0174 - Fuel Trim System Lean Bank 2	P0175 - Fuel Trim System Rich Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	CONTINUED NEXT LINE
	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	CONTINUED NEXT LINE
	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P2177 - Fuel Trim System Lean Off Idle Bank 1	P2178 - Fuel Trim System Rich Off Idle Bank 1	P2179 - Fuel Trim System Lean Off Idle Bank 2	P2180 - Fuel Trim System Rich Off Idle Bank 2	P2187 - Fuel Trim System Lean at Idle Bank 1	P2188 - Fuel Trim System Rich at Idle Bank 1	P2189 - Fuel Trim System Lean at Idle Bank 2	P2190 - Fuel Trim System Rich at Idle Bank 2	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	CONTINUED NEXT LINE
	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E68 - Fuel Trim System Lean During Cylinder Deactivation Bank 1	P2E69 - Fuel Trim System Rich During Cylinder Deactivation Bank 1	P2E6A - Fuel Trim System Lean During Cylinder Deactivation Bank 2	P2E6B - Fuel Trim System Rich During Cylinder Deactivation Bank 2	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	END												
P219E - Cylinder 3 Fuel Trim Cylinder Balance	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0171 - Fuel Trim System Lean Bank 1	P0172 - Fuel Trim System Rich Bank 1	P0174 - Fuel Trim System Lean Bank 2	P0175 - Fuel Trim System Rich Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	CONTINUED NEXT LINE
	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	CONTINUED NEXT LINE
	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P2177 - Fuel Trim System Lean Off Idle Bank 1	P2178 - Fuel Trim System Rich Off Idle Bank 1	P2179 - Fuel Trim System Lean Off Idle Bank 2	P2180 - Fuel Trim System Rich Off Idle Bank 2	P2187 - Fuel Trim System Lean at Idle Bank 1	P2188 - Fuel Trim System Rich at Idle Bank 1	P2189 - Fuel Trim System Lean at Idle Bank 2	P2190 - Fuel Trim System Rich at Idle Bank 2	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	CONTINUED NEXT LINE
	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E68 - Fuel Trim System Lean During Cylinder Deactivation Bank 1	P2E69 - Fuel Trim System Rich During Cylinder Deactivation Bank 1	P2E6A - Fuel Trim System Lean During Cylinder Deactivation Bank 2	P2E6B - Fuel Trim System Rich During Cylinder Deactivation Bank 2	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	END												
P219F - Cylinder 4 Fuel Trim Cylinder Balance	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0171 - Fuel Trim System Lean Bank 1	P0172 - Fuel Trim System Rich Bank 1	P0174 - Fuel Trim System Lean Bank 2	P0175 - Fuel Trim System Rich Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	CONTINUED NEXT LINE
	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	CONTINUED NEXT LINE
	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P2177 - Fuel Trim System Lean Off Idle Bank 1	P2178 - Fuel Trim System Rich Off Idle Bank 1	P2179 - Fuel Trim System Lean Off Idle Bank 2	P2180 - Fuel Trim System Rich Off Idle Bank 2	P2187 - Fuel Trim System Lean at Idle Bank 1	P2188 - Fuel Trim System Rich at Idle Bank 1	P2189 - Fuel Trim System Lean at Idle Bank 2	P2190 - Fuel Trim System Rich at Idle Bank 2	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	CONTINUED NEXT LINE
	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E68 - Fuel Trim System Lean During Cylinder Deactivation Bank 1	P2E69 - Fuel Trim System Rich During Cylinder Deactivation Bank 1	P2E6A - Fuel Trim System Lean During Cylinder Deactivation Bank 2	P2E6B - Fuel Trim System Rich During Cylinder Deactivation Bank 2	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	END												
P21A0 - Cylinder 5 Fuel Trim Cylinder Balance	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0171 - Fuel Trim System Lean Bank 1	P0172 - Fuel Trim System Rich Bank 1	P0174 - Fuel Trim System Lean Bank 2	P0175 - Fuel Trim System Rich Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	CONTINUED NEXT LINE
	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	CONTINUED NEXT LINE
	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P2177 - Fuel Trim System Lean Off Idle Bank 1	P2178 - Fuel Trim System Rich Off Idle Bank 1	P2179 - Fuel Trim System Lean Off Idle Bank 2	P2180 - Fuel Trim System Rich Off Idle Bank 2	P2187 - Fuel Trim System Lean at Idle Bank 1	P2188 - Fuel Trim System Rich at Idle Bank 1	P2189 - Fuel Trim System Lean at Idle Bank 2	P2190 - Fuel Trim System Rich at Idle Bank 2	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	CONTINUED NEXT LINE
	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E68 - Fuel Trim System Lean During Cylinder Deactivation Bank 1	P2E69 - Fuel Trim System Rich During Cylinder Deactivation Bank 1	P2E6A - Fuel Trim System Lean During Cylinder Deactivation Bank 2	P2E6B - Fuel Trim System Rich During Cylinder Deactivation Bank 2	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	END												
P21A1 - Cylinder 6 Fuel Trim Cylinder Balance	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0171 - Fuel Trim System Lean Bank 1	P0172 - Fuel Trim System Rich Bank 1	P0174 - Fuel Trim System Lean Bank 2	P0175 - Fuel Trim System Rich Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	CONTINUED NEXT LINE
	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	CONTINUED NEXT LINE
	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P2177 - Fuel Trim System Lean Off Idle Bank 1	P2178 - Fuel Trim System Rich Off Idle Bank 1	P2179 - Fuel Trim System Lean Off Idle Bank 2	P2180 - Fuel Trim System Rich Off Idle Bank 2	P2187 - Fuel Trim System Lean at Idle Bank 1	P2188 - Fuel Trim System Rich at Idle Bank 1	P2189 - Fuel Trim System Lean at Idle Bank 2	P2190 - Fuel Trim System Rich at Idle Bank 2	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	CONTINUED NEXT LINE
	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E68 - Fuel Trim System Lean During Cylinder Deactivation Bank 1	P2E69 - Fuel Trim System Rich During Cylinder Deactivation Bank 1	P2E6A - Fuel Trim System Lean During Cylinder Deactivation Bank 2	P2E6B - Fuel Trim System Rich During Cylinder Deactivation Bank 2	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	END												

The DTCs in this column is inhibited by the DTCs listed to the right	The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left				
Inhibited DTC	Fault Active DTCs						Fault Active DTCs						Fault Active DTCs						Fault Active DTCs				
P21A2 - Cylinder 7 Fuel Trim Cylinder Balance	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0171 - Fuel Trim System Lean Bank 1	P0172 - Fuel Trim System Rich Bank 1	P0174 - Fuel Trim System Lean Bank 2	P0175 - Fuel Trim System Rich Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	CONTINUED NEXT LINE
	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	CONTINUED NEXT LINE
	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P2177 - Fuel Trim System Lean Off Idle Bank 1	P2178 - Fuel Trim System Rich Off Idle Bank 1	P2179 - Fuel Trim System Lean Off Idle Bank 2	P2180 - Fuel Trim System Rich Off Idle Bank 2	P2187 - Fuel Trim System Lean at Idle Bank 1	P2188 - Fuel Trim System Rich at Idle Bank 1	P2189 - Fuel Trim System Lean at Idle Bank 2	P2190 - Fuel Trim System Rich at Idle Bank 2	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	CONTINUED NEXT LINE
	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E68 - Fuel Trim System Lean During Cylinder Deactivation Bank 1	P2E69 - Fuel Trim System Rich During Cylinder Deactivation Bank 1	P2E6A - Fuel Trim System Lean During Cylinder Deactivation Bank 2	P2E6B - Fuel Trim System Rich During Cylinder Deactivation Bank 2	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	END												
P21A3 - Cylinder 8 Fuel Trim Cylinder Balance	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0171 - Fuel Trim System Lean Bank 1	P0172 - Fuel Trim System Rich Bank 1	P0174 - Fuel Trim System Lean Bank 2	P0175 - Fuel Trim System Rich Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	CONTINUED NEXT LINE
	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	CONTINUED NEXT LINE
	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P2177 - Fuel Trim System Lean Off Idle Bank 1	P2178 - Fuel Trim System Rich Off Idle Bank 1	P2179 - Fuel Trim System Lean Off Idle Bank 2	P2180 - Fuel Trim System Rich Off Idle Bank 2	P2187 - Fuel Trim System Lean at Idle Bank 1	P2188 - Fuel Trim System Rich at Idle Bank 1	P2189 - Fuel Trim System Lean at Idle Bank 2	P2190 - Fuel Trim System Rich at Idle Bank 2	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	CONTINUED NEXT LINE
	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E68 - Fuel Trim System Lean During Cylinder Deactivation Bank 1	P2E69 - Fuel Trim System Rich During Cylinder Deactivation Bank 1	P2E6A - Fuel Trim System Lean During Cylinder Deactivation Bank 2	P2E6B - Fuel Trim System Rich During Cylinder Deactivation Bank 2	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	END												
P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0236 - Turbocharger Boost Sensor Performance	P0237 - Turbocharger Boost Sensor Circuit Low	P0238 - Turbocharger Boost Sensor Circuit High	P0240 - Turbocharger Boost Sensor Performance Bank 2	P0241 - Turbocharger Boost Sensor Circuit Low Bank 2	P0242 - Turbocharger Boost Sensor Circuit High Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2176 - Minimum Throttle Position Not Learned	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	CONTINUED NEXT LINE
	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END																		
P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	END																						
P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	END																						
P222B - Barometric Pressure Sensor Performance Bank 2 Sensor 1	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	END																			
P222C - Barometric Pressure Sensor Circuit Low Bank 2 Sensor 1	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	END																			
P222D - Barometric Pressure Sensor Circuit High Bank 2 Sensor 1	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	END																			
P2232 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 2	P0036 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 2	P0037 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 2	P0038 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 2	END																			
P2235 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 2 Sensor 2	P0056 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 2	P0057 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 2	P0058 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 2	END																			
P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	END										
P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	END										
P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	END	
P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	END	
P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	END										
P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	END										
P2270 - Oxygen Sensor Signal Stuck Lean Bank 1 Sensor 2	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0036 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 2	P0037 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 2	P0038 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0137 - Oxygen Sensor Circuit Low Bank 1 Sensor 2	P0138 - Oxygen Sensor Circuit High Bank 1 Sensor 2	P013A - Oxygen Sensor Slow Response - Rich to Lean Bank 1 Sensor 2	P013B - Oxygen Sensor Slow Response - Lean to Rich Bank 1 Sensor 2	P013E - Oxygen Sensor Delayed Response - Rich to Lean Bank 1 Sensor 2	P013F - Oxygen Sensor Delayed Response - Lean to Rich Bank 1 Sensor 2	P0140 - Oxygen Sensor Circuit Insufficient Activity Bank 1 Sensor 2	CONTINUED NEXT LINE
	P0141 - Oxygen Sensor Heater Performance Bank 1 Sensor 2	P0171 - Fuel Trim System Lean Bank 1	P0172 - Fuel Trim System Rich Bank 1	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	CONTINUED NEXT LINE
	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	CONTINUED NEXT LINE
	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2177 - Fuel Trim System Lean Off Idle Bank 1	P2178 - Fuel Trim System Rich Off Idle Bank 1	P2187 - Fuel Trim System Lean at Idle Bank 1	P2188 - Fuel Trim System Rich at Idle Bank 1	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2232 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 2	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2270 - Oxygen Sensor Signal Stuck Lean Bank 1 Sensor 2	P2271 - Oxygen Sensor Signal Stuck Rich Bank 1 Sensor 2	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E68 - Fuel Trim System Lean During Cylinder Deactivation Bank 1	P2E69 - Fuel Trim System Rich During Cylinder Deactivation Bank 1	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END				
P2271 - Oxygen Sensor Signal Stuck Rich Bank 1 Sensor 2	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0036 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 2	P0037 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 2	P0038 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0137 - Oxygen Sensor Circuit Low Bank 1 Sensor 2	P0138 - Oxygen Sensor Circuit High Bank 1 Sensor 2	P013A - Oxygen Sensor Slow Response - Rich to Lean Bank 1 Sensor 2	P013B - Oxygen Sensor Slow Response - Lean to Rich Bank 1 Sensor 2	P013E - Oxygen Sensor Delayed Response - Rich to Lean Bank 1 Sensor 2	P013F - Oxygen Sensor Delayed Response - Lean to Rich Bank 1 Sensor 2	P0140 - Oxygen Sensor Circuit Insufficient Activity Bank 1 Sensor 2	CONTINUED NEXT LINE
	P0141 - Oxygen Sensor Heater Performance Bank 1 Sensor 2	P0171 - Fuel Trim System Lean Bank 1	P0172 - Fuel Trim System Rich Bank 1	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	CONTINUED NEXT LINE
	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	CONTINUED NEXT LINE
	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2177 - Fuel Trim System Lean Off Idle Bank 1	P2178 - Fuel Trim System Rich Off Idle Bank 1	P2187 - Fuel Trim System Lean at Idle Bank 1	P2188 - Fuel Trim System Rich at Idle Bank 1	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2232 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 2	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2270 - Oxygen Sensor Signal Stuck Lean Bank 1 Sensor 2	P2271 - Oxygen Sensor Signal Stuck Rich Bank 1 Sensor 2	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E68 - Fuel Trim System Lean During Cylinder Deactivation Bank 1	P2E69 - Fuel Trim System Rich During Cylinder Deactivation Bank 1	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END				
P2272 - Oxygen Sensor Signal Stuck Lean Bank 2 Sensor 2	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0056 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 2	P0057 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 2	P0058 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P013C - Oxygen Sensor Slow Response - Rich to Lean Bank 2 Sensor 2	P013D - Oxygen Sensor Slow Response - Lean to Rich Bank 2 Sensor 2	P014A - Oxygen Sensor Delayed Response - Rich to Lean Bank 2 Sensor 2	P014B - Oxygen Sensor Delayed Response - Lean to Rich Bank 2 Sensor 2	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0157 - Oxygen Sensor Circuit Low Bank 2 Sensor 2	P0158 - Oxygen Sensor Circuit High Bank 2 Sensor 2	P0160 - Oxygen Sensor Circuit Insufficient Activity Bank 2 Sensor 2	CONTINUED NEXT LINE
	P0161 - Oxygen Sensor Heater Performance Bank 2 Sensor 2	P0174 - Fuel Trim System Lean Bank 2	P0175 - Fuel Trim System Rich Bank 2	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	CONTINUED NEXT LINE
	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	CONTINUED NEXT LINE
	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2179 - Fuel Trim System Lean Off Idle Bank 2	P2180 - Fuel Trim System Rich Off Idle Bank 2	P2189 - Fuel Trim System Lean at Idle Bank 2	P2190 - Fuel Trim System Rich at Idle Bank 2	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2235 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 2 Sensor 2	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2272 - Oxygen Sensor Signal Stuck Lean Bank 2 Sensor 2	P2273 - Oxygen Sensor Signal Stuck Rich Bank 2 Sensor 2	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E6A - Fuel Trim System Lean During Cylinder Deactivation Bank 2	P2E6B - Fuel Trim System Rich During Cylinder Deactivation Bank 2	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END				

The DTCs in this column is inhibited by the DTCs listed to the right	The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left				
Inhibited DTC	Fault Active DTCs						Fault Active DTCs						Fault Active DTCs						Fault Active DTCs				
P2273 - Oxygen Sensor Signal Stuck Rich Bank 2 Sensor 2	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0056 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 2	P0057 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 2	P0058 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 2	P0101 - Mass Air Flow Sensor Performance	P0102 - Mass Air Flow Sensor Circuit Low	P0103 - Mass Air Flow Sensor Circuit High	P0106 - Manifold Absolute Pressure Sensor Performance	CONTINUED NEXT LINE
	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P010B - Mass Air Flow Sensor 2 Performance	P010C - Mass Air Flow Sensor 2 Circuit Low	P010D - Mass Air Flow Sensor 2 Circuit High	P0116 - Engine Coolant Temperature Sensor Performance	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	P013C - Oxygen Sensor Slow Response - Rich to Lean Bank 2 Sensor 2	P013D - Oxygen Sensor Slow Response - Lean to Rich Bank 2 Sensor 2	P014A - Oxygen Sensor Delayed Response - Rich to Lean Bank 2 Sensor 2	P014B - Oxygen Sensor Delayed Response - Lean to Rich Bank 2 Sensor 2	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0157 - Oxygen Sensor Circuit Low Bank 2 Sensor 2	P0158 - Oxygen Sensor Circuit High Bank 2 Sensor 2	P0160 - Oxygen Sensor Circuit Insufficient Activity Bank 2 Sensor 2	CONTINUED NEXT LINE
	P0161 - Oxygen Sensor Heater Performance Bank 2 Sensor 2	P0174 - Fuel Trim System Lean Bank 2	P0175 - Fuel Trim System Rich Bank 2	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	CONTINUED NEXT LINE
	P0497 - Evaporative Emission System No Flow During Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P0641 - Sensor Reference Voltage 1 Circuit Open	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	CONTINUED NEXT LINE
	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2179 - Fuel Trim System Lean Off Idle Bank 2	P2180 - Fuel Trim System Rich Off Idle Bank 2	P2189 - Fuel Trim System Lean at Idle Bank 2	P2190 - Fuel Trim System Rich at Idle Bank 2	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2235 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 2 Sensor 2	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2272 - Oxygen Sensor Signal Stuck Lean Bank 2 Sensor 2	P2273 - Oxygen Sensor Signal Stuck Rich Bank 2 Sensor 2	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P2E6A - Fuel Trim System Lean During Cylinder Deactivation Bank 2	P2E6B - Fuel Trim System Rich During Cylinder Deactivation Bank 2	P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	CONTINUED NEXT LINE
	P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	P3499 - Cylinder 2 Deactivation Performance	P349A - Cylinder 3 Deactivation Performance	P349C - Cylinder 5 Deactivation Performance	P349F - Cylinder 8 Deactivation Performance	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END				
P227B - Barometric Pressure Sensor Performance Bank 1 Sensor 2	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	END																			
P227C - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 2	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	END																			
P227D - Barometric Pressure Sensor Circuit High Bank 1 Sensor 2	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	END																			
P228C - Fuel Pressure Regulator Exceeded Control Limits - Pressure Too Low	P0090 - Fuel Pressure Regulator Control Circuit Open	P0191 - Fuel Rail Pressure Sensor Performance	P10E8 - Fuel Pressure Regulator High Control Circuit Shorted to Control Circuit	P2C02 - Fuel Pressure Regulator Control Circuit Open Bank 2	P313A - Fuel Pressure Regulator High Control Circuit Shorted to Control Circuit Bank 2	END																	
P228D - Fuel Pressure Regulator Exceeded Control Limits - Pressure Too High	P0090 - Fuel Pressure Regulator Control Circuit Open	P0191 - Fuel Rail Pressure Sensor Performance	P10E8 - Fuel Pressure Regulator High Control Circuit Shorted to Control Circuit	P2C02 - Fuel Pressure Regulator Control Circuit Open Bank 2	P313A - Fuel Pressure Regulator High Control Circuit Shorted to Control Circuit Bank 2	END																	
P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	END								
P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	END								
P2300 - Ignition Coil 1 Control Circuit Low	END																						
P2301 - Ignition Coil 1 Control Circuit High	END																						
P2303 - Ignition Coil 2 Control Circuit Low	END																						
P2304 - Ignition Coil 2 Control Circuit High	END																						
P2306 - Ignition Coil 3 Control Circuit Low	END																						
P2307 - Ignition Coil 3 Control Circuit High	END																						
P2309 - Ignition Coil 4 Control Circuit Low	END																						
P2310 - Ignition Coil 4 Control Circuit High	END																						
P2312 - Ignition Coil 5 Control Circuit Low	END																						
P2313 - Ignition Coil 5 Control Circuit High	END																						
P2315 - Ignition Coil 6 Control Circuit Low	END																						
P2316 - Ignition Coil 6 Control Circuit High	END																						
P2318 - Ignition Coil 7 Control Circuit Low	END																						
P2319 - Ignition Coil 7 Control Circuit High	END																						
P2321 - Ignition Coil 8 Control Circuit Low	END																						
P2322 - Ignition Coil 8 Control Circuit High	END																						
P2500 - Generator L-Terminal Circuit Low	END																						
P2501 - Generator L-Terminal Circuit High	END																						
P2534 - Ignition On/Start Switch Circuit Low	END																						
P2535 - Ignition On/Start Switch Circuit High	END																						
P2537 - Ignition Accessory Switch Circuit Low	END																						
P2538 - Ignition Accessory Switch Circuit High	END																						
P257D - Engine Hood Switch Performance	END																						
P257E - Engine Hood Switch Circuit Low	END																						
P257F - Engine Hood Switch Circuit High	END																						
P25A2 - Brake System Control Module Requested MIL Illumination	END																						
P25B3 - Turbocharger A Wastegate Stuck Open	END																						
P25B4 - Turbocharger A Wastegate Stuck Closed	END																						
P25B5 - Turbocharger B Wastegate Stuck Open	END																						
P25B6 - Turbocharger B Wastegate Stuck Closed	END																						
P25CA - Camshaft Position Actuator Park Lock Control Circuit Open	END																						
P25CB - Camshaft Position Actuator Park Lock Control Circuit Low	END																						
P25CC - Camshaft Position Actuator Park Lock Control Circuit High	END																						
P25CD - Intake Camshaft Position Actuator Park Lock Control Circuit Open Bank 2	END																						
P25CE - Intake Camshaft Position Actuator Park Lock Control Circuit Low Bank 2	END																						

The DTCs in this column is inhibited by the DTCs listed to the right	The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left				
Inhibited DTC	Fault Active DTCs						Fault Active DTCs						Fault Active DTCs						Fault Active DTCs				
P25CF - Intake Camshaft Position Actuator Park Lock Control Circuit High Bank 2	END																						
P2600 - Auxiliary Coolant Pump Relay Control Circuit Open	END																						
P2602 - Auxiliary Coolant Pump Relay Control Circuit Low	END																						
P2603 - Auxiliary Coolant Pump Relay Control Circuit High	END																						
P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	END										
P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	END										
P262B - Control Module Power Off Timer Performance	P0072 - Ambient Air Temperature Sensor Circuit Low	P0073 - Ambient Air Temperature Sensor Circuit High	P0074 - Ambient Air Temperature Sensor Circuit Intermittent	P0117 - Engine Coolant Temperature Sensor Circuit Low	P0118 - Engine Coolant Temperature Sensor Circuit High	P0119 - Engine Coolant Temperature Sensor Circuit Erratic	P0603 - Control Module Long Term Memory Reset	P0604 - Control Module Random Access Memory	P0651 - Sensor Reference Voltage 2 Circuit Open	P0689 - Engine Controls Ignition Relay Feedback Circuit Low	P0690 - Engine Controls Ignition Relay Feedback Circuit High	P0697 - Sensor Reference Voltage 3 Circuit Open	P262B - Control Module Power Off Timer Performance	END									
P2635 - Fuel Pump Flow Performance	END																						
P263A - Malfunction Indicator Lamp Control Circuit Low	END																						
P263B - Malfunction Indicator Lamp Control Circuit High	END																						
P26E4 - Starter Drive Pinion Relay Control Circuit Open	END																						
P26E5 - Starter Drive Pinion Relay Control Circuit Low	END																						
P26E6 - Starter Drive Pinion Relay Control Circuit High	END																						
P26FA - Low Temperature Loop Coolant Pump Overspeed	END																						
P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P00A6 - Intake Air Temperature Sensor 2 Performance Bank 2	P00A7 - Intake Air Temperature Sensor 2 Circuit Low Bank 2	P00A8 - Intake Air Temperature Sensor 2 Circuit High Bank 2	P00A9 - Intake Air Temperature Sensor 2 Circuit Erratic Bank 2	P0107 - Manifold Absolute Pressure Sensor Circuit Low	P0108 - Manifold Absolute Pressure Sensor Circuit High	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0240 - Turbocharger Boost Sensor Performance Bank 2	CONTINUED NEXT LINE
	P0241 - Turbocharger Boost Sensor Circuit Low Bank 2	P0242 - Turbocharger Boost Sensor Circuit High Bank 2	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P218A - Minimum Throttle Position Not Learned Bank 2	P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	CONTINUED NEXT LINE
	P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END																		
P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	END																					
P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	END																					
P2AB8 - Turbocharger A Wastegate Position Sensor Circuit Low	END																						
P2AB9 - Turbocharger A Wastegate Position Sensor Circuit High	END																						
P2ABB - Turbocharger B Wastegate Position Sensor Circuit Low	END																						
P2ABC - Turbocharger B Wastegate Position Sensor Circuit High	END																						
P2ABD - Turbocharger Wastegate Actuator A Driver Current/Temperature Too High	END																						
P2ABE - Turbocharger Wastegate Actuator B Driver Current/Temperature Too High	END																						
P2B81 - Turbocharger A Wastegate Position Sensor Performance	END																						
P2B82 - Turbocharger B Wastegate Position Sensor Performance	END																						
P2B93 - Turbocharger A Wastegate Position Sensor Exceeded Learning Limit	P25B3 - Turbocharger A Wastegate Stuck Open	P25B4 - Turbocharger A Wastegate Stuck Closed	END																				
P2B94 - Turbocharger B Wastegate Position Sensor Exceeded Learning Limit	P25B5 - Turbocharger B Wastegate Stuck Open	P25B6 - Turbocharger B Wastegate Stuck Closed	END																				
P2B95 - Cold Start Injection Pulse Performance	END																						
P2BA0 - Low Temperature Loop Coolant Pump Underspeed	END																						
P2C02 - Fuel Pressure Regulator Control Circuit Open Bank 2	END																						
P2C03 - Fuel Pressure Regulator Control Circuit Low Bank 2	END																						
P2C04 - Fuel Pressure Regulator Control Circuit High Bank 2	END																						
P2C48 - Low Temperature Loop Coolant Pump Performance	END																						
P2C9B - Cold Start Turbocharger A Wastegate Control Performance	END																						
P2C9C - Cold Start Turbocharger B Wastegate Control Performance	END																						
P2E68 - Fuel Trim System Lean During Cylinder Deactivation Bank 1	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	CONTINUED NEXT LINE
	P0096 - Intake Air Temperature Sensor 2 Performance	P0097 - Intake Air Temperature Sensor 2 Circuit Low	P0098 - Intake Air Temperature Sensor 2 Circuit High	P0099 - Intake Air Temperature Sensor 2 Circuit Erratic	P00A6 - Intake Air Temperature Sensor 2 Performance Bank 2	P00A7 - Intake Air Temperature Sensor 2 Circuit Low Bank 2	P00A8 - Intake Air Temperature Sensor 2 Circuit High Bank 2	P00A9 - Intake Air Temperature Sensor 2 Circuit Erratic Bank 2	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	CONTINUED NEXT LINE
	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	CONTINUED NEXT LINE
	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P05CC - Cold Start Intake Camshaft Position System Performance Bank 1	P05CD - Cold Start Intake Camshaft Position System Performance Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	CONTINUED NEXT LINE
	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2176 - Minimum Throttle Position Not Learned	P218A - Minimum Throttle Position Not Learned Bank 2	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	CONTINUED NEXT LINE
	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END																		

The DTCs in this column is inhibited by the DTCs listed to the right	The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left						The DTCs in these columns inhibit the DTC to the left				
Inhibited DTC	Fault Active DTCs						Fault Active DTCs						Fault Active DTCs						Fault Active DTCs				
P2E69 - Fuel Trim System Rich During Cylinder Deactivation Bank 1	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	CONTINUED NEXT LINE
	P0096 - Intake Air Temperature Sensor 2 Performance	P0097 - Intake Air Temperature Sensor 2 Circuit Low	P0098 - Intake Air Temperature Sensor 2 Circuit High	P0099 - Intake Air Temperature Sensor 2 Circuit Erratic	P00A6 - Intake Air Temperature Sensor 2 Performance Bank 2	P00A7 - Intake Air Temperature Sensor 2 Circuit Low Bank 2	P00A8 - Intake Air Temperature Sensor 2 Circuit High Bank 2	P00A9 - Intake Air Temperature Sensor 2 Circuit Erratic Bank 2	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	CONTINUED NEXT LINE
	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	CONTINUED NEXT LINE
	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P05CC - Cold Start Intake Camshaft Position System Performance Bank 1	P05CD - Cold Start Intake Camshaft Position System Performance Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	CONTINUED NEXT LINE
	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2176 - Minimum Throttle Position Not Learned	P218A - Minimum Throttle Position Not Learned Bank 2	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	CONTINUED NEXT LINE
	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END																		
P2E6A - Fuel Trim System Lean During Cylinder Deactivation Bank 2	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	CONTINUED NEXT LINE
	P0096 - Intake Air Temperature Sensor 2 Performance	P0097 - Intake Air Temperature Sensor 2 Circuit Low	P0098 - Intake Air Temperature Sensor 2 Circuit High	P0099 - Intake Air Temperature Sensor 2 Circuit Erratic	P00A6 - Intake Air Temperature Sensor 2 Performance Bank 2	P00A7 - Intake Air Temperature Sensor 2 Circuit Low Bank 2	P00A8 - Intake Air Temperature Sensor 2 Circuit High Bank 2	P00A9 - Intake Air Temperature Sensor 2 Circuit Erratic Bank 2	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	CONTINUED NEXT LINE
	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	CONTINUED NEXT LINE
	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P05CC - Cold Start Intake Camshaft Position System Performance Bank 1	P05CD - Cold Start Intake Camshaft Position System Performance Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	CONTINUED NEXT LINE
	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2176 - Minimum Throttle Position Not Learned	P218A - Minimum Throttle Position Not Learned Bank 2	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	CONTINUED NEXT LINE
	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END																		
P2E6B - Fuel Trim System Rich During Cylinder Deactivation Bank 2	P000A - Camshaft Position System Slow Response Bank 1	P000B - Exhaust Camshaft Position System Slow Response Bank 1	P000C - Intake Camshaft Position System Slow Response Bank 2	P000D - Exhaust Camshaft Position System Slow Response Bank 2	P0010 - Camshaft Position Actuator Control Circuit Open	P0011 - Camshaft Position System Performance	P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	P0014 - Exhaust Camshaft Position System Performance Bank 1	P0016 - Crankshaft to Camshaft Correlation	P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	P0021 - Intake Camshaft Position System Performance Bank 2	P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	P0024 - Exhaust Camshaft Position System Performance Bank 2	P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	CONTINUED NEXT LINE
	P0096 - Intake Air Temperature Sensor 2 Performance	P0097 - Intake Air Temperature Sensor 2 Circuit Low	P0098 - Intake Air Temperature Sensor 2 Circuit High	P0099 - Intake Air Temperature Sensor 2 Circuit Erratic	P00A6 - Intake Air Temperature Sensor 2 Performance Bank 2	P00A7 - Intake Air Temperature Sensor 2 Circuit Low Bank 2	P00A8 - Intake Air Temperature Sensor 2 Circuit High Bank 2	P00A9 - Intake Air Temperature Sensor 2 Circuit Erratic Bank 2	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	CONTINUED NEXT LINE
	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0300 - Engine Misfire Detected	P0301 - Cylinder 1 Misfire Detected	P0302 - Cylinder 2 Misfire Detected	P0303 - Cylinder 3 Misfire Detected	P0304 - Cylinder 4 Misfire Detected	P0305 - Cylinder 5 Misfire Detected	P0306 - Cylinder 6 Misfire Detected	P0307 - Cylinder 7 Misfire Detected	P0308 - Cylinder 8 Misfire Detected	P0335 - Crankshaft Position Sensor Circuit	P0336 - Crankshaft Position Sensor Performance	P034A - Crankshaft Position Sensor Start Position Incorrect	P034B - Crankshaft Position Sensor Direction Incorrect	P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	P0459 - Evaporative Emission Purge Solenoid Control Circuit High	P0496 - Evaporative Emission System Flow During Non-Purge	P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2	CONTINUED NEXT LINE
	P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2	P04AE - Evaporative Emission Purge Solenoid Performance Bank 2	P04DF - Evaporative Emission Purge Solenoid Performance Bank 1	P05CC - Cold Start Intake Camshaft Position System Performance Bank 1	P05CD - Cold Start Intake Camshaft Position System Performance Bank 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	P0651 - Sensor Reference Voltage 2 Circuit Open	P0697 - Sensor Reference Voltage 3 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	P2088 - Camshaft Position Actuator Control Circuit Low	P2089 - Camshaft Position Actuator Control Circuit High	P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	CONTINUED NEXT LINE
	P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P2176 - Minimum Throttle Position Not Learned	P218A - Minimum Throttle Position Not Learned Bank 2	P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	CONTINUED NEXT LINE
	U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	U136D - Invalid Data Received From Throttle Position Sensor 2	U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	END																		
P3051 - DC/DC Converter Output Voltage Sensing Circuit 1 Low	END																						
P3052 - DC/DC Converter Output Voltage Sensing Circuit 2 Low	END																						
P3053 - DC/DC Converter Output Voltage Sensing Circuit 1 High	END																						
P3054 - DC/DC Converter Output Voltage Sensing Circuit 2 High	END																						
P3055 - DC/DC Converter Output Voltage 1 Performance	END																						
P3056 - DC/DC Converter Output Voltage 2 Performance	END																						
P305B - DC/DC Converter Ignition Switch Run/Start Position Circuit High	END																						
P305C - DC/DC Converter Ignition Switch Run/Start Position Circuit Low	END																						
P305D - DC/DC Converter Crank Input Signal Circuit High Voltage	END																						
P305E - DC/DC Converter Crank Input Signal Circuit Low Voltage	END																						
P30D6 - Control Module Processor Serial Peripheral Interface Bus 1	END																						
P30D7 - Control Module Processor Serial Peripheral Interface Bus 2	END																						
P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	END																					
P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	END																					
P30E3 - Closed Throttle Position Exceeded Maximum Learning Limit	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0638 - Throttle Actuator Control Command Performance	P2100 - Throttle Actuator Control Motor Control Circuit Open	P2101 - Throttle Actuator Position Performance	P30D6 - Control Module Processor Serial Peripheral Interface Bus 1	END												
P30E4 - Closed Throttle Position Exceeded Minimum Learning Limit	P0121 - Throttle Position Sensor Performance	P0122 - Throttle Position Sensor Circuit Low	P0123 - Throttle Position Sensor Circuit High	P0221 - Throttle Position Sensor 2 Performance	P0222 - Throttle Position Sensor 2 Circuit Low	P0223 - Throttle Position Sensor 2 Circuit High	P0638 - Throttle Actuator Control Command Performance	P2100 - Throttle Actuator Control Motor Control Circuit Open	P2101 - Throttle Actuator Position Performance	P30D6 - Control Module Processor Serial Peripheral Interface Bus 1	END												
P30E5 - Closed Throttle Position Exceeded Maximum Learning Limit Bank 2	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0639 - Throttle Actuator Control Command Performance Bank 2	P210A - Throttle Actuator Control Motor Control Circuit Open Bank 2	P210B - Throttle Actuator Position Performance Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P30D7 - Control Module Processor Serial Peripheral Interface Bus 2	END												
P30E6 - Closed Throttle Position Exceeded Minimum Learning Limit Bank 2	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0639 - Throttle Actuator Control Command Performance Bank 2	P210A - Throttle Actuator Control Motor Control Circuit Open Bank 2	P210B - Throttle Actuator Position Performance Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P30D7 - Control Module Processor Serial Peripheral Interface Bus 2	END												
P30E7 - Throttle Rest Position Not Reached During Learn Bank 2	P0226 - Throttle Position Sensor Performance Bank 2	P0227 - Throttle Position Sensor Circuit Low Bank 2	P0228 - Throttle Position Sensor Circuit High Bank 2	P0639 - Throttle Actuator Control Command Performance Bank 2	P210A - Throttle Actuator Control Motor Control Circuit Open Bank 2	P210B - Throttle Actuator Position Performance Bank 2	P212B - Throttle Position Sensor 2 Performance Bank 2	P212C - Throttle Position Sensor 2 Circuit Low Bank 2	P212D - Throttle Position Sensor 2 Circuit High Bank 2	P30D7 - Control Module Processor Serial Peripheral Interface Bus 2	END												
P30E8 - Turbocharger A Wastegate Control Circuit 2 Low	END																						
P30E9 - Turbocharger A Wastegate Control Circuit 2 High	END																						
P30EA - Turbocharger B Wastegate Control Circuit 2 Low	END																						
P30EB - Turbocharger B Wastegate Control Circuit 2 High	END																						
P3138 - Fuel Pressure Regulator High Control Circuit Low Bank 2	END																						
P3139 - Fuel Pressure Regulator High Control Circuit High Bank 2	END																						
P313A - Fuel Pressure Regulator High Control Circuit Shorted to Control Circuit Bank 2	END																						
P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	END																						
P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	END																						
P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	END																						
P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	END																						

The DTCs in this column is inhibited by the DTCs listed to the right	The DTCs in these columns inhibit the DTC to the left	The DTCs in these columns inhibit the DTC to the left	The DTCs in these columns inhibit the DTC to the left	The DTCs in these columns inhibit the DTC to the left
Inhibited DTC	Fault Active DTCs	Fault Active DTCs	Fault Active DTCs	Fault Active DTCs
P3196 - Low Temperature Loop Coolant Pump Speed Performance	END			
P3198 - Low Temperature Loop Coolant Pump Motor Current Out Of Range High	END			
P3199 - Low Temperature Loop Coolant Pump Motor Current Out Of Range Low	END			
P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	END			
P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	END			
P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	END			
P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	END			
P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	END			
P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	END			
P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	END			
P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	END			
P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	END			
P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	END			
P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	END			
P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	END			
P3499 - Cylinder 2 Deactivation Performance	END			
P349A - Cylinder 3 Deactivation Performance	END			
P349C - Cylinder 5 Deactivation Performance	END			
P349F - Cylinder 8 Deactivation Performance	END			
U0073 - Control Module Communication High Speed CAN Bus Off	END			
U0074 - Control Module Communication Powertrain Expansion CAN Bus Off	END			
U0076 - Control Module Communication Powertrain Sensor CAN Bus Off	END			
U0101 - Lost Communication With Transmission Control Module	END			
U0102 - Lost Communication with Transfer Case Control Module	END			
U0104 - Lost Communication With Adaptive Cruise Control Module	END			
U0129 - Lost Communication With Brake System Control Module	END			
U0140 - Lost Communication With Body Control Module	END			
U0146 - Lost Communication With Gateway	END			
U01B0 - Lost Communication With Battery Sensor Module	END			
U023A - Lost Communication with Active Safety Control Module 1	END			
U0402 - Invalid Data Received From Transmission Control Module	END			
U0403 - Invalid Data Received From Transfer Case Control Module	END			
U0404 - Invalid Data Received From Transmission Range Selector Control Module	END			
U0405 - Invalid Data Received From Cruise Control Module	END			
U0418 - Invalid Data Received From Brake System Control Module	END			
U0422 - Invalid Data Received From Body Control Module	END			
U0447 - Invalid Data Received From Serial Data Gateway Module	END			
U0499 - Invalid Data Received From Telematics Communication Interface Control Module	END			
U04B1 - Invalid Data Received From Battery Sensor Module	END			
U053B - Invalid Data Received From Active Safety Control Module 1	END			
U0606 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 1	END			
U0607 - Lost Communication With Throttle Position Sensor Bank 1 Sensor 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	END	
U0608 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 1	END			
U0611 - Lost Communication With Intake Air Temperature Sensor Bank 1 Sensor 1	END			
U0612 - Lost Communication With Intake Air Temperature Sensor Bank 2 Sensor 1	END			
U0625 - Lost Communication With Fuel Rail Pressure Sensor Bank 1 Sensor 1	END			
U062F - Loss Of Communication with Low Temperature Loop Coolant Pump	END			
U0644 - Lost Communication With Turbocharger A Wastegate Position Sensor	END			

The DTCs in this column is inhibited by the DTCs listed to the right	The DTCs in these columns inhibit the DTC to the left			The DTCs in these columns inhibit the DTC to the left	The DTCs in these columns inhibit the DTC to the left	The DTCs in these columns inhibit the DTC to the left
Inhibited DTC	Fault Active DTCs			Fault Active DTCs	Fault Active DTCs	Fault Active DTCs
U0674 - Lost Communication With Turbocharger B Wastegate Position Sensor	END					
U0680 - Lost Communication With Barometric Pressure Sensor Bank 2 Sensor 1	END					
U0688 - Lost Communication With Throttle Position Sensor Bank 2 Sensor 2	P0697 - Sensor Reference Voltage 3 Circuit Open	END				
U068A - Lost Communication With Barometric Pressure Sensor Bank 1 Sensor 2	END					
U101B - Lost Communication With Fuel Rail Pressure Sensor Bank 1 Sensor 2	P0651 - Sensor Reference Voltage 2 Circuit Open	END				
U131D - Invalid Data Received From Fuel Pump Driver Control Module	END					
U1345 - Engine Control Module LIN Bus 1	END					
U1346 - Engine Control Module LIN Bus 2	END					
U1348 - Engine Control Module LIN Bus 4	END					
U1349 - Engine Control Module LIN Bus 5	END					
U135E - Lost Communication with Transmission Control Module on Engine Control Module LIN Bus 1	END					
U136C - Invalid Data Received From Throttle Position Sensor 1	END					
U136D - Invalid Data Received From Throttle Position Sensor 2	P0641 - Sensor Reference Voltage 1 Circuit Open	P06A3 - Sensor Reference Voltage 4 Circuit Open	END			
U136E - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 1	END					
U136F - Invalid Data Received From Throttle Position Sensor Bank 2 Sensor 2	P0697 - Sensor Reference Voltage 3 Circuit Open	END				
U1370 - Invalid Data Received From Intake Air Temperature Sensor 1	END					
U1371 - Invalid Data Received From Barometric Pressure Sensor 2	END					
U1372 - Invalid Data Received From Intake Air Temperature Sensor Bank 2 Sensor 1	END					
U1373 - Invalid Data Received From Barometric Pressure Sensor Bank 2 Sensor 1	P0651 - Sensor Reference Voltage 2 Circuit Open	END				
U1374 - Invalid Data Received From Fuel Rail Pressure Sensor 1	END					
U1375 - Invalid Data Received From Fuel Rail Pressure Sensor 2	P0651 - Sensor Reference Voltage 2 Circuit Open	END				
U1376 - Invalid Data Received From Turbocharger Wastegate Position Sensor Bank 1	END					
U1377 - Invalid Data Received From Turbocharger Wastegate Position Sensor Bank 2	END					
U1378 - Invalid Data Received From Low Temperature Coolant Loop Pump	END					
U18A2 - Lost Communication With Fuel Pump Driver Control Module	END					
U18A7 - Lost Communication with DC/DC Converter Control Module on Powertrain Expansion CAN Bus	END					
U18C6 - Transmission Range Selector Control Module Lost Communication With ECM on Powertrain Sensor CAN Bus	END					
U18D2 - Lost Communication with Transmission Range Selector Control Module on Powertrain Sensor CAN Bus	END					
U18D3 - Lost Communication with Transmission Range Selector Control Module on Powertrain Expansion CAN Bus	END					
U18D5 - Central Gateway Module Lost Communication with Engine Control Module	END					
U18D7 - Central Gateway Module Lost Communication with Transmission Control Module	END					
U18DC - Central Gateway Module Lost Communication with Brake System Control Module 1	END					
U240D - Transmission Range Selector Control Module Powertrain Expansion CAN Bus Off	END					
U240E - Transmission Range Selector Control Module Sensor CAN Bus Off	END					
U2413 - Central Gateway Module High Speed CAN Bus Off	END					
U2414 - Central Gateway Module High Speed Extension CAN Bus Off	END					
U250D - Invalid Data Received From Transmission Control Module on LIN Bus	END					

Enable Matrix for Diagnostic System Manager

DTC	Additional Basic Enable Conditions			
B071F - Transmission Range Indicator	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
B2A00 - Door Open Switch Signal - Door Ajar Switch Signal Correlation	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
B2B0D - Central Gateway Module Ignition Switch Run/Start Position Circuit Low	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
B2B0E - Central Gateway Module Ignition Switch Run/Start Position Circuit High	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
B2B11 - Central Gateway Module System Voltage Low	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
B2B12 - Central Gateway Module Control Module Memory	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
B2B13 - Central Gateway Module Control Module Internal Performance	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P000A - Camshaft Position System Slow Response Bank 1	Battery saver mode not active	END		
P000B - Exhaust Camshaft Position System Slow Response Bank 1	Battery saver mode not active	END		
P000C - Intake Camshaft Position System Slow Response Bank 2	Battery saver mode not active	END		
P000D - Exhaust Camshaft Position System Slow Response Bank 2	Battery saver mode not active	END		
P0010 - Camshaft Position Actuator Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0011 - Camshaft Position System Performance	Battery saver mode not active	END		
P0013 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0014 - Exhaust Camshaft Position System Performance Bank 1	Battery saver mode not active	END		
P0016 - Crankshaft to Camshaft Correlation	Battery saver mode not active	END		

DTC	Additional Basic Enable Conditions			
P0017 - Crankshaft to Exhaust Camshaft Correlation Bank 1	Battery saver mode not active	END		
P0018 - Crankshaft to Intake Camshaft Correlation Bank 2	Battery saver mode not active	END		
P0019 - Crankshaft to Exhaust Camshaft Correlation Bank 2	Battery saver mode not active	END		
P0020 - Intake Camshaft Position Actuator Control Circuit Open Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0021 - Intake Camshaft Position System Performance Bank 2	Battery saver mode not active	END		
P0023 - Exhaust Camshaft Position Actuator Control Circuit Open Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0024 - Exhaust Camshaft Position System Performance Bank 2	Battery saver mode not active	END		
P0030 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0031 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0032 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0033 - Boost Bypass Valve A Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0034 - Boost Bypass Valve A Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0035 - Boost Bypass Valve A Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0036 - Oxygen Sensor Heater Control Circuit Open Bank 1 Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0037 - Oxygen Sensor Heater Control Circuit Low Bank 1 Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0038 - Oxygen Sensor Heater Control Circuit High Bank 1 Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0050 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0051 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END

DTC	Additional Basic Enable Conditions				
P0052 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0056 - Oxygen Sensor Heater Control Circuit Open Bank 2 Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0057 - Oxygen Sensor Heater Control Circuit Low Bank 2 Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0058 - Oxygen Sensor Heater Control Circuit High Bank 2 Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0071 - Ambient Air Temperature Sensor Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0072 - Ambient Air Temperature Sensor Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0073 - Ambient Air Temperature Sensor Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0074 - Ambient Air Temperature Sensor Circuit Intermittent	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	Engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	END
P0089 - Fuel Pressure Regulator Performance	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	Battery saver mode not active	END		
P0090 - Fuel Pressure Regulator Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0091 - Fuel Pressure Regulator Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0092 - Fuel Pressure Regulator Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0096 - Intake Air Temperature Sensor 2 Performance	Battery saver mode not active	END			
P0097 - Intake Air Temperature Sensor 2 Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0098 - Intake Air Temperature Sensor 2 Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0099 - Intake Air Temperature Sensor 2 Circuit Erratic	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	Engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	END
P00A6 - Intake Air Temperature Sensor 2 Performance Bank 2	Battery saver mode not active	END			
P00A7 - Intake Air Temperature Sensor 2 Circuit Low Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	

DTC	Additional Basic Enable Conditions				
P00A8 - Intake Air Temperature Sensor 2 Circuit High Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P00A9 - Intake Air Temperature Sensor 2 Circuit Erratic Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	Engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	END
P00AB - Intake Air Temperature Sensor 1 Performance Bank 2	Battery saver mode not active	END			
P00AC - Intake Air Temperature Sensor 1 Circuit Low Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P00AD - Intake Air Temperature Sensor 1 Circuit High Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P00AE - Intake Air Temperature Sensor 1 Circuit Erratic Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	Engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	END
P00C0 - Boost Bypass Valve B Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P00C1 - Boost Bypass Valve B Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P00C2 - Boost Bypass Valve B Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P00C6 - Fuel Rail Pressure Too Low - Engine Cranking Bank 1	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	END			
P00C9 - Fuel Pressure Regulator High Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P00CA - Fuel Pressure Regulator High Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0101 - Mass Air Flow Sensor Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0102 - Mass Air Flow Sensor Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0103 - Mass Air Flow Sensor Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0106 - Manifold Absolute Pressure Sensor Performance	Battery saver mode not active	END			
P0107 - Manifold Absolute Pressure Sensor Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0108 - Manifold Absolute Pressure Sensor Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	

DTC	Additional Basic Enable Conditions				
P010B - Mass Air Flow Sensor 2 Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P010C - Mass Air Flow Sensor 2 Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P010D - Mass Air Flow Sensor 2 Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0111 - Intake Air Temperature Sensor Performance	Battery saver mode not active	END			
P0112 - Intake Air Temperature Sensor Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0113 - Intake Air Temperature Sensor Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0114 - Intake Air Temperature Sensor Circuit Erratic	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	Engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	END
P0116 - Engine Coolant Temperature Sensor Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0117 - Engine Coolant Temperature Sensor Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0118 - Engine Coolant Temperature Sensor Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0119 - Engine Coolant Temperature Sensor Circuit Erratic	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	Engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	END
P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature	Battery saver mode not active	END			
P0135 - O2 Sensor Heater Circuit Bank 1 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P2243 - O2 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0131 - Oxygen Sensor Circuit Low Bank 1 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0132 - Oxygen Sensor Circuit High Bank 1 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0133 - Oxygen Sensor Slow Response Bank 1 Sensor 1	Battery saver mode not active	END			
P0137 - Oxygen Sensor Circuit Low Bank 1 Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	

DTC	Additional Basic Enable Conditions			
P0138 - Oxygen Sensor Circuit High Bank 1 Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P013A - Oxygen Sensor Slow Response - Rich to Lean Bank 1 Sensor 2	Battery voltage is equal to or above 10.9 V	Battery saver mode not active	END	
P013B - Oxygen Sensor Slow Response - Lean to Rich Bank 1 Sensor 2	Battery voltage is equal to or above 10.9 V	Battery saver mode not active	END	
P013C - Oxygen Sensor Slow Response - Rich to Lean Bank 2 Sensor 2	Battery voltage is equal to or above 10.9 V	Battery saver mode not active	END	
P013D - Oxygen Sensor Slow Response - Lean to Rich Bank 2 Sensor 2	Battery voltage is equal to or above 10.9 V	Battery saver mode not active	END	
P013E - Oxygen Sensor Delayed Response - Rich to Lean Bank 1 Sensor 2	Battery voltage is equal to or above 10.9 V	Battery saver mode not active	END	
P013F - Oxygen Sensor Delayed Response - Lean to Rich Bank 1 Sensor 2	Battery voltage is equal to or above 10.9 V	Battery saver mode not active	END	
P0140 - Oxygen Sensor Circuit Insufficient Activity Bank 1 Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0141 - Oxygen Sensor Heater Performance Bank 1 Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P014A - Oxygen Sensor Delayed Response - Rich to Lean Bank 2 Sensor 2	Battery voltage is equal to or above 10.9 V	Battery saver mode not active	END	
P014B - Oxygen Sensor Delayed Response - Lean to Rich Bank 2 Sensor 2	Battery voltage is equal to or above 10.9 V	Battery saver mode not active	END	
P0155 - O2 Sensor Heater Circuit Bank 2 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2247 - O2 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0151 - Oxygen Sensor Circuit Low Bank 2 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0152 - Oxygen Sensor Circuit High Bank 2 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0153 - Oxygen Sensor Slow Response Bank 2 Sensor 1	Battery saver mode not active	END		
P0157 - Oxygen Sensor Circuit Low Bank 2 Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0158 - Oxygen Sensor Circuit High Bank 2 Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END

DTC	Additional Basic Enable Conditions				
P0160 - Oxygen Sensor Circuit Insufficient Activity Bank 2 Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0161 - Oxygen Sensor Heater Performance Bank 2 Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0171 - Fuel Trim System Lean Bank 1	Battery saver mode not active	END			
P0172 - Fuel Trim System Rich Bank 1	Battery saver mode not active	END			
P0174 - Fuel Trim System Lean Bank 2	Battery saver mode not active	END			
P0175 - Fuel Trim System Rich Bank 2	Battery saver mode not active	END			
P018B - Fuel Pressure Sensor Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P018C - Fuel Pressure Sensor Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P018D - Fuel Pressure Sensor Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0191 - Fuel Rail Pressure Sensor Performance	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	Battery saver mode not active	END		
P0196 - Engine Oil Temperature Sensor Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0197 - Engine Oil Temperature Sensor Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0198 - Engine Oil Temperature Sensor Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0199 - Engine Oil Temperature Sensor Erratic	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	Engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	END
P0201 - Fuel Injector 1 Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0202 - Fuel Injector 2 Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0203 - Fuel Injector 3 Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0204 - Fuel Injector 4 Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	

DTC	Additional Basic Enable Conditions			
P0205 - Fuel Injector 5 Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0206 - Fuel Injector 6 Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0207 - Fuel Injector 7 Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0208 - Fuel Injector 8 Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0234 - Boost System A Overboost Condition	Battery saver mode not active	END		
P0236 - Turbocharger Boost Sensor Performance	Battery saver mode not active	END		
P0237 - Turbocharger Boost Sensor Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0238 - Turbocharger Boost Sensor Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0240 - Turbocharger Boost Sensor Performance Bank 2	Battery saver mode not active	END		
P0241 - Turbocharger Boost Sensor Circuit Low Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0242 - Turbocharger Boost Sensor Circuit High Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0243 - Turbocharger A Wastegate Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0245 - Turbocharger A Wastegate Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0246 - Turbocharger A Wastegate Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0247 - Turbocharger B Wastegate Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0249 - Turbocharger B Wastegate Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0250 - Turbocharger B Wastegate Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0299 - Boost System A Underboost Condition	Battery saver mode not active	END		

DTC	Additional Basic Enable Conditions			
P029D - Fuel Injector 1 Leak	Battery saver mode not active	END		
P02A1 - Fuel Injector 2 Leak	Battery saver mode not active	END		
P02A5 - Fuel Injector 3 Leak	Battery saver mode not active	END		
P02A9 - Fuel Injector 4 Leak	Battery saver mode not active	END		
P02AD - Fuel Injector 5 Leak	Battery saver mode not active	END		
P02B1 - Fuel Injector 6 Leak	Battery saver mode not active	END		
P02B5 - Fuel Injector 7 Leak	Battery saver mode not active	END		
P02B9 - Fuel Injector 8 Leak	Battery saver mode not active	END		
P02CA - Boost System B Overboost Condition	Battery saver mode not active	END		
P02CB - Boost System B Underboost Condition	Battery saver mode not active	END		
P02EE - Cylinder 1 Injector Control Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P02EF - Cylinder 2 Injector Control Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P02F0 - Cylinder 3 Injector Control Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P02F1 - Cylinder 4 Injector Control Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P02F2 - Cylinder 5 Injector Control Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P02F3 - Cylinder 6 Injector Control Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P02F4 - Cylinder 7 Injector Control Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P02F5 - Cylinder 8 Injector Control Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END

DTC	Additional Basic Enable Conditions			
P0300 - Engine Misfire Detected	Battery saver mode not active	END		
P0301 - Cylinder 1 Misfire Detected	Battery saver mode not active	END		
P0302 - Cylinder 2 Misfire Detected	Battery saver mode not active	END		
P0303 - Cylinder 3 Misfire Detected	Battery saver mode not active	END		
P0304 - Cylinder 4 Misfire Detected	Battery saver mode not active	END		
P0305 - Cylinder 5 Misfire Detected	Battery saver mode not active	END		
P0306 - Cylinder 6 Misfire Detected	Battery saver mode not active	END		
P0307 - Cylinder 7 Misfire Detected	Battery saver mode not active	END		
P0308 - Cylinder 8 Misfire Detected	Battery saver mode not active	END		
P0315 - Crankshaft Position System Variation Not Learned	Battery saver mode not active	END		
P0325 - Knock Sensor Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0326 - Knock Sensor Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0327 - Knock Sensor Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0328 - Knock Sensor Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P032A - Knock Sensor 3 Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P032B - Knock Sensor 3 Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P032C - Knock Sensor 3 Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P032D - Knock Sensor 3 Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END

DTC	Additional Basic Enable Conditions			
P0330 - Knock Sensor 2 Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0331 - Knock Sensor 2 Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0332 - Knock Sensor 2 Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0333 - Knock Sensor 2 Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0335 - Crankshaft Position Sensor Circuit	Battery saver mode not active	END		
P0336 - Crankshaft Position Sensor Performance	Battery saver mode not active	END		
P033A - Knock Sensor 4 Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P033B - Knock Sensor 4 Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P033C - Knock Sensor 4 Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P033D - Knock Sensor 4 Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0341 - Camshaft Position Sensor Performance	Battery saver mode not active	END		
P0342 - Camshaft Position Sensor Circuit Low	Battery saver mode not active	END		
P0343 - Camshaft Position Sensor Circuit High	Battery saver mode not active	END		
P0346 - Intake Camshaft Position Sensor Performance Bank 2	Battery saver mode not active	END		
P0347 - Intake Camshaft Position Sensor Circuit Low Bank 2	Battery saver mode not active	END		
P0348 - Intake Camshaft Position Sensor Circuit High Bank 2	Battery saver mode not active	END		
P034A - Crankshaft Position Sensor Start Position Incorrect	Battery saver mode not active	END		
P034B - Crankshaft Position Sensor Direction Incorrect	Battery saver mode not active	END		

DTC	Additional Basic Enable Conditions			
P0351 - Ignition Coil 1 Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0352 - Ignition Coil 2 Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0353 - Ignition Coil 3 Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0354 - Ignition Coil 4 Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0355 - Ignition Coil 5 Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0356 - Ignition Coil 6 Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0357 - Ignition Coil 7 Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0358 - Ignition Coil 8 Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0366 - Exhaust Camshaft Position Sensor Performance Bank 1	Battery saver mode not active	END		
P0367 - Exhaust Camshaft Position Sensor Circuit Low Bank 1	Battery saver mode not active	END		
P0368 - Exhaust Camshaft Position Sensor Circuit High Bank 1	Battery saver mode not active	END		
P0391 - Exhaust Camshaft Position Sensor Performance Bank 2	Battery saver mode not active	END		
P0392 - Exhaust Camshaft Position Sensor Circuit Low Bank 2	Battery saver mode not active	END		
P0393 - Exhaust Camshaft Position Sensor Circuit High Bank 2	Battery saver mode not active	END		
P0420 - Catalyst System Low Efficiency	Battery saver mode not active	END		
P0430 - Catalyst System Low Efficiency Bank 2	Battery saver mode not active	END		
P0442 - Evaporative Emission System Small Leak Detected	Battery saver mode not active	END		
P0443 - Evaporative Emission Purge Solenoid Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END

DTC	Additional Basic Enable Conditions				
P0446 - Evaporative Emission Vent System Performance	Battery saver mode not active	END			
P0449 - Evaporative Emission Vent Solenoid Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0451 - Fuel Tank Pressure Sensor Performance	Battery saver mode not active	END			
P0452 - Fuel Tank Pressure Sensor Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0453 - Fuel Tank Pressure Sensor Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0454 - Fuel Tank Pressure Sensor Circuit Intermittent	Battery saver mode not active	END			
P0455 - Evaporative Emission System Large Leak Detected	Battery saver mode not active	END			
P0458 - Evaporative Emission Purge Solenoid Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0459 - Evaporative Emission Purge Solenoid Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0461 - Fuel Level Sensor Performance	Battery saver mode not active	END			
P0462 - Fuel Level Sensor Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END
P0463 - Fuel Level Sensor Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END
P0480 - Cooling Fan Relay 1 Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0496 - Evaporative Emission System Flow During Non-Purge	Battery saver mode not active	END			
P0497 - Evaporative Emission System No Flow During Purge	Battery saver mode not active	END			
P0498 - Evaporative Emission Vent Solenoid Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0499 - Evaporative Emission Vent Solenoid Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P04AB - Evaporative Emission Purge Solenoid Control Circuit Open Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	

DTC		Additional Basic Enable Conditions				
P04AC - Evaporative Emission Purge Solenoid Control Circuit Low Bank 2		Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P04AD - Evaporative Emission Purge Solenoid Control Circuit High Bank 2		Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P04AE - Evaporative Emission Purge Solenoid Performance Bank 2		Battery saver mode not active	END			
P04DB - Crankcase Ventilation System Disconnected		Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P04DF - Evaporative Emission Purge Solenoid Performance Bank 1		Battery saver mode not active	END			
P0506 - Idle Speed Low		Battery saver mode not active	END			
P0507 - Idle Speed High		Battery saver mode not active	END			
P050A - Cold Start Idle Speed System		Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END		
P050B - Cold Start Ignition Timing System		Battery voltage is equal to or above 10.9 V	Battery saver mode not active	END		
P0513 - Theft Deterrent Key Incorrect		Battery saver mode not active	END			
P051B - Crankcase Vapor Pressure Sensor Performance		Battery saver mode not active	END			
P051C - Crankcase Vapor Pressure Sensor Circuit Low		Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P051D - Crankcase Vapor Pressure Sensor Circuit High		Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0521 - Engine Oil Pressure Sensor 1 Performance		Battery saver mode not active	END			
P0522 - Engine Oil Pressure Sensor 1 Circuit Low		Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0523 - Engine Oil Pressure Sensor 1 Circuit High		Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0524 - Engine Oil Pressure Too Low		Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Battery saver mode not active	Engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	END
P0532 - Air Conditioning Refrigerant Pressure Sensor Circuit Low		Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	

DTC	Additional Basic Enable Conditions				
P0533 - Air Conditioning Refrigerant Pressure Sensor Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P053F - Cold Start Fuel Pressure Performance	Battery voltage is equal to or above 10.9 V	Battery saver mode not active	END		
P0562 - System Voltage Low	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END		
P0563 - System Voltage High	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END		
P0564 - Cruise Control Multi-Function Switch 1 Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END
P0565 - Cruise Control Switch Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END
P0567 - Cruise Control Resume Switch 1 Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END
P0568 - Cruise Control Set Switch 1 Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END
P056C - Cruise Control Cancel Switch Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END
P0572 - Brake Switch Circuit 1 Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0573 - Brake Switch Circuit 1 High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P057B - Brake Pedal Position Sensor Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P057C - Brake Pedal Position Sensor Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P057D - Brake Pedal Position Sensor Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0580 - Cruise Control Multi-Function Switch 1 Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END
P0581 - Cruise Control Multi-Function Switch 1 Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END
P0589 - Cruise Control Multi-Function Switch 2 Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END
P058A - Battery Sensor Module Performance	Battery saver mode not active	END			

DTC	Additional Basic Enable Conditions				
P058B - Battery Sensor Module Current Sensor Performance	Battery saver mode not active	END			
P058C - Battery Sensor Module Temperature Sensor Performance	Battery saver mode not active	END			
P058D - Battery Sensor Module Voltage Sensing Performance	Battery saver mode not active	END			
P058E - Battery Sensor Module Temperature High	Battery saver mode not active	END			
P058F - Battery Sensor Module Temperature Low	Battery saver mode not active	END			
P0592 - Cruise Control Multi-Function Switch 2 Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END
P0593 - Cruise Control Multi-Function Switch 2 Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END
P05CC - Cold Start Intake Camshaft Position System Performance Bank 1	Battery saver mode not active	END			
P05CD - Cold Start Intake Camshaft Position System Performance Bank 2	Battery saver mode not active	END			
P05D1 - Driver Mode Select Switch Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P05D2 - Driver Mode Select Switch Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P05D3 - Driver Mode Select Switch Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0602 - Control Module Not Programmed	Battery saver mode not active	END			
P0603 - Control Module Long Term Memory Reset	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0604 - Control Module Random Access Memory	Battery saver mode not active	END			
P0606 - Control Module Internal Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0615 - Starter Relay Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P0616 - Starter Relay Control Circuit Low	Battery saver mode not active	END			

DTC	Additional Basic Enable Conditions			
P0617 - Starter Relay Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0621 - Generator L-Terminal Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0625 - Generator F-Terminal Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0626 - Generator F-Terminal Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0627 - Fuel Pump Relay Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0628 - Fuel Pump Relay Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0629 - Fuel Pump Relay Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P062B - Control Module Fuel Injector Control Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0630 - VIN Not Programmed or Mismatched - Engine Control Module	Battery saver mode not active	END		
P0633 - Theft Deterrent Key Not Programmed	Battery saver mode not active	END		
P0645 - Air Conditioning Clutch Relay Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0646 - Air Conditioning Clutch Relay Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0647 - Air Conditioning Clutch Relay Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P064D - Control Module Oxygen Sensor Bank 1 Sensor 1 System Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P064E - Control Module Oxygen Sensor Bank 2 Sensor 1 System Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0650 - Malfunction Indicator Lamp Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0689 - Engine Controls Ignition Relay Feedback Circuit Low	Battery saver mode not active	END		
P0690 - Engine Controls Ignition Relay Feedback Circuit High	Battery saver mode not active	END		

DTC	Additional Basic Enable Conditions			
P0691 - Cooling Fan Relay 1 Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P0692 - Cooling Fan Relay 1 Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P06AF - Torque Management System - Forced Engine Shutdown	Battery saver mode not active	END		
P06B6 - Control Module Knock Sensor Processor 1 Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P06D1 - Control Module Ignition Coil Internal Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P06DA - Engine Oil Pressure Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P06DB - Engine Oil Pressure Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P06DC - Engine Oil Pressure Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P06DD - Engine Oil Pressure Control Performance	Battery saver mode not active	END		
P0700 - Transmission Control Module Requested Malfunction Indicator Lamp Illumination	Battery saver mode not active	END		
P073D - Unable to Engage Neutral	Battery saver mode not active	END		
P073E - Unable to Engage Reverse	Battery saver mode not active	END		
P07B3 - Transmission Range Selector Park Position Switch 1 Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P07B4 - Transmission Range Selector Park Position Switch 1 Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P07B5 - Transmission Range Selector Park Position Switch 1 Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P07B9 - Transmission Range Selector Park Position Switch 2 Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P07BA - Transmission Range Selector Park Position Switch 2 Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P07BB - Transmission Range Selector Park Position Switch 2 Circuit Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END

DTC	Additional Basic Enable Conditions				
P07BE - Transmission Range Selector Park Position Switch 1/2 Correlation	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P07E4 - Unable to Engage Park	Battery saver mode not active	END			
P07E5 - Unable to Engage Drive	Battery saver mode not active	END			
P082A - Transmission Range Selector X-Axis Position Sensor 1 Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P082B - Transmission Range Selector X-Axis Position Sensor 1 Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P082C - Transmission Range Selector X-Axis Position Sensor 1 Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P082D - Transmission Range Selector Y-Axis Position Sensor 1 Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P082E - Transmission Range Selector Y-Axis Position Sensor 1 Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P082F - Transmission Range Selector Y-Axis Position Sensor 1 Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P089B - Transmission Range Selector X-Axis Position Sensor 2 Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P089C - Transmission Range Selector X-Axis Position Sensor 2 Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P089D - Transmission Range Selector X-Axis Position Sensor 2 Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P08A0 - Transmission Range Selector Y-Axis Position Sensor 2 Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P08A1 - Transmission Range Selector Y-Axis Position Sensor 2 Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P08A2 - Transmission Range Selector Y-Axis Position Sensor 2 Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P1002 - Fuel Pump Driver Control Module System Voltage Performance	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END	
P1005 - Fuel Pump Driver Control Module Too Many Resets	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END
P1007 - Fuel Pump Driver Control Module Ignition On/Start Switch Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END

DTC	Additional Basic Enable Conditions				
P100C - Battery Sensor Module Temperature Erratic	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	Engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	END
P100D - Battery Sensor Module Internal Temperature Circuit Erratic	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	Engine is not in ready state (which is active when the ignition is on or following a stall of the engine)	END
P1011 - Camshaft Position Actuator Park Position	Battery saver mode not active	END			
P1012 - Exhaust Camshaft Position Actuator Park Position Bank 1	Battery saver mode not active	END			
P1013 - Intake Camshaft Position Actuator Park Position Bank 2	Battery saver mode not active	END			
P1014 - Exhaust Camshaft Position Actuator Park Position Bank 2	Battery saver mode not active	END			
P1029 - Fuel Pump Phase U-V-W Circuits Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END
P102A - Fuel Pump Phase U-V-W Circuits Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END
P102B - Fuel Pump Phase U-V-W Circuits High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END
P102C - Fuel Pump Phase U-V-W Circuits Shorted	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END
P1038 - Turbocharger A Wastegate Actuator Supply Voltage Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P103A - Turbocharger A Wastegate Control Circuit Shorted	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P10A3 - Cylinder 1 Injection Pulse Offset Exceeded Minimum Learning Limit	Battery saver mode not active	END			
P10A4 - Cylinder 1 Injection Pulse Offset Exceeded Maximum Learning Limit	Battery saver mode not active	END			
P10A5 - Cylinder 2 Injection Pulse Offset Exceeded Minimum Learning Limit	Battery saver mode not active	END			
P10A6 - Cylinder 2 Injection Pulse Offset Exceeded Maximum Learning Limit	Battery saver mode not active	END			
P10A7 - Cylinder 3 Injection Pulse Offset Exceeded Minimum Learning Limit	Battery saver mode not active	END			
P10A8 - Cylinder 3 Injection Pulse Offset Exceeded Maximum Learning Limit	Battery saver mode not active	END			

DTC	Additional Basic Enable Conditions			
P10A9 - Cylinder 4 Injection Pulse Offset Exceeded Minimum Learning Limit	Battery saver mode not active	END		
P10AA - Cylinder 4 Injection Pulse Offset Exceeded Maximum Learning Limit	Battery saver mode not active	END		
P10AB - Cylinder 5 Injection Pulse Offset Exceeded Minimum Learning Limit	Battery saver mode not active	END		
P10AC - Cylinder 5 Injection Pulse Offset Exceeded Maximum Learning Limit	Battery saver mode not active	END		
P10AD - Cylinder 6 Injection Pulse Offset Exceeded Minimum Learning Limit	Battery saver mode not active	END		
P10AE - Cylinder 6 Injection Pulse Offset Exceeded Maximum Learning Limit	Battery saver mode not active	END		
P10AF - Cylinder 7 Injection Pulse Offset Exceeded Minimum Learning Limit	Battery saver mode not active	END		
P10B0 - Cylinder 7 Injection Pulse Offset Exceeded Maximum Learning Limit	Battery saver mode not active	END		
P10B1 - Cylinder 8 Injection Pulse Offset Exceeded Minimum Learning Limit	Battery saver mode not active	END		
P10B2 - Cylinder 8 Injection Pulse Offset Exceeded Maximum Learning Limit	Battery saver mode not active	END		
P10BD - Turbocharger B Wastegate Actuator Supply Voltage Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P10BE - Turbocharger B Wastegate Control Circuit Shorted	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P10E8 - Fuel Pressure Regulator High Control Circuit Shorted to Control Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P1176 - Fuel Pump Driver Control Module 5V Reference 1 Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P1177 - Fuel Pump Driver Control Module 5V Reference 2 Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P1178 - Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P1179 - Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P1248 - Fuel Injector 1 High Control Circuit Shorted to Control Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END

DTC	Additional Basic Enable Conditions				
P1249 - Fuel Injector 2 High Control Circuit Shorted to Control Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P124A - Fuel Injector 3 High Control Circuit Shorted to Control Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P124B - Fuel Injector 4 High Control Circuit Shorted to Control Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P124C - Fuel Injector 5 High Control Circuit Shorted to Control Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P124D - Fuel Injector 6 High Control Circuit Shorted to Control Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P124E - Fuel Injector 7 High Control Circuit Shorted to Control Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P124F - Fuel Injector 8 High Control Circuit Shorted to Control Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P1255 - Fuel Pump Control Module Driver High Temperature	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END
P128A - Fuel Rail Pressure Sensor Internal Performance Bank 1 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P128B - Fuel Rail Pressure Sensor Internal Performance Bank 1 Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P129B - Fuel Pump Driver Control Module System Voltage Low	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END	
P129C - Fuel Pump Driver Control Module System Voltage High	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END	
P129D - Fuel Pump Driver Control Module Ignition On/Start Switch Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END
P129F - Fuel Pump Driver Control Module Fuel Pump Speed Signal Incorrect	Battery voltage is equal to or above 10.9 V	Battery saver mode not active	System Power Mode is run	END	
P12A6 - Fuel Pump Driver Control Module Enable Circuit Performance	Battery saver mode not active	System Power Mode is run	END		
P135A - Ignition Coil Supply Voltage Circuit Bank 1	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END		
P135B - Ignition Coil Supply Voltage Circuit Bank 2	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END		
P138B - Brake Pedal Position Sensor "A" Exceeded Learning Limit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	

DTC	Additional Basic Enable Conditions							
P1434 - Fuel Level Sensor 1 Reference Feedback Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END			
P143E - Fuel Level Sensor 2 Reference Feedback Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END			
P155A - Cruise Control Switch State Undetermined	Battery voltage is equal to or above 10.9 V	Engine not in afterrun mode (defined as engine stopped with ignition off)	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Battery saver mode not active	Engine not in stopping mode (defined as engine speed greater than 0 rpm with ignition off)	System Power Mode is run	END
P155B - Cruise Control Set Switch 2 Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END			
P155C - Cruise Control Resume Switch 2 Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END			
P1589 - Cruise Control Lane Center Switch Circuit	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END			
P1631 - Theft Deterrent Fuel Enable Signal Not Correct	Battery saver mode not active	END						
P1649 - Theft Deterrent Security Code Not Programmed	Battery saver mode not active	END						
P16D4 - Battery Sensor Module Voltage Sensing Circuit Low	Battery saver mode not active	END						
P16D5 - Battery Sensor Module Voltage Sensing Circuit High	Battery saver mode not active	END						
P16D6 - Battery Sensor Module Current Sensor Low	Battery saver mode not active	END						
P16D7 - Sensor Supply Voltage Relay Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				
P16D8 - Sensor Supply Voltage Relay Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				
P16D9 - Sensor Supply Voltage Relay Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				
P16DD - Battery Sensor Module Current Sensor High	Battery saver mode not active	END						
P16DE - Battery Sensor Module Internal Temperature Circuit Low	Battery saver mode not active	END						
P16DF - Battery Sensor Module Internal Temperature Circuit High	Battery saver mode not active	END						
P16E1 - Battery Sensor Module Random Access Memory	Battery saver mode not active	END						

DTC	Additional Basic Enable Conditions			
P16E2 - Battery Sensor Module Read Only Memory	Battery saver mode not active	END		
P16E3 - Battery Sensor Module Calibration Incorrect	Battery saver mode not active	END		
P16F4 - Internal Control Module Transmission Range Control Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P1787 - Unexpected Range Change Detected	Battery saver mode not active	END		
P1789 - Current Transmission Range Unknown	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P17A3 - Transmission Range Selector Shift Interlock Switch 1 Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P17A4 - Transmission Range Selector Shift Interlock Switch 1 Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P17A5 - Transmission Range Selector Shift Interlock Switch 1 Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P17A6 - Transmission Range Selector Shift Interlock Switch 1/2 Correlation	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P17A7 - Transmission Range Selector Shift Interlock Switch 2 Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P17A8 - Transmission Range Selector Shift Interlock Switch 2 Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P17A9 - Transmission Range Selector Shift Interlock Switch 2 Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P17D8 - Transmission Range Selector Control Module Memory Checksum Error	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P17D9 - Transmission Range Selector Control Module Read Only Memory (ROM) Error	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P17DA - Transmission Range Selector Control Module Internal Random Access Memory (RAM) Error	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P17DB - Transmission Range Selector Control Module Processor	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	Battery saver mode not active	END	
P17DD - Transmission Range Selector Control Module System Voltage Low	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P17DE - Transmission Range Selector Control Module System Voltage High	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	

DTC	Additional Basic Enable Conditions				
P17DF - Transmission Range Selector Control Module System Voltage Performance	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END		
P17E0 - Transmission Range Selector Control Module Ignition On/Start Switch Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P17E1 - Transmission Range Selector Control Module Ignition On/Start Switch Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P17E2 - Transmission Range Selector Control Module Ignition Accessory Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P17F3 - Transmission Range Selector Park Position Switch 1/2 Stuck On	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P17F4 - Transmission Range Selector Shift Interlock Switch 1/2 Stuck On	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P189D - Transmission Range Selector Park Position Switch 1/2 Stuck Off	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P2066 - Fuel Level Sensor 2 Performance	Battery saver mode not active	END			
P2067 - Fuel Level Sensor 2 Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END
P2068 - Fuel Level Sensor 2 Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END
P2088 - Camshaft Position Actuator Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P2089 - Camshaft Position Actuator Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P2090 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P2091 - Exhaust Camshaft Position Actuator Control Circuit High Bank 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P2092 - Intake Camshaft Position Actuator Control Circuit Low Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P2093 - Intake Camshaft Position Actuator Control Circuit High Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P2094 - Exhaust Camshaft Position Actuator Control Circuit Low Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	
P2095 - Exhaust Camshaft Position Actuator Control Circuit High Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END	

DTC	Additional Basic Enable Conditions			
P2096 - Post Catalyst Fuel Trim System Low Limit Bank 1	Battery saver mode not active	END		
P2097 - Post Catalyst Fuel Trim System High Limit Bank 1	Battery saver mode not active	END		
P2098 - Post Catalyst Fuel Trim System Low Limit Bank 2	Battery saver mode not active	END		
P2099 - Post Catalyst Fuel Trim System High Limit Bank 2	Battery saver mode not active	END		
P2146 - Fuel Injector High Control Circuit 1 Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2149 - Fuel Injector High Control Circuit 2 Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2152 - Fuel Injector High Control Circuit 3 Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2155 - Fuel Injector High Control Circuit 4 Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P216A - Fuel Injector High Control Circuit 5 Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P216D - Fuel Injector High Control Circuit 6 Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2177 - Fuel Trim System Lean Off Idle Bank 1	Battery saver mode not active	END		
P2178 - Fuel Trim System Rich Off Idle Bank 1	Battery saver mode not active	END		
P2179 - Fuel Trim System Lean Off Idle Bank 2	Battery saver mode not active	END		
P217A - Fuel Injector High Control Circuit 7 Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P217D - Fuel Injector High Control Circuit 8 Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2180 - Fuel Trim System Rich Off Idle Bank 2	Battery saver mode not active	END		
P2187 - Fuel Trim System Lean at Idle Bank 1	Battery saver mode not active	END		
P2188 - Fuel Trim System Rich at Idle Bank 1	Battery saver mode not active	END		

DTC	Additional Basic Enable Conditions			
P2189 - Fuel Trim System Lean at Idle Bank 2	Battery saver mode not active	END		
P2190 - Fuel Trim System Rich at Idle Bank 2	Battery saver mode not active	END		
P2195 - Oxygen Sensor Signal Biased Lean Bank 1 Sensor 1	Battery saver mode not active	END		
P2196 - Oxygen Sensor Signal Biased Rich Bank 1 Sensor 1	Battery saver mode not active	END		
P2197 - Oxygen Sensor Signal Biased Lean Bank 2 Sensor 1	Battery saver mode not active	END		
P2198 - Oxygen Sensor Signal Biased Rich Bank 2 Sensor 1	Battery saver mode not active	END		
P219C - Cylinder 1 Fuel Trim Cylinder Balance	Battery saver mode not active	END		
P219D - Cylinder 2 Fuel Trim Cylinder Balance	Battery saver mode not active	END		
P219E - Cylinder 3 Fuel Trim Cylinder Balance	Battery saver mode not active	END		
P219F - Cylinder 4 Fuel Trim Cylinder Balance	Battery saver mode not active	END		
P21A0 - Cylinder 5 Fuel Trim Cylinder Balance	Battery saver mode not active	END		
P21A1 - Cylinder 6 Fuel Trim Cylinder Balance	Battery saver mode not active	END		
P21A2 - Cylinder 7 Fuel Trim Cylinder Balance	Battery saver mode not active	END		
P21A3 - Cylinder 8 Fuel Trim Cylinder Balance	Battery saver mode not active	END		
P2227 - Barometric Pressure Sensor Performance Bank 1 Sensor 1	Battery saver mode not active	END		
P2228 - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2229 - Barometric Pressure Sensor Circuit High Bank 1 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P222B - Barometric Pressure Sensor Performance Bank 2 Sensor 1	Battery saver mode not active	END		

DTC	Additional Basic Enable Conditions			
P222C - Barometric Pressure Sensor Circuit Low Bank 2 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P222D - Barometric Pressure Sensor Circuit High Bank 2 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2232 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 1 Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2235 - Oxygen Sensor Signal Circuit Shorted to Heater Circuit Bank 2 Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2237 - Oxygen Sensor Pumping Current Control Circuit Open Bank 1 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2240 - Oxygen Sensor Pumping Current Control Circuit Open Bank 2 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2251 - Oxygen Sensor Low Reference Circuit Open Bank 1 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2254 - Oxygen Sensor Low Reference Circuit Open Bank 2 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2270 - Oxygen Sensor Signal Stuck Lean Bank 1 Sensor 2	Battery voltage is equal to or above 10.9 V	Battery saver mode not active	END	
P2271 - Oxygen Sensor Signal Stuck Rich Bank 1 Sensor 2	Battery voltage is equal to or above 10.9 V	Battery saver mode not active	END	
P2272 - Oxygen Sensor Signal Stuck Lean Bank 2 Sensor 2	Battery voltage is equal to or above 10.9 V	Battery saver mode not active	END	
P2273 - Oxygen Sensor Signal Stuck Rich Bank 2 Sensor 2	Battery voltage is equal to or above 10.9 V	Battery saver mode not active	END	
P227B - Barometric Pressure Sensor Performance Bank 1 Sensor 2	Battery saver mode not active	END		
P227C - Barometric Pressure Sensor Circuit Low Bank 1 Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P227D - Barometric Pressure Sensor Circuit High Bank 1 Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P228C - Fuel Pressure Regulator Exceeded Control Limits - Pressure Too Low	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	Battery saver mode not active	END	
P228D - Fuel Pressure Regulator Exceeded Control Limits - Pressure Too High	Manufacturer Enable Counter is zero (value of 0 means ECM is locked and out of assembly plant mode)	Battery saver mode not active	END	
P2297 - Oxygen Sensor Out of Range During Deceleration Bank 1 Sensor 1	Battery saver mode not active	END		

DTC	Additional Basic Enable Conditions			
P2298 - Oxygen Sensor Out of Range During Deceleration Bank 2 Sensor 1	Battery saver mode not active	END		
P2300 - Ignition Coil 1 Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2301 - Ignition Coil 1 Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2303 - Ignition Coil 2 Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2304 - Ignition Coil 2 Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2306 - Ignition Coil 3 Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2307 - Ignition Coil 3 Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2309 - Ignition Coil 4 Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2310 - Ignition Coil 4 Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2312 - Ignition Coil 5 Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2313 - Ignition Coil 5 Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2315 - Ignition Coil 6 Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2316 - Ignition Coil 6 Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2318 - Ignition Coil 7 Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2319 - Ignition Coil 7 Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2321 - Ignition Coil 8 Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2322 - Ignition Coil 8 Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2500 - Generator L-Terminal Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END

DTC	Additional Basic Enable Conditions			
P2501 - Generator L-Terminal Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2534 - Ignition On/Start Switch Circuit Low	Battery voltage is equal to or above 10.9 V	Battery saver mode not active	END	
P2535 - Ignition On/Start Switch Circuit High	Battery voltage is equal to or above 10.9 V	Battery saver mode not active	END	
P2537 - Ignition Accessory Switch Circuit Low	Battery voltage is equal to or above 10.9 V	Battery saver mode not active	END	
P2538 - Ignition Accessory Switch Circuit High	Battery voltage is equal to or above 10.9 V	Battery saver mode not active	END	
P257D - Engine Hood Switch Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P257E - Engine Hood Switch Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P257F - Engine Hood Switch Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P25A2 - Brake System Control Module Requested MIL Illumination	Battery saver mode not active	END		
P25B3 - Turbocharger A Wastegate Stuck Open	Battery saver mode not active	END		
P25B4 - Turbocharger A Wastegate Stuck Closed	Battery saver mode not active	END		
P25B5 - Turbocharger B Wastegate Stuck Open	Battery saver mode not active	END		
P25B6 - Turbocharger B Wastegate Stuck Closed	Battery saver mode not active	END		
P25CA - Camshaft Position Actuator Park Lock Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P25CB - Camshaft Position Actuator Park Lock Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P25CC - Camshaft Position Actuator Park Lock Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P25CD - Intake Camshaft Position Actuator Park Lock Control Circuit Open Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P25CE - Intake Camshaft Position Actuator Park Lock Control Circuit Low Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END

DTC	Additional Basic Enable Conditions			
P25CF - Intake Camshaft Position Actuator Park Lock Control Circuit High Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2600 - Auxiliary Coolant Pump Relay Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2602 - Auxiliary Coolant Pump Relay Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2603 - Auxiliary Coolant Pump Relay Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2626 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 1 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2629 - Oxygen Sensor Pumping Current Trim Circuit Open Bank 2 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P262B - Control Module Power Off Timer Performance	Battery saver mode not active	END		
P2635 - Fuel Pump Flow Performance	Battery saver mode not active	END		
P263A - Malfunction Indicator Lamp Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P263B - Malfunction Indicator Lamp Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P26E4 - Starter Drive Pinion Relay Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P26E5 - Starter Drive Pinion Relay Control Circuit Low	Battery saver mode not active	END		
P26E6 - Starter Drive Pinion Relay Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P26FA - Low Temperature Loop Coolant Pump Overspeed	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2A0B - Manifold Absolute Pressure Sensor Performance Bank 2	Battery saver mode not active	END		
P2A0C - Manifold Absolute Pressure Sensor Circuit Low Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2A0D - Manifold Absolute Pressure Sensor Circuit High Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2AB8 - Turbocharger A Wastegate Position Sensor Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END

DTC	Additional Basic Enable Conditions			
P2AB9 - Turbocharger A Wastegate Position Sensor Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2ABB - Turbocharger B Wastegate Position Sensor Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2ABC - Turbocharger B Wastegate Position Sensor Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2ABD - Turbocharger Wastegate Actuator A Driver Current/Temperature Too High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2ABE - Turbocharger Wastegate Actuator B Driver Current/Temperature Too High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2B81 - Turbocharger A Wastegate Position Sensor Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2B82 - Turbocharger B Wastegate Position Sensor Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2B93 - Turbocharger A Wastegate Position Sensor Exceeded Learning Limit	Battery saver mode not active	END		
P2B94 - Turbocharger B Wastegate Position Sensor Exceeded Learning Limit	Battery saver mode not active	END		
P2B95 - Cold Start Injection Pulse Performance	Battery voltage is equal to or above 10.9 V	Battery saver mode not active	END	
P2BA0 - Low Temperature Loop Coolant Pump Underspeed	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2C02 - Fuel Pressure Regulator Control Circuit Open Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2C03 - Fuel Pressure Regulator Control Circuit Low Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2C04 - Fuel Pressure Regulator Control Circuit High Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2C48 - Low Temperature Loop Coolant Pump Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2C9B - Cold Start Turbocharger A Wastegate Control Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2C9C - Cold Start Turbocharger B Wastegate Control Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P2E68 - Fuel Trim System Lean During Cylinder Deactivation Bank 1	Battery saver mode not active	END		

DTC	Additional Basic Enable Conditions			
P2E69 - Fuel Trim System Rich During Cylinder Deactivation Bank 1	Battery saver mode not active	END		
P2E6A - Fuel Trim System Lean During Cylinder Deactivation Bank 2	Battery saver mode not active	END		
P2E6B - Fuel Trim System Rich During Cylinder Deactivation Bank 2	Battery saver mode not active	END		
P3051 - DC/DC Converter Output Voltage Sensing Circuit 1 Low	Battery saver mode not active	END		
P3052 - DC/DC Converter Output Voltage Sensing Circuit 2 Low	Battery saver mode not active	END		
P3053 - DC/DC Converter Output Voltage Sensing Circuit 1 High	Battery saver mode not active	END		
P3054 - DC/DC Converter Output Voltage Sensing Circuit 2 High	Battery saver mode not active	END		
P3055 - DC/DC Converter Output Voltage 1 Performance	Battery saver mode not active	END		
P3056 - DC/DC Converter Output Voltage 2 Performance	Battery saver mode not active	END		
P305B - DC/DC Converter Ignition Switch Run/Start Position Circuit High	Battery saver mode not active	END		
P305C - DC/DC Converter Ignition Switch Run/Start Position Circuit Low	Battery saver mode not active	END		
P305D - DC/DC Converter Crank Input Signal Circuit High Voltage	Battery saver mode not active	END		
P305E - DC/DC Converter Crank Input Signal Circuit Low Voltage	Battery saver mode not active	END		
P30D8 - Control Module Processor Serial Peripheral Interface Bus 3	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P30D9 - Control Module Processor Serial Peripheral Interface Bus 4	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P30E8 - Turbocharger A Wastegate Control Circuit 2 Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P30E9 - Turbocharger A Wastegate Control Circuit 2 High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P30EA - Turbocharger B Wastegate Control Circuit 2 Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END

DTC	Additional Basic Enable Conditions			
P30EB - Turbocharger B Wastegate Control Circuit 2 High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P3138 - Fuel Pressure Regulator High Control Circuit Low Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P3139 - Fuel Pressure Regulator High Control Circuit High Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P313A - Fuel Pressure Regulator High Control Circuit Shorted to Control Circuit Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P318A - Cylinder 2 Reactivation Performance - Trapped High Pressure Exhaust Charge	Battery saver mode not active	END		
P318B - Cylinder 3 Reactivation Performance - Trapped High Pressure Exhaust Charge	Battery saver mode not active	END		
P318D - Cylinder 5 Reactivation Performance - Trapped High Pressure Exhaust Charge	Battery saver mode not active	END		
P3190 - Cylinder 8 Reactivation Performance - Trapped High Pressure Exhaust Charge	Battery saver mode not active	END		
P3196 - Low Temperature Loop Coolant Pump Speed Performance	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P3198 - Low Temperature Loop Coolant Pump Motor Current Out Of Range High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P3199 - Low Temperature Loop Coolant Pump Motor Current Out Of Range Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P3409 - Cylinder 2 Deactivation Solenoid Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P3411 - Cylinder 2 Deactivation Solenoid Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P3412 - Cylinder 2 Deactivation Solenoid Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P3417 - Cylinder 3 Deactivation Solenoid Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P3419 - Cylinder 3 Deactivation Solenoid Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P3420 - Cylinder 3 Deactivation Solenoid Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END
P3433 - Cylinder 5 Deactivation Solenoid Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END

DTC	Additional Basic Enable Conditions							
P3435 - Cylinder 5 Deactivation Solenoid Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				
P3436 - Cylinder 5 Deactivation Solenoid Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				
P3457 - Cylinder 8 Deactivation Solenoid Control Circuit Open	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				
P3459 - Cylinder 8 Deactivation Solenoid Control Circuit Low	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				
P3460 - Cylinder 8 Deactivation Solenoid Control Circuit High	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				
P3499 - Cylinder 2 Deactivation Performance	Battery saver mode not active	END						
P349A - Cylinder 3 Deactivation Performance	Battery saver mode not active	END						
P349C - Cylinder 5 Deactivation Performance	Battery saver mode not active	END						
P349F - Cylinder 8 Deactivation Performance	Battery saver mode not active	END						
U0073 - Control Module Communication High Speed CAN Bus Off	Battery saver mode not active	END						
U0074 - Control Module Communication Powertrain Expansion CAN Bus Off	Battery saver mode not active	END						
U0076 - Control Module Communication Powertrain Sensor CAN Bus Off	Battery saver mode not active	END						
U0101 - Lost Communication With Transmission Control Module	Battery voltage is equal to or above 10.9 V	Engine not in afterrun mode (defined as engine stopped with ignition off)	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Battery saver mode not active	Engine not in stopping mode (defined as engine speed greater than 0 rpm with ignition off)	System Power Mode is run	END
U0102 - Lost Communication with Transfer Case Control Module	Battery voltage is equal to or above 10.9 V	Engine not in afterrun mode (defined as engine stopped with ignition off)	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Battery saver mode not active	Engine not in stopping mode (defined as engine speed greater than 0 rpm with ignition off)	System Power Mode is run	END
U0104 - Lost Communication With Adaptive Cruise Control Module	Battery voltage is equal to or above 10.9 V	Engine not in afterrun mode (defined as engine stopped with ignition off)	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Battery saver mode not active	Engine not in stopping mode (defined as engine speed greater than 0 rpm with ignition off)	System Power Mode is run	END
U0129 - Lost Communication With Brake System Control Module	Battery voltage is equal to or above 10.9 V	Engine not in afterrun mode (defined as engine stopped with ignition off)	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Battery saver mode not active	Engine not in stopping mode (defined as engine speed greater than 0 rpm with ignition off)	System Power Mode is run	END
U0140 - Lost Communication With Body Control Module	Battery voltage is equal to or above 10.9 V	Engine not in afterrun mode (defined as engine stopped with ignition off)	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Battery saver mode not active	Engine not in stopping mode (defined as engine speed greater than 0 rpm with ignition off)	System Power Mode is run	END
U0146 - Lost Communication With Gateway	Battery voltage is equal to or above 10.9 V	Engine not in afterrun mode (defined as engine stopped with ignition off)	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Battery saver mode not active	Engine not in stopping mode (defined as engine speed greater than 0 rpm with ignition off)	System Power Mode is run	END

DTC	Additional Basic Enable Conditions							
U01B0 - Lost Communication With Battery Sensor Module	Battery voltage is equal to or above 10.9 V	Engine not in afterrun mode (defined as engine stopped with ignition off)	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Battery saver mode not active	Engine not in stopping mode (defined as engine speed greater than 0 rpm with ignition off)	System Power Mode is run	END
U023A - Lost Communication with Active Safety Control Module 1	Battery voltage is equal to or above 10.9 V	Engine not in afterrun mode (defined as engine stopped with ignition off)	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Battery saver mode not active	Engine not in stopping mode (defined as engine speed greater than 0 rpm with ignition off)	System Power Mode is run	END
U0402 - Invalid Data Received From Transmission Control Module	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END			
U0403 - Invalid Data Received From Transfer Case Control Module	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END			
U0404 - Invalid Data Received From Transmission Range Selector Control Module	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END			
U0405 - Invalid Data Received From Cruise Control Module	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END			
U0418 - Invalid Data Received From Brake System Control Module	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END			
U0422 - Invalid Data Received From Body Control Module	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END			
U0447 - Invalid Data Received From Serial Data Gateway Module	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END			
U0499 - Invalid Data Received From Telematics Communication Interface Control Module	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END			
U04B1 - Invalid Data Received From Battery Sensor Module	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				
U053B - Invalid Data Received From Active Safety Control Module 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END			
U0599 - Invalid Data Received From DC/DC Converter Control Module	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END			
U0611 - Lost Communication With Intake Air Temperature Sensor Bank 1 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in afterrun mode (defined as engine stopped with ignition off)	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Battery saver mode not active	Engine not in stopping mode (defined as engine speed greater than 0 rpm with ignition off)	System Power Mode is run	END
U0612 - Lost Communication With Intake Air Temperature Sensor Bank 2 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in afterrun mode (defined as engine stopped with ignition off)	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Battery saver mode not active	Engine not in stopping mode (defined as engine speed greater than 0 rpm with ignition off)	System Power Mode is run	END
U062F - Loss Of Communication with Low Temperature Loop Coolant Pump	Battery voltage is equal to or above 10.9 V	Engine not in afterrun mode (defined as engine stopped with ignition off)	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Battery saver mode not active	Engine not in stopping mode (defined as engine speed greater than 0 rpm with ignition off)	System Power Mode is run	END
U0644 - Lost Communication With Turbocharger A Wastegate Position Sensor	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				
U0674 - Lost Communication With Turbocharger B Wastegate Position Sensor	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				

DTC	Additional Basic Enable Conditions							
U0680 - Lost Communication With Barometric Pressure Sensor Bank 2 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in afterrun mode (defined as engine stopped with ignition off)	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Battery saver mode not active	Engine not in stopping mode (defined as engine speed greater than 0 rpm with ignition off)	System Power Mode is run	END
U068A - Lost Communication With Barometric Pressure Sensor Bank 1 Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in afterrun mode (defined as engine stopped with ignition off)	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Battery saver mode not active	Engine not in stopping mode (defined as engine speed greater than 0 rpm with ignition off)	System Power Mode is run	END
U101B - Lost Communication With Fuel Rail Pressure Sensor Bank 1 Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				
U131D - Invalid Data Received From Fuel Pump Driver Control Module	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END			
U1345 - Engine Control Module LIN Bus 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END			
U1346 - Engine Control Module LIN Bus 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END			
U1348 - Engine Control Module LIN Bus 4	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END			
U1349 - Engine Control Module LIN Bus 5	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END			
U135E - Lost Communication with Transmission Control Module on Engine Control Module LIN Bus 1	Battery voltage is equal to or above 10.9 V	Engine not in afterrun mode (defined as engine stopped with ignition off)	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Battery saver mode not active	Engine not in stopping mode (defined as engine speed greater than 0 rpm with ignition off)	System Power Mode is run	END
U1370 - Invalid Data Received From Intake Air Temperature Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				
U1371 - Invalid Data Received From Barometric Pressure Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				
U1372 - Invalid Data Received From Intake Air Temperature Sensor Bank 2 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				
U1373 - Invalid Data Received From Barometric Pressure Sensor Bank 2 Sensor 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				
U1375 - Invalid Data Received From Fuel Rail Pressure Sensor 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				
U1376 - Invalid Data Received From Turbocharger Wastegate Position Sensor Bank 1	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				
U1377 - Invalid Data Received From Turbocharger Wastegate Position Sensor Bank 2	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				
U1378 - Invalid Data Received From Low Temperature Coolant Loop Pump	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	System Power Mode is run	END			
U18A2 - Lost Communication With Fuel Pump Driver Control Module	Battery voltage is equal to or above 10.9 V	Engine not in afterrun mode (defined as engine stopped with ignition off)	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Battery saver mode not active	Engine not in stopping mode (defined as engine speed greater than 0 rpm with ignition off)	System Power Mode is run	END

DTC	Additional Basic Enable Conditions							
U18A7 - Lost Communication with DC/DC Converter Control Module on Powertrain Expansion CAN Bus	Battery voltage is equal to or above 10.9 V	Engine not in afterrun mode (defined as engine stopped with ignition off)	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	Engine not in stopping mode (defined as engine speed greater than 0 rpm with ignition off)	END		
U18C6 - Transmission Range Selector Control Module Lost Communication With ECM on Powertrain Sensor CAN Bus	Battery voltage is equal to or above 10.9 V	Engine not in afterrun mode (defined as engine stopped with ignition off)	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Battery saver mode not active	Engine not in stopping mode (defined as engine speed greater than 0 rpm with ignition off)	END	
U18D2 - Lost Communication with Transmission Range Selector Control Module on Powertrain Sensor CAN Bus	Battery voltage is equal to or above 10.9 V	Engine not in afterrun mode (defined as engine stopped with ignition off)	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Battery saver mode not active	Engine not in stopping mode (defined as engine speed greater than 0 rpm with ignition off)	System Power Mode is run	END
U18D3 - Lost Communication with Transmission Range Selector Control Module on Powertrain Expansion CAN Bus	Battery voltage is equal to or above 10.9 V	Engine not in afterrun mode (defined as engine stopped with ignition off)	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Engine is not in standby state (standby state occurs after ECM initialization or following after-run)	Battery saver mode not active	Engine not in stopping mode (defined as engine speed greater than 0 rpm with ignition off)	System Power Mode is run	END
U18D5 - Central Gateway Module Lost Communication with Engine Control Module	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END					
U18D7 - Central Gateway Module Lost Communication with Transmission Control Module	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END					
U18DC - Central Gateway Module Lost Communication with Brake System Control Module 1	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END					
U240D - Transmission Range Selector Control Module Powertrain Expansion CAN Bus Off	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				
U240E - Transmission Range Selector Control Module Sensor CAN Bus Off	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				
U2413 - Central Gateway Module High Speed CAN Bus Off	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END					
U2414 - Central Gateway Module High Speed Extension CAN Bus Off	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END					
U250D - Invalid Data Received From Transmission Control Module on LIN Bus	Battery voltage is equal to or above 10.9 V	Engine not in starting mode (defined as engine crank with speed not equal to run mode)	Battery saver mode not active	END				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Backup Transmission Range Command Message Counter Incorrect	C1201	UPDATE The diagnostic monitor detects an alive rolling count error or protection value (checksum) error in the LIN bus frame containing the Electronic Transmission Range Selector (ETRS) signal data. The alive rolling count sequences 0, 1, 2, 3 repeatedly. As each serial data frame is broadcast by the transmitting controller, the transmitting controller increments the alive rolling count in this sequence manner. The receiving controller compares the most recent received alive rolling count value to the previous value plus one. If the values are not equal, an alive rolling count error has occurred. The protection value is based on the checksum of the ETRS data parameters in the transmit message frame, and is incorporated in the transmit message frame. If the TCM receives the ECM/ CHCM ETRS data	rolling count value received from ECM/ CHCM and expected TCM calculated value not equal	= TRUE	Loop rate calibration either 10 milliseconds or 12.5 milliseconds service mode $04 active battery voltage battery voltage time ETRS ECM/CHCM frame recieved	= CeCFMD_e_DEC_Time Base_12p5 = FALSE ≥ 11.00 volts ≥ 300.000 seconds = TRUE	alive rolling count errors ≥ 8 out of 10 sample counts	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		message frame, the TCM calculates the protection value, again based on the ETRS data parameters, in the receive message frame. If the TCM calculated protection value does not equal the protection value incorporated in the ECM/CHCM ETRS data message frame, a or protection value error has occurred. If continuous alive rolling count errors or protection value errors occur, the DTC is set.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Steering Wheel Angle Sensor Signal Message Counter Incorrect	C1211	This DTC monitors for an error in the Steering Wheel Angle Sensor Signal Message Counter Emission neutral default action sets steering angle to 0.0.	Communication of the Alive Rolling Count or Protection Value from the Steering Wheel Angle Sensor over CAN bus is incorrect for out of total samples	>= 8.00 counts >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 300.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts	Executes in 10ms loop.	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lateral Acceleration Sensor Circuit Low	C124F	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a short to ground or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	≤ -3.8500 g ≥ -3.8500 g (≤ 0.5 Ω impedance between signal and controller ground)	battery voltage run crank voltage diagnostic monitor enable sensor type is either directly proportional or inversely proportional U0073 fault active U0073 test fail this key on	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = CeLATR_e_VoltageDirectProp = FALSE = FALSE	raw lateral acceleration signal stability time ≥ 30.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lateral Acceleration Sensor Circuit High	C1250	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a short to power or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	≥ 3.8500 g ≤ 3.8500 g (≤ 0.5 Ω impedance between signal and controller power)	battery voltage run crank voltage diagnostic monitor enable sensor type is either directly proportional or inversely proportional U0073 fault active U0073 test fail this key on	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = CeLATR_e_VoltageDirectProp = FALSE = FALSE	raw lateral acceleration signal stability time ≥ 30.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lateral Acceleration Sensor Performance	C1251	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a signal value that is stuck in a valid range by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	ABS(raw lateral acceleration signal) AND ABS(raw lateral acceleration signal) update raw lateral acceleration signal fail, 50 millisecond update rate	≥ 0.5300 g ≤ 3.8500 g	battery voltage run crank voltage diagnostic monitor enable update raw lateral acceleration signal stablity time: TOSS vehicle speed automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear ABS(raw lateral acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean ≥ 15.0 KPH = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA	raw lateral acceleration signal stability time ≥ 10.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Longitudinal Acceleration Sensor Circuit Low	C1252	Controller specific analog circuit diagnoses the raw longitudinal acceleration signal for a short to ground or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	raw longitudinal acceleration signal when sensor type is directly proportional OR raw longitudinal acceleration signal when sensor type is inversely proportional update raw longitudinal acceleration signal stability time, fail and sample time, 50 millisecond update rate	≤ -3.8500 g ≥ -3.8500 g (≤ 0.5 Ω impedance between signal and controller ground)	battery voltage run crank voltage diagnostic monitor enable sensor type is either directly proportional or inversely proportional U0073 fault active U0073 test fail this key on	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = CeLATR_e_VoltageDirectProp = FALSE = FALSE	raw longitudinal acceleration signal stability time ≥ 30.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Longitudinal Acceleration Sensor Circuit High	C1253	Controller specific analog circuit diagnoses the raw longitudinal acceleration signal for a short to power or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	raw longitudinal acceleration signal when sensor type is directly proportional OR raw longitudinal acceleration signal when sensor type is inversely proportional update raw longitudinal acceleration signal stability time, fail and sample time, 50 millisecond update rate	≥ 3.8500 g ≤ 3.8500 g (≤ 0.5 Ω impedance between signal and controller power)	battery voltage run crank voltage diagnostic monitor enable sensor type is either directly proportional or inversely proportional U0073 fault active U0073 test fail this key on	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = CeLATR_e_VoltageDirectProp = FALSE = FALSE	raw longitudinal acceleration signal stability time ≥ 30.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Longitudinal Acceleration Sensor Performance	C1254	Controller specific analog circuit diagnoses the raw longitudinal acceleration signal rationalized against the TOSS vehicle speed acceleration. The diagnostic monitor can be designed to detect an invalid longitudinal acceleration signal based on the TOSS vehicle speed windows and TOSS vehicle speed acceleration, 4 windows can be enabled. The delta between the TOSS vehicle speed acceleration and longitudinal acceleration signal is taken within each window to verify the delta is small, no failure indicated, or the delta is large indicating the longitudinal acceleration signal is in error. Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal region 1 fail time, 50 millisecond update rate	≥ 0.0800 g	battery voltage run crank voltage diagnostic monitor enable region 1 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal) update region 1 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 1 Boolean ≥ 15.0 KPH ≤ 0.5300 g = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≥ 0.5300 g ≤ 3.8500 g ≤ 0.70 % ≥ 50.0 Nm ≥ 0.0800 g ≥ 2.0 KPH ≤ 120.0 KPH	raw lateral longitudinal acceleration signal stability time ≥ 10.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate region 1 fail time ≥ 4.0 seconds out of region 1 sample time ≥ 5.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	< 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError		
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal region 2 fail time, 50 millisecond update rate	≥ 0.0000 g	battery voltage run crank voltage diagnostic monitor enable region 2 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal)	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 0 Boolean ≥ 15.0 KPH ≤ 0.5300 g = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≥ 0.5300 g ≤ 3.8500 g	raw lateral longitudinal acceleration signal stability time ≥ 10.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					update region 2 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	 ≤ 0.70 % ≥ 80.0 Nm ≥ 0.1500 g ≥ 0.0 KPH ≤ 0.0 KPH < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	region 2 fail time ≥ 75.0 seconds out of region 2 sample time ≥ 120.0 seconds, 50 millisecond update rate	
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal region 3 fail time, 50 millisecond update rate	≥ 0.0000 g	battery voltage run crank voltage diagnostic monitor enable region 3 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 0 Boolean ≥ 15.0 KPH ≤ 0.5300 g = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE	raw lateral longitudinal acceleration signal stability time ≥ 10.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P07C0 fault active P07C0test fail this key on attained gear ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal) update region 3 sample time: brake pedal position engine torque ABS(TOSS vehicle speed acceleration) TOSS vehicle speed ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	= FALSE = FALSE = 1st thru 10th ≥ 0.5300 g ≤ 3.8500 g ≤ 0.70 % ≥ 80.0 Nm ≤ 0.1000 g ≥ 0.0 KPH < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	region 3 fail time ≥ 75.0 seconds out of region 3 sample time ≥ 120.0 seconds, 50 millisecond update rate	
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal region 4 fail time, 50 millisecond update rate	≥ 0.1700 g	battery voltage run crank voltage diagnostic monitor enable region 3 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 1 Boolean ≥ 15.0 KPH ≤ 0.5300 g = TRUE = TRUE = TRUE	raw lateral longitudinal acceleration signal stability time ≥ 10.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					diagnsotic fault sequence gear active	= FALSE		
					P0716 fault active	= FALSE		
					P0716 test fail this key on	= FALSE		
					P0717 fault active	= FALSE		
					P0717 test fail this key on	= FALSE		
					P07BF fault active	= FALSE		
					P07BF test fail this key on	= FALSE		
					P07C0 fault active	= FALSE		
					P07C0test fail this key on	= FALSE		
					attained gear	= 1st thru 10th		
					ABS(raw longitudinal acceleration signal)	≥ 0.5300 g		
					AND			
					ABS(raw longitudinal acceleration signal)	≤ 3.8500 g		
					update region 4 sample time:		region 4 fail time	
					brake pedal position	≤ 0.70 %	≥ 2.0 seconds	
					engine torque	≤ 50.0 Nm	out of region 4	
					TOSS vehicle speed acceleration	≤ -0.1700 g	sample time ≥ 2.5 seconds,	
					TOSS vehicle speed	≥ 2.0 KPH	50 millisecond	
					TOSS vehicle speed	≤ 120.0 KPH	update rate	
					ABS(raw longitudinal acceleration signal) update sample time	< 0.5300 g		
					U0073 fault active	= FALSE		
					U0073 test fail this key on	= FALSE		
					DTCs not fault active	VehicleSpeedSensor_FA VehicleSpeedSensorError		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
System Voltage Performance	P0561	Detects a low performing 12V battery system. This diagnostic reports the DTC when the absolute value of the difference between the battery voltage and the run/ crank voltage exceeds a calibrated value.	Run Crank voltage low and high	ABS(Battery voltage - Run Crank voltage) > 3.00	Battery voltage B+ line present = TRUE Battery voltage low and high diag enable = TRUE Run Crank voltage	1.00 1.00 Voltage ≥ 5.00 volts	40 failures out of 50 samples 100 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect or the flash memory detects an uncorrectable error via the Error Correcting Code.	The Primary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5.00 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background.	Type A, 1 Trips
			The Primary Processor's Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations.	254 failures detected via Error Correcting Code			Diagnostic runs continuously via the flash hardware.	
			The Primary Processor's calculated checksum does not match the stored checksum value for a selected subset of the calibrations.	2 consecutive failures detected or 5 total failures detected.			Diagnostic runs continuously. Will report a detected fault within 200 ms.	
				In all cases, the failure count is cleared when controller shuts down				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Not Programmed	P0602	This DTC will be stored if the DEC ECU has not been flash programmed with production software and calibration.	controller not flash programmed calibration	= 0 Boolean	controller normal power up initialization, ignition run crank transtions from low to high service Mode $04 active during one second loop	 = FALSE	at controller power up intitalization one time (one event/ occurance) OR in one second time loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Long Term Memory Reset	P0603	This DTC detects an invalid NVM which includes a Static NVM, Perserved NVM, ECC ROM in NVM Flash Region, and Perserved NVM during shut down.	Static NVM region error detected during initialization				Diagnostic runs at controller power up.	Type A, 1 Trips
			Perserved NVM region error detected during initialization				Diagnostic runs at controller power up.	
			Perserved NVM region error detected during shut down.				Diagnostic runs at controller power down.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module RAM Failure	P0604	Indicates that the controller has detected a RAM fault. This includes Primary Processor System RAM Fault, Primary Processor Cache RAM Fault, Primary Processor TPU RAM Fault, Primary Processor Update Dual Store RAM Fault, Primary Processor Write Protected RAM Fault, and Secondary Processor RAM Fault. This diagnostic runs continuously.	Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	Type A, 1 Trips
			Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written >=	3 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	0.40000 s			When dual store updates occur.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	65,534 counts			Diagnostic runs continuously (background loop)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Processor Integrity Fault	P0606	Indicates that the conroller has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors.	Time new seed not received exceeded			always running	409.594 seconds	Type A, 1 Trips
			MAIN processor receives seed in wrong order			always running	18 / 17 counts intermittent. 50 ms/count in the ECM main processor	
			2 fails in a row in the MAIN processor's ALU check			Test is Enabled: CPU1 0 CPU2 1 CPU3 0 CPU4 0 (If 0, this test is disabled)	25 ms	
			2 fails in a row in the MAIN processor's configuration register masks versus known good data			Test is Enabled: 1 (If 0, this test is disabled)	12.5 to 25 ms	
			Checks number of stack over/under flow since last powerup reset >=	5.00		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			Voltage deviation >	0.4950		Test is Enabled: 1 (If 0, this test is disabled)	5 / 10 counts or 0.450 seconds continuous; 50 ms/count in the ECM main processor	
			Checks for ECC (error correcting code) circuit	3 (results in MIL), 5 (results in MIL and		Test is Enabled: 1	variable, depends on	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	remedial action)		(If 0, this test is disabled)	length of time to access flash with corrupted memory	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to write flash to RAMvariable, depends on length of time to write flash to RAM	
			MAIN processor DMA transfer from Flash to RAM has 1 failure			Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to write flash to RAM	
			Safety critical software is not executed in proper order.	>= 1 incorrect sequence.		Test is Enabled: **P0606 Program Sequence Watch Enable f(CPU#, loop time or event)** (If 0, this test is disabled)	Fail Table, f(Loop Time). See supporting tables: **P0606_PSW Sequence Fail f (Loop Time)** / Sample Table, f (Loop Time)See supporting tables: **P0606_PSW Sequence Sample f(Loop Time)**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							counts 50 ms/count in the ECM main processor	
			MAIN processor determines a seed has not changed within a specified time period within the 50ms task.	Previous seed value equals current seed value.		Test is Enabled: 1 (If 0, this test is disabled)	Table, f(Loop Time). See supporting tables: **P0606_Last Seed Timeout f (Loop Time)**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Processor Integrity Performance	P0607	Indicates that the controller has detected an internal processor integrity performance.	Performs the failure diagnostic for the offline and online BIST results.		calibration enable	= 1 Boolean	5 counts background task/ count in the ECM main processor	Type A, 1 Trips
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)	calibration enable	= 1 Boolean	variable, depends on length of time to access flash with corrupted memory	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)	calibration enable	= 1 Boolean	variable, depends on length of time to write flash to RAMvariable, depends on length of time to write flash to RAM	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Internal Control Module EEPROM Error	P062F	This DTC detects a NVM long term performance. There are two types of diagnostics that run during controller power up. One for HWIO reports that writing to NVM (at shutdown) will not succeed, and the other HWIO reports the assembly calibration integrity check has failed.	HWIO reports that writing to NVM (at shutdown) will not succeed				Diagnostic runs at controller power up.	Type A, 1 Trips
			HWIO reports the assembly calibration integrity check has failed				Diagnostic runs at controller power up.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Actuator Supply Voltage Circuit Low	P0658	Controller specific output driver circuit diagnoses the high sided driver circuit for a short to ground failure, or where controller H/W cannot differentiate, diagnoses the high sided driver circuit for a short to ground failure or open circuit failure, when the output is powered on, by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground or an open circuit.	≤ 0.5 Ω impedance between signal and controller ground OR ≥ 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail count and increment sample count, otherwise increment only sample count	(ground short diagnostic monitor enable calibration OR open circuit diagnostic monitor enable calibration) high side drive ON service mode $04 active	= 1 Boolean = 1 Boolean = TRUE = FALSE	ground short fail count ≥ 6 counts within sample count of 2,400 counts OR open circuit fail count ≥ 6 counts within sample count of 2,400 counts 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Fluid Temperature (TFT) Sensor Performance	P0711	The diagnostic monitor will verify the time to transmission fluid temperature warm up based on the raw transmission fluid temperature sesnor, any intermittent signal that causes multiple unrealistic delta changes (intermittent faults) based on the raw transmission fluid temperature sesnor, and, raw transmission fluid temperature sesnor signal stuck in valid range.	raw transmission fluid temperature and the transmission fluid temperature warm up time has elapsed	≤ 15.0 °C			transmission fluid temperature warm up time ≥ **transmission fluid temperature warm up time** seconds	Type B, 2 Trips
					diagnsotic monitor enable	= 1 Boolean		
					P0712 NOT fault active			
					P0713 NOT fault active			
					battery voltage	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					warm up test enable	= 1 Boolean		
					TFT rationality diagnostic monitor enabled	= VeTFSR_b_TFT_RatlEnbl		
					driver accelerator pdeal position	≥ 5.0 %		
					engine torque	≥ 50.0 Nm		
					engine speed	≥ 500.0 RPM		
					vehicle speed	≥ 10.0 KPH		
					engine coolant temperature	≥ -40.0 °C		
					engine coolant temperature	≤ 150.0 °C		
					raw transmission fluid temperature	≥ -40.0 °C		
					raw transmission fluid temperature	≤ 150.0 °C		
					P2818 fault active	= FALSE		
					P2818 test fail this key on	= FALSE		
					DTCs not fault active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						EngineTorqueEstInaccurate AcceleratorPedalFailure CrankSensor_FA ECT_Sensor_FA VehicleSpeedSensor_FA		
			current transmission fluid temperature string length = previous transmission fluid temperature transmission temperature string length + (raw transmission fluid temperature - previous raw transmission fluid temperature, update rate 100 milliseconds, increment sample count	≥ 80.0 °C			sample count ≥ 10 counts evaluate fail temperature threshold, 100 millisecond update rate, if transmission fluid temperature string length above fail threshold increment fail time fail time ≥ 8.0 seconds out of sample time ≥ 12.0 seconds	
					diagnsotic monitor enable P0712 NOT fault active P0713 NOT fault active battery voltage	= 1 Boolean ≥ 9.00 volts	 battery voltage time ≥ 0.100 seconds	
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					intermittent test enable propulsion system active	= 1 Boolean = TRUE		
			raw transmission fluid temperature - previous	≤ 0.0000 °C			fail time ≥ 600.0 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			raw transmission fluid temperature, update rate 100 milliseconds, update fail time		diagnsotic monitor enable P0712 NOT fault active P0713 NOT fault active battery voltage run crank voltage stuck in range test enable propulsion system active raw transmission fluid temperature raw transmission fluid temperature	= 1 Boolean ≥ 9.00 volts ≥ 9.00 volts = 1 Boolean = TRUE ≥ -40.0 °C ≤ 150.0 °C	 battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Fluid Temperature Sensor Circuit Low Voltage	P0712	Controller specific analog circuit diagnoses the transmission fluid temperature sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds, converted to a resistance value.	circuit resistance update fail time 1 seconds update rate	≤ 13.000 Ω			fail time ≥ 5.00 seconds out of sample time ≥ 6.00 seconds 1 seconds update rate	Type B, 2 Trips
					diagnostic monitor enable	= 1 Boolean	battery voltage in range time ≥ 0.100 seconds	
					battery voltage	≥ 9.00 volts		
							run crank voltage in range time ≥ 0.100 seconds	
					run crank voltage run crank voltage in range time	≥ 9.00 volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Fluid Temperature Sensor Circuit Low Voltage	P0713	Controller specific analog circuit diagnoses the transmission fluid temperature sensor and wiring for an open circuit or short to voltage failure by comparing a voltage measurement to controller specific voltage thresholds, converted to a resistance value.	circuit resistance update fail time 1 seconds update rate	≥ 206,875.0 Ω	diagnostic monitor enable battery voltage run crank voltage run crank voltage in range time	= 1 Boolean ≥ 9.00 volts ≥ 9.00 volts	fail time ≥ 5.00 seconds out of fail time ≥ 6.00 seconds 1 seconds update rate battery voltage in range time ≥ 0.100 seconds run crank voltage in range time ≥ 0.100 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Input Speed Sensor Performance	P0716	Detects unrealistic drop in raw transmission input speed signal RPM. Drop events are counted up to fail threshold. A drop event is defined by a sudden delta change in RPM from one value to a lower value. The raw transmission input speed must achieve a value high enough to record an unrealistic drop sample to sample. Once the drop threshold is met, fail time is accumualted indicating the raw transmission input speed has not recovered above a threshold, allowing the fail event count to increment. Multiple fail event counts must occur, but if the signal remains low, no further deltas occur, the "Input Speed Sensor Circuit Low Voltage" DTC will set before P0716, as P0716 is designed to set based on an intermittent raw transmission input speed signal RPM.	delta raw transmission input speed delta raw transmission input speed = raw transmission input speed - last valid raw transmission input speed, 25 millisecond update rate	≥ 2,000.0 RPM	service mode $04 active diagnostic monitor enable P0717 test fail this key on P07BF test fail this key on P07C0 test fail this key on High Side Driver 1 and 2 Run Crank Voltage Service Fast Learn Run Crank Active last valid raw transmission input speed OR valid raw transmission input speed (before drop event) ****************************** Stability Criteria last valid raw transmission input speed updates very 25 milliseconds when stablity time complete as long as (delta delta raw transmission input speed AND raw transmission input	= FALSE = 1 Boolean (0 is disable, 1 is enable) = FALSE = FALSE = FALSE = TRUE ≥ 9.0 Volts = FALSE = TRUE ≥ 240.0 RPM ≥ 240.0 RPM ****************************** ≤ 320.0 RPM > 200.0 RPM	fail time ≥ 1.500 seconds updated fail event count, fail event count ≥ 5 counts, 25 millisecond update rate raw transmission input speed time ≥ 2.000 seconds stability time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					speed)			
					raw transmission output speed	≥ 377.0 RPM		
					accelerator pedal position	≥ 5.0 %		
					engine torque	≤ 8,191.9 Nm		
					engine torque	≥ 30.0 Nm		
					hydraulic system pressure available	= TRUE		
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Input Speed Sensor Circuit Low Voltage	P0717	Detects no activity in raw transmission input speed signal RPM due to open ciruit electrical failure mode or sensor internal faults, or, controller internal failure modes. The raw transmission input speed signal RPM is rationalized against vehicle conditions in which the the powertrain is producing torque available at the drive wheels, but raw transmission input speed signal RPM remains low. After a sudden drop in raw transmission input speed signal RPM, a race condition can occur between P0717 and "Input Speed Sensor Performance" depending on the true nature of the failure.	raw transmission input speed OR TISS/TOSS fault (single power supply to TISS and TOSS) = TRUE, update fail time 25 millisecond update rate	≤ 168.0 RPM < 175.0 RPM	service mode $04 active diagnostic monitor enable run crank active service fast learn active run crank voltage hydraulic pressure avail P0722 fault active P0723 fault active P077C fault active P077D fault active brake pedal position P0716 test fail this key on P07BF test fail this key on P07C0 test fail this key on accelerator pedal position engine torque engine torque AND ***************************** (transmission current attained gear transmission current attained gear raw transmission output speed OR transmission current attained gear transmission current attained gear raw transmission output speed)	= FALSE = 1 Boolean (0 is disable, 1 is enable) = TRUE = FALSE ≥ 9.0 volts = TRUE = FALSE = FALSE = FALSE = FALSE < 70.0 % = FALSE = FALSE = FALSE ≥ 5.0 % ≥ 30.0 Nm ≤ 8,191.9 Nm ***************************** ≤ CeCGSR_e_CR_Fourth ≥ CeCGSR_e_CR_First ≥ 250.0 RPM ≤ CeCGSR_e_CR_Tenth ≥ CeCGSR_e_CR_Fourth ≥ 377.0 RPM	fail time ≥ 4.00 seconds run crank voltage time ≥ 25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					**************************** AND (P0717 fault active OR P0717 test fail this key on) **************************** TISS/TOSS fault (single power supply to TISS and TOSS) = TRUE occurs when: (P0722 fail time high gear exceeds fail threshold OR P0722 fail time low gear exceeds fail threshold) AND TISS/TOSS has single power supply calibration TISS/TOSS single power supply test enabled Raw Input Speed DTCs not fault active	**************************** = FALSE = FALSE **************************** ≥ 4.00 s ≥ 3.00 s = 0 Boolean = 1 Boolean < 175.00 rpm EngineTorqueEstInaccurate		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Performance	P0721	The diagnostic monitor determines if the direction TOSS value is coherent based on the on period time of the directional sensor and TOSS raw. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow TOSS raw RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	TOSS raw direction when TOSS transitional period = FALSE AND (TOSS raw direction when TOSS transitional period = FALSE OR TOSS raw when TOSS transitional period = TRUE) update fail and sample time 6.25 ms update rate	≠ FORWARD ≠ REVERSE ≥ 225.0 RPM	service mode $04 active diagnostic monitor enable TOSS count sample period (P0721 fault active OR P0721 test fail this key on) senor type is directional senor type cailbration ****************************** TOSS transitional period detected = FALSE when: (on period OR on period when direction unknown OR on period AND on period when direction is reverse OR on period AND on period when direction is forward) TOSS transitional period detected = TRUE when: on period AND	= FALSE = 1 Boolean ≠ 0 counts = FALSE = FALSE = CeTOSR_e_Directional ****************************** ≥ 0.4434 seconds ≤ 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds	fail time ≥ 3.500 seconds out of sample time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					on period when direction unknown			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit Low Voltage	P0722	Detects no activity in raw transmission output speed signal RPM due to open ciruit electrical failure mode or sensor internal faults, or, controller internal failure modes. The raw transmission output speed signal RPM is rationalized against vehicle conditions in which the the powertrain is producing torque, but raw transmission output speed signal RPM remains low. After a sudden drop in raw transmission output speed signal RPM, a race condition can occur between P0722 and "Output Speed Sensor Circuit Intermittent" depending on the true nature of the failure.	raw transmission output speed, update fail time 6.25 millisecond update rate use high gear fail time threshold when: (attained gear attained gear attained gear) ELSE use low gear fail time threshold	≤ 30.0 RPM ≥ CeCGSR_e_CR_First ≤ CeCGSR_e_CR_Tenth > CeCGSR_e_CR_Fourth	service mode $04 active diagnostic monitor enable ****************************** when neutral range or shift occurs: (Intrusive Shift Active OR (garage shift AND Locked to Freewheel AND Freewheel to Locked) OR PRNDL OR PRNDL OR range inhibit state) AND (engine torque accelerator pedal position) when not neutral range occurs: attained gear attained gear (attained gear engine torque accelerator pedal (TCC slip	= FALSE = 1 Boolean ****************************** = TRUE ≠ COMPLETE = FALSE = FALSE = PARK = NEUTRAL ≠ no inhibit active ≥ 8,192.0 Nm ≥ 100.0 % ≥ CeCGSR_e_CR_First ≤ CeCGSR_e_CR_Tenth > CeCGSR_e_CR_Fourth ≥ 30.0 Nm ≥ 3.0 % > 100.00 rpm	fail time ≥ 4.00 seconds high gear OR fail time ≥ 3.00 seconds low gear	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR TCC mode)) when not neutral range occurs: (attained gear engine torque accelerator pedal (TCC slip OR TCC mode)) ****************************** (TISS AND TISS) OR (Engine Speed AND Engine Speed) ****************************** P0716 test fail this key on P0717 test fail this key on P07BF test fail this key on P07C0 test fail this key on PTO check: PTO enable calibration is FALSE OR (PTO enable calibration is TRUE AND PTO active) run crank voltage service fast learn active run crank voltage	 ≠ Off Mode ≤ CeCGSR_e_CR_Fourth ≥ 50.0 Nm ≥ 3.5 % > 100.00 rpm ≠ Off Mode ****************************** ≤ 8,191.9 RPM ≥ 175.0 RPM ≤ 8,191.9 RPM ≥ 3,500.0 RPM ****************************** = FALSE = FALSE = FALSE = FALSE = 1 Boolean = 1 Boolean = FALSE ≥ 5.00 volts = FALSE ≥ 9.00 volts	run crank voltage time ≥ 25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					transmission fluid temperature P0723 test fail this key on P077C test fail this key on P077D test fail this key on (P0722 fault active OR P0722 test fail this key on) (Hydraulic Pressure Avail Trans Engaged State) DTCs not fault active	≥ -40.00 °C = FALSE = FALSE = FALSE = FALSE = FALSE = TRUE ≠ NotEngaged AcceleratorPedalFailure EngineTorqueEstInaccurate	Pressure and Trans Engaged for delay time **P0722 OSS Direction Change Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit Intermittent	P0723	Detects unrealistic drop in raw transmission output speed signal RPM. Drop events are counted up to fail threshold. A drop event is defined by a sudden delta change in RPM from one value to a lower value. The raw transmission output speed must achieve a value high enough to record an unrealistic drop sample to sample. Once the drop threshold is met, fail time is accumualted indicating the raw transmission output speed has not recovered above a threshold, allowing the fail event count to increment. Multiple fail event counts must occur, but if the signal remains low, no further deltas occur, the "Output Speed Sensor Circuit Low Voltage" DTC will set before P0723, as P0723 is designed to set based on an intermittent raw transmission output speed signal RPM.	4WD low fail threshold: delta raw transmission output speed OR NOT 4WD low fail threshold, update fail time, delta raw transmission output speed = raw transmission output speed previous loop - raw transmission output speed, 25 millisecond update rate	≥ 1,755.0 RPM ≥ 650.0 RPM			fail time ≥ 1.500 seconds updated fail event count, fail event count ≥ 5 counts, 25 millisecond update rate	Type A, 1 Trips
					service mode $04 active	= FALSE		
					diagnostic monitor enable	= 1 Boolean		
					transmission engaged state	≠ not engaged	transmission engaged state time ≥ **P0723 transmission engaged state time threshold**	
					4WD low state	= 4WD low state previous loop, 25 millisecond update rate	4WD low change time ≥ 3.0 seconds	
					PTO check: PTO disable calibration is FALSE OR	≠ 1 Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(PTO disable calibration is TRUE AND PTO active)	= 1 Boolean = FALSE		
					run crank voltage	≥ 5.00 volts	run crank voltage time ≥ 25 milliseconds	
					service fast learn active run crank voltage P077C test fail this key on P077D test fail this key on	= FALSE ≥ 9.00 volts = FALSE = FALSE		
					******************************	******************************		
					when PRNDL is moved to NEUTRAL allow transmission engaged state time before enabling fail evaluation, or, if raw raw transmission output speed is active in NEUTRAL enable fail evaluation:			
					PRNDL OR	= CeTRGR_e_PRNDL_Neutral		
					PRNDL OR	= CeTRGR_e_PRNDL_Transitional1 N-D transitional		
					PRNDL OR	= CeTRGR_e_PRNDL_Transitional4 R-N transitional		
					raw transmission output speed OR	≥ 250.0 RPM		
					last valid raw transmission output speed	≥ 250.0 RPM		
					******************************	******************************		
					determine if raw transmission input speed is stable:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(raw transmission input speed - raw transmission input speed previous, 25 millisecond update AND raw transmission input speed) OR (TISS/TOSS has single power supply calibration AND raw transmission input speed) ****************************** select delta RPM fail theshold: (4WD low state AND 4WD low valid) select P0723 4WD TOSS delta fail threshold otherwise use P0723 TOSS delta fail threshold ****************************** last valid raw transmission output speed OR valid raw transmission output speed (before drop event) last valid raw transmission output speed updates every 25 milliseconds when stablity time complete as long as (delta delta raw transmission output speed AND raw transmission output speed) hydraulic pressure avail	≤ 4,095.9 RPM ≥ 200.0 RPM = 0 Boolean = 0.0 RPM ****************************** = TRUE = TRUE ****************************** > 36.0 RPM > 36.0 RPM ≤ 140.0 RPM ≥ 36.0 RPM = TRUE	raw transmission input speed stability time ≥ 2.00 seconds no time required raw transmission output speed time ≥ 2.00 seconds stability time ≥ 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					******************************	******************************		
					PRNDL	≠ ParkCeTRGR_e_PRNDL_Park		
					AND PRNDL	≠ CeTRGR_e_PRNDL_Transitional2		
					AND			
					******************************	******************************		
					((PRNDL	= CeTRGR_e_PRNDL_Neutral		
					OR PRNDL	= CeTRGR_e_PRNDL_Transitional1		
					OR PRNDL)	= CeTRGR_e_PRNDL_Transitional4		
					AND (Output Speed	≥ 50.00 RPM		
					raw transmission output speed - raw transmission output speed previous, 25 millisecond update))	< 20.00 AND > -140.00	Delta met time > 2.00	
					OR			
					******************************	******************************		
					(PRNDL	≠ CeTRGR_e_PRNDL_Neutral		
					AND PRNDL	≠ CeTRGR_e_PRNDL_Transitional1		
					AND PRNDL)	≠ CeTRGR_e_PRNDL_Transitional4		
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Torque Converter Clutch (TCC) System Performance - GR10 specific	P0741	The GR10 diagnostic monitor detects the transmission torque converter control valve failed hydraulically on. The torque converter hydraulic control circuit is multiplexed with the transmission clutch select valve hydraulic control circuit, allowing for the torque converter control valve stuck on test to execute when the clutch select valve solenoid is commanded ON. When the clutch select valve solenoid is commanded ON as the vehicle speed decreases toward zero KPH, and, if the torque converter control valve is stuck on, the torque converter slip speed rate of change will have a large slope while decreasing toward zero RPM, and the torque converter slip speed will remain low near zero RPM.	calculated transmission torque converter K factor = engine speed / SQR (engine torque) increment fail count 25 millisecond update rate	> **P0741 GR10 torque converter K factor fail limit** see supporting table			fail count ≥ 4 counts in 100 count sample 25 millisecond update rate	Type A, 1 Trips
					diagnostic monitor enable	= 1 Boolean		
					(TCC stuck off enable	= 1 Boolean		
					OR			
					TCC stuck on enable)	= 1 Boolean		
					hydraulic pressure available:			
					engine speed	≥ 500.0 RPM	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	
					battery voltage	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					P281B falut active	= FALSE		
					P281D falut active	= FALSE		
					P281E falut active	= FALSE		
					P0722 fault pending	= FALSE		
					P0723 fault pending	= FALSE		
					PRNDL	≠ PARK		
					PRNDL	≠ NEUTRAL		
					transmission fluid temperature	≥ -6.66 °C		
					transmission fluid temperature	≤ 130.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					engine speed	≥ 1,500.0 RPM		
					intrusive shift active (intrusive shift due to fault maturing for clutch pressure control solenoid stuck off/on P0746, P0747, P0776, P0777, P0796, P0797, P2714, P2715, P2723, P2724, P2732, P2733, P2820, P2821)	= FALSE		
					P0741 test fail this key on	= FALSE		
					range shift state	= range shift complete (steagy state gear)		
					attained gear slip	≤ 75.0 RPM		
					engine torque	≥ 5.00 Nm		
					accelerator pedal position	≥ 0.00 %		
					accelerator pedal position	≤ 100.0 %		
					transmission torque converter speed ratio (transmission turbine shaft speed / engine speed)	≤ 0.950		
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate CrankSensor_FA P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Stuck Off (GR10)	P0746	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C1 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM			fail time ≥ 1.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update	Type A, 1 Trips
					******************************	******************************		
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					use run crank voltage calibration is FALSE	= 0 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 0 Boolean		
					AND			
					run crank voltage)	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control			procedure active hydraulic pressure available hydraulic line pressure **************************** enable C1 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR (accelerator pedal position OR engine speed) C1 clutch slip speed valid	= FALSE Boolean = TRUE ≥ -999.00 kPa **************************** = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE ≥ 36.0 RPM ≥ 0.50 % ≥ 1,000.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip	≥ 1.000 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C1 (GR10 CB123456R) clutch pressure control solenoid.			 C1 clutch pressured map (enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear) range shift state ****************************** DTCs not fault pending DTCs not fault active	speed calculation) = mapped to line pressure, C1 clutch pressure has reached fully applied state = 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE = range shift complete ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Stuck On	P0747	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C1 clutch slip speed OR shift type is garage shift: C1 clutch slip speed ELSE shift is another type: C1 clutch slip speed update fail time 6.25 milliscond update	 < 50.0 RPM < 100.00 RPM < 50.0 RPM			Base fail time: shift type is power down shift: fail time ≥ 0.60 seconds shift type is garage shift: fail time ≥ 0.25 shift type is another type: fail time ≥ 0.150 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			****************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)	****************************** = 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		is disabled. This diagnostic monitor is relative to the GR10 C1 CB123456R clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					hydraulic pressure ****************************	≥ -999 kPa *****************************		
					range shift state	≠ range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	≥ 36.0 RPM		
					((C1 off going clutch pressure control ramp time out complete	= TRUE		
					AND off going clutch pressure ramp control ramp time out enable)	= 1 (1 to enable, 0 to disable)		
					OR			
					C1 off going clutch command pressure)	≤ 350.0 kPa	exhaust delay by shift type:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							closed throttle upshift: **C1 exhaust delay closed throttle lift foot up shift** open throttle upshift: **C1 exhaust delay open throttle power on up shift** garage shifts: **C1 exhaust delay garage shift** closed throttle downshift: **C1 exhaust delay closed throttle down shift** negative torque upshift: **C1 exhaust delay negative torque up shift** open throttle downshift: **C1 exhaust delay open throttle power down shift**	
					(engine torque AND Primary oncoming stuck	≥ 8,191.8 Nm = 0 (0 is enable, 1 is		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					on torque enable cal)	enable)		
					OR			
					(primary oncoming clutch active	= TRUE		
					primary on coming control state	≠ clutch fill phase		
					primary on coming commanded pressure)	≥ pressure clip threshold according to shift type:		
						closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C2 Torque-Based Pressure Clip** OR **C3 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip** OR **C6 Torque-Based Pressure Clip**	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C2_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	
						clip thresholds for all other shift types:		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C1 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test:			
					(current shift type AND shift type enable cal for current shift type)	≠ Garage shift = **Clutch Stuck On Shift Type Enable** (0 table value will disable, 1 will enable)		
					OR			
					(Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts	= FALSE = 1 (0 will enable, 1 will enable) = NEUTRAL OR commanded gear = 1 (0 to disable, 1 to		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND	enable)		
					driver requested direction	= FORWARD		
					AND			
					commanded gear)	= a FORWARD gear		
					OR			
					(stuck on enable cal for reverse garage shifts	= 1 (0 to disable, 1 to		
					AND	enable)		
					driver requested direction	= REVERSE		
					AND			
					commanded gear))	= REVERSE		
					clutch stuck off intrusive shift active	= FALSE		
					startle mitigation active (see note on startle mitigation below)	= FALSE		
					(new clutch controller has been initalized	= TRUE		
					OR			
					transitioning to a different clutch controller)	= TRUE		
					current clutch solenoid test state	transitions to TestState or TUT_HOLD (see note below about state transitions)		
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					*****************************	*****************************		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747,			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Stuck Off (GR10)	P0776	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C2 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM			fail time ≥ 1.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update	Type A, 1 Trips
					******************************	******************************		
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					use run crank voltage calibration is FALSE	= 0 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 0 Boolean		
					AND			
					run crank voltage)	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control			procedure active hydraulic pressure available hydraulic line pressure **************************** enable C2 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR (accelerator pedal position OR engine speed) C2 clutch slip speed valid	= FALSE Boolean = TRUE ≥ -999.00 kPa **************************** = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE ≥ 36.0 RPM ≥ 0.50 % ≥ 1,000.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip	≥ 1.000 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C2 (GR10 CB128910R) clutch pressure control solenoid.				speed calculation)		
					C2 clutch pressured map	= mapped to line pressure, C2 clutch pressure has reached fully applied state		
					(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)	= 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE		
					range shift state	= range shift complete		
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Stuck On	P0777	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C2 clutch slip speed OR shift type is garage shift: C2 clutch slip speed ELSE shift is another type: C2 clutch slip speed update fail time 6.25 milliscond update	 < 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time ≥ 0.60 seconds shift type is garage shift: fail time ≥ 0.25 shift type is another type: fail time ≥ 0.15 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			******************************	******************************	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count ≥ 3 counts 6.25 milliscond update	
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					use run crank voltage calibration is FALSE	= 0 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 0 Boolean		
					AND			
					run crank voltage)	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		is disabled. This diagnostic monitor is relative to the GR10 C2 CB128910R clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					hydraulic pressure ****************************	≥ -999 kPa *****************************		
					range shift state	≠ range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	≥ 36.0 RPM		
					((C2 off going clutch pressure control ramp time out complete	= TRUE		
					AND off going clutch pressure ramp control ramp time out enable)	= 1 (1 to enable, 0 to disable)		
					OR			
					C2 off going clutch command pressure)	≤ 350 kPa	exhaust delay by shift type:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							closed throttle upshift: **C2 exhaust delay open throttle power on up shift** open throttle upshift: **C2 exhaust delay open throttle power on up shift** garage shifts: **C2 exhaust delay garage shift** closed throttle downshift: **C2 exhaust delay closed throttle down shift** negative torque upshift: **C2 exhaust delay negative torque up shift** open throttle downshift: **C2 exhaust delay open throttle power down shift**	
					(engine torque AND Primary oncoming stuck on torque enable cal)	≥ 8,192 Nm = 0 (0 is enable, 1 is enable)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	 = TRUE ≠ clutch fill phase ≥ pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C1 Torque-Based Pressure Clip** OR **C3 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip** OR **C6 Torque-Based Pressure Clip** clip thresholds for all other shift types: garage shifts:	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						Clutch Clip Press GS Shifts closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C2 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test:			
					(current shift type AND	≠ Garage shift		
					shift type enable cal for current shift type)	= **Clutch Stuck On Shift Type Enable** (0 table value will disable, 1 will enable)		
					OR			
					(Intrusive shift active AND	= FALSE		
					shift type enable cal for garage shift AND	= 1 (0 will enable, 1 will enable)		
					Attained Gear AND	= NEUTRAL OR commanded gear		
					(stuck on enable cal for forward garge shifts AND	= 1 (0 to disable, 1 to enable)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear))	= FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE		
					clutch stuck off intrusive shift active	= FALSE		
					startle mitigation active (see note on startle mitigation below)	= FALSE		
					(new clutch controller has been initalized OR transitioning to a different clutch controller)	= TRUE = TRUE		
					current clutch solenoid test state	transitions to TestState or TUT_HOLD (see note below about state transitions)		
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					******************************	******************************		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715,			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit Low	P077C	Controller specific analog circuit diagnoses the transmission output speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission output speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	≤ 0.2500 volts (≤ 0.5 Ω impedance between signal and controller ground)	service mode $04 active diagnostic monitor enable P077D fault active service fast learn run crank voltage battery voltage P077C fault active P077C test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count, fail count ≥ 16 counts 6.25 millisecond update rate service fast learn, run crank and battery voltage time ≥ 5.00 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit High	P077D	Controller specific analog circuit diagnoses the transmission output speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission output speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	≥ 4.7500 volts (≤ 0.5 Ω impedance between signal and controller power)	service mode $04 active diagnostic monitor enable P077C fault active service fast learn run crank voltage battery voltage P077D fault active P077D test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count, fail count ≥ 16 counts 6.25 millisecond update rate service fast learn, run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Stuck Off (GR10)	P0796	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C3 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM			fail time ≥ 1.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update	Type A, 1 Trips
					******************************	******************************		
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					use run crank voltage calibration is FALSE	= 0 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 0 Boolean		
					AND			
					run crank voltage)	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control			procedure active hydraulic pressure available hydraulic line pressure **************************** enable C3 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR (accelerator pedal position OR engine speed) C3 clutch slip speed valid	= FALSE Boolean = TRUE ≥ -999.00 kPa **************************** = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE ≥ 36.0 RPM ≥ 0.50 % ≥ 1,000.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip	≥ 1.000 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C3 (GR10 C23457910) clutch pressure control solenoid.			C3 clutch pressured map (enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear) range shift state ***************************** DTCs not fault pending DTCs not fault active	speed calculation) = mapped to line pressure, C3 clutch pressure has reached fully applied state = 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE = range shift complete ***************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Stuck On	P0797	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C3 clutch slip speed OR shift type is garage shift: C3 clutch slip speed ELSE shift is another type: C3 clutch slip speed update fail time 6.25 milliscond update	 < 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time ≥ 0.60 seconds shift type is garage shift: fail time ≥ 0.35 shift type is another type: fail time ≥ 0.15 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			******************************	******************************	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count ≥ 3 counts 6.25 milliscond update	
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					use run crank voltage calibration is FALSE	= 0 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 0 Boolean		
					AND			
					run crank voltage)	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		is disabled. This diagnostic monitor is relative to the GR10 C3 C23457910 clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					hydraulic pressure ****************************	≥ -999 kPa *****************************		
					range shift state	≠ range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	≥ 36.0 RPM		
					((C3 off going clutch pressure control ramp time out complete	= TRUE		
					AND off going clutch pressure ramp control ramp time out enable)	= 1 (1 to enable, 0 to disable)		
					OR			
					C3 off going clutch command pressure)	≤ 350 kPa	exhaust delay by shift type:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							closed throttle upshift: **C3 exhaust delay closed throttle lift foot up shift** open throttle upshift: **C3 exhaust delay open throttle power on up shift** garage shifts: **C3 exhaust delay garage shift** closed throttle downshift: **C3 exhaust delay closed throttle down shift** negative torque upshift: **C3 exhaust delay negative torque up shift** open throttle downshift: **C3 exhaust delay open throttle power down shift**	
					(engine torque AND Primary oncoming stuck	≥ 8,192 Nm = 0 (0 is enable, 1 is		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	enable) = TRUE ≠ clutch fill phase ≥ pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C1 Torque-Based Pressure Clip** OR **C2 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip** OR **C6 Torque-Based Pressure Clip** clip thresholds for all other shift types:	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C2_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C3 clutch slip speed valid, all speed sensors are functional for lever node clutch slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test: (current shift type AND shift type enable cal for current shift type) OR (Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts	≠ Garage shift **Clutch Stuck On Shift** = **Type Enable** (0 table value will disable, 1 will enable) = FALSE = 1 (0 will enable, 1 will enable) = NEUTRAL OR commanded gear = 1 (0 to disable, 1 to		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ****************************** DTCs not fault pending DTCs not fault active	enable) = FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to TestState or TUT_HOLD (see note below about state transitions) ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					*****************************	*****************************		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747,			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Input/Turbine Speed Sensor A Circuit Low	P07BF	Controller specific analog circuit diagnoses the transmission input/ turbine speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intput/turbine speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	≤ 0.2500 volts (≤ 0.5 Ω impedance between signal and controller ground)	service mode $04 active diagnostic monitor enable P07C0 fault active service fast learn run crank voltage battery voltage P07BF fault active P07BF test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count, fail count ≥ 16 counts 6.25 millisecond update rate service fast learn, run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Input/Turbine Speed Sensor A Circuit High	P07C0	Controller specific analog circuit diagnoses the transmission input/ turbine speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission input/turbine speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	≥ 4.7500 volts (≤ 0.5 Ω impedance between signal and controller power)	service mode $04 active diagnostic monitor enable P07BF fault active service fast learn run crank voltage battery voltage P07C0 fault active P07C0 test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count, fail count ≥ 16 counts 6.25 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Upshift Switch Circuit	P0815	Diagnoses the state of the upshift switch circuit, stuck in the state "tap up" (upshift) active. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	switch state update fail time 1 100 millisecond update rate	= tap up (upshift) state active	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active P0826 fault active P0826 test fail this key on P0826 fault pending (P0815 fault active OR P0815 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 25 milliseconds ≥ 9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≥ 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity	fail time 1 ≥ 1.00 seconds	Emissions Neutral Diagnostics – Type C
			switch state update fail time 2 100 millisecond update rate	= tap up (upshift) state active	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 25 milliseconds ≥ 9.00 volts = FALSE	fail time 2 ≥ 120.00 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0826 fault active P0826 test fail this key on P0826 fault pending (P0815 fault active OR P0815 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = FALSE = FALSE = FALSE = FALSE ≥ 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Downshift Switch Circuit	P0816	Diagnoses the state of the downshift switch circuit, stuck in the state "tap down" (downshift) active. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	switch state update fail time 1 100 millisecond update rate	= tap down (downshift) state active	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active P0826 fault active P0826 test fail this key on P0826 fault pending (P0816 fault active OR P0816 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 25 milliseconds ≥ 9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≥ 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity	fail time 1 ≥ 1.00 seconds	Emissions Neutral Diagnostics – Type C
			switch state update fail time 2 100 millisecond update rate	= tap down (downshift) state active	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 25 milliseconds ≥ 9.00 volts = FALSE	fail time 2 ≥ 120.00 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0826 fault active P0826 test fail this key on P0826 fault pending (P0816 fault active OR P0816 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = FALSE = FALSE = FALSE = FALSE ≥ 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Up and Down Shift Switch Circuit	P0826	Diagnoses the state of the upshift/downshift switch circuit at an illegal voltage, voltage out of range. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	switch state update fail time 100 millisecond update rate	= illegal (voltage out of range)	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage P1761 fault active (P0826 fault active OR P0826 fault active test fail this key on)	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 9.00 volts = FALSE = FALSE = FALSE	fail time ≥ 60.00 seconds run crank voltage time ≥ 25 milliseconds	Emissions Neutral Diagnostics – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Control Circuit Open	P0960	Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, or 8 speed CB1278R clutch or CVT secondary pulley, solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit Increment fail time	≥ 200 K Ω impedance between signal and controller ground			fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Control Circuit Low	P0962	Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, or 8 speed CB1278R clutch or CVT secondary pulley, solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	≤ 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.10 seconds out of sample time ≥ 0.17 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Control Circuit High	P0963	Controller specific circuit diagnoses 9 speed, 10 speed CB123456R, 8 speed CB1278R clutch or CVT secondary pulley, solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	≤ 0.5 Ω impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Control Circuit Open	P0964	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch or CVT primary pulley, solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	≥ 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Control Circuit Low	P0966	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch or CVT primary pulley, solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	≤ 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.10 seconds out of sample time ≥ 0.17 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Control Circuit High	P0967	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch or CVT primary pulley, solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	≤ 0.5 Ω impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Control Circuit Open	P0968	Controller specific circuit diagnoses 9 speed CB38, 10 speed C23457910, or 8 speed C13567, clutch or CVT line pressure, solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	≥ 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Control Circuit Low	P0970	Controller specific circuit diagnoses 9 speed CB38,10 speed C23457910, or 8 speed C13567 clutch,or CVT line pressure, solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	≤ 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.10 seconds out of sample time ≥ 0.17 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Control Circuit High	P0971	Controller specific circuit diagnoses 9 speed CB38, 10 speed C23457910, or 8 speed C13567,clutch or CVT line pressure, solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	≤ 0.5 Ω impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Redundant Memory Performance	P16F3	The diagnostic monitor is a rationalization of command values: command clutch pressures and command gear. The monitor is broken up into two fault detection routines, command pressure (tie up) fault detection and command gear/shift fault detection. The command pressure (tie up) fault detection is designed to verify the number of clutches applied in a given gear state is limited, in order to prevent a transmission internal mechanical tie-up condition. A condition which could lead to a vehicle deceleration above the design safety metric. If commanded clutch pressures are above a threshold which would allow multiple clutches to carry torque, the clutch is considered applied, otherwise the clutch is considered released. If there are more clutches applied, via the commanded clutch pressures, in a given gear state than is rational, one or more of	command pressure (tie up) fault detection minimum # of clutches ON by attained gear and by comanded gear, take lower of the 2 values, where attained gear is the current operating gear and command gear is the targetted value to transtion toward see **9 speed transmission clutch definition and gear state to clutch map** and **10 speed transmission clutch definition and gear state to clutch map** attached supporting tables for clutch 1 through clutch 7 definition and gear state to clutch map	≤ **NumClchTieUp** See Attached Supporting Tables	Reduandant Memory Command Pressure Enable Calibraiton Not Reduandant Memory Command Pressure Enable Calibraiton No traction event in progress: ABS((driven wheel speed - non-drive wheel speed) / driven wheel speed) 25 millisecond derivative TOSS RPM, (TOSS delta 25 millisecond loop to 25 milsecond loop) / 25 millisecond for time Clutch 1 hydraulic volume fill factor Clutch 2 hydraulic volume fill factor Clutch 3 hydraulic volume fill factor Clutch 4 hydraulic volume fill factor Clutch 5 hydraulic volume fill factor Clutch 6 hydraulic volume fill factor Clutch 7 hydraulic volume fill factor when clutch is off going (releasing) clutch the commanded clutch pressure equation = ((pressure control solenoid command	= 0 Boolean = 1 Boolean ≥ 0.00 % < 0.750 * **P2D2 Cltch Slip Sum** see attached supporting Table ≥ 0.0500 seconds ≥ 1.000 unitless ≥ 1.000 unitless ≥ 1.000 unitless ≥ 1.000 unitless ≥ 1.000 unitless ≥ 1.000 unitless ≥ 1.000 unitless	single event 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		the clutch pressure command values are in error. Given rate of change of transmission output shaft speed, command gear state clutches and clutch hydraulic fill volumes, those clutches in transition from the hydraulic released state to the hydraulic applied state and from the hydraulic applied state to the hydraulic released state, the rationality detects any number of command clutch pressures above a threshold, that are simultaneously active to cause a vehicle deceleration above the design safety metric. The command gear/ shift fault detection is designed to verify the commanded gear will not induce a downshift resulting in a gear state that is erroneous given vehicle operating conditions. The detection rationalizes the command gear against a minimum gear, highest gear ratio, for given vehicle speed and driver accelerator position.			pressure - pressure offset) * regulator valve gain) - regulator valve return spring pressure adaptive when clutch 1 is off going clutch: clutch 1 command pressure clutch 1 state is OFF when: clutch 1 command pressure, else clutch is ON and count clutch 1 toward minimum # of clutches ON when clutch 2 is off going clutch: clutch 2 command pressure clutch 2 state is OFF when: clutch 2 command pressure, else clutch is ON and count clutch 2 toward minimum # of clutches ON when clutch 3 is off going clutch: clutch 3 command pressure	= ((clutch 1 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa **P2D2 Decel Pressure - ≤ C1** see attached supporting tables = ((clutch 2 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa **P2D2 Decel Pressure - ≤ C2** see attached supporting tables = ((clutch 3 pressure		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa		
					clutch 3 state is OFF when: clutch 3 command pressure, else clutch is ON and count clutch 3 toward minimum # of clutches ON	**P2D2 Decel Pressure -** ≤ **C3** see attached supporting tables		
					when clutch 4 is off going clutch: clutch 4 command pressure	= ((clutch 4 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa		
					clutch 4 state is OFF when: clutch 4 command pressure, else clutch is ON and count clutch 4 toward minimum # of clutches ON	**P2D2 Decel Pressure -** ≤ **C4** see attached supporting tables		
					when clutch 5 is off going clutch: clutch 5 command pressure	= ((clutch 5 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa		
					clutch 5 state is OFF when: clutch 5 command pressure,			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					else clutch is ON and count clutch 5 toward minimum # of clutches ON	**P2D2 Decel Pressure - ≤ C5** see attached supporting tables		
					when clutch 6 is off going clutch: clutch 6 command pressure	= ((clutch 6 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa		
					clutch 6 state is OFF when: clutch 6 command pressure,			
					else clutch is ON and count clutch 6 toward minimum # of clutches ON	**P2D2 Decel Pressure - ≤ C6** see attached supporting tables		
					when clutch 7 is off going clutch: clutch 7 command pressure	= ((clutch 7 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa		
					clutch 7 state is OFF when: clutch 7 command pressure,			
					else clutch is ON and count clutch 7 toward minimum # of clutches ON	**P2D2 Decel Pressure - ≤ C7** see attached supporting tables		
					service fast learn not active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					no speed sensor DTCs fault active: P0716, P0717, P0721, P0722, P0723, P077C, P077D, P07BF, P07C0, P172A, P172B, P176B, P176C, P176D, P1783, P178F, P17C4, P17C5, P17C6, P17CC, P17CD, P17CE, P17D3, P17D6 no high side driver DTCs fault active: P0658, P2670			
			command gear/shift fault detection		Reduandant Memory Command Gear Enable Calibraiton Not	= 0 Boolean	command gear fail event count ≥ 3 counts	
			1st gear commanded and vehicle seed OR 2nd gear commanded and vehicle seed OR 3rd gear commanded and vehicle seed OR 4th gear commanded and vehicle seed OR 5th gear commanded and vehicle seed OR 6th gear commanded and vehicle seed OR 7th gear commanded and vehicle seed OR 8th gear commanded and	> 63.22 KPH > 99.44 KPH > 138.33 KPH > 167.81 KPH > 195.29 KPH > 232.82 KPH > 296.85 KPH	Reduandant Memory Command Gear Enable Calibraiton service fast learn not active no speed sensor DTCs fault active: P0716, P0717, P0721, P0722, P0723, P077C, P077D, P07BF, P07C0, P172A, P172B, P176B, P176C, P176D, P1783, P178F, P17C4, P17C5, P17C6, P17CC, P17CD, P17CE, P17D3, P17D6 no high side driver DTCs fault active:	= 1 Boolean	6.25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			vehicle seed OR 9th gear commanded and vehicle seed OR 10th gear commanded and vehicle seed THEN increment command gear fail event count and abort commanded gear and delay for time before next fail evaluation	> 347.75 KPH > 430.73 KPH > 466.95 KPH > 5.00 seconds	P0658, P2670			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit Forward Direction Error	P172A	The TOS sensor is a directional sensor, and raw TOS direction is rationalized based on attained gear and multiple speed sensors. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. If the raw TOS direction is not a forward gear but attained gear is a forward gear, and, TISS and intermediate speed sensors confirm consistent direction, the raw TOS direction is in error.	(raw TOS direction OR raw TIS direction OR intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	≠ forward ≠ forward **intermediate speed sensor 1 or 2** ≠ **predicted direction** **intermediate speed sensor 1 or 2** ≠ **predicted direction** ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** =**enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds ≥ 1st gear ≤ 10th gear = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	Type A, 1 Trips
			(raw TOS direction OR intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	≠ forward **intermediate speed sensor 1 or 2** ≠ **predicted direction** **intermediate speed sensor 1 or 2** ≠ **predicted direction** ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available**	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds ≥ 1st gear ≤ 10th gear = FALSE = range shift complete ≥ 1.00 seconds		
			(raw TOS direction OR raw TIS direction OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	≠ forward ≠ forward **intermediate speed sensor 1 or 2** ≠ **predicted direction** ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete)	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds ≥ 1st gear ≤ 10th gear = FALSE = range shift complete	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					enable time	≥ 1.00 seconds		
			(raw TOS direction OR raw TIS direction OR intermediate speed sensor 1 direction raw) AND attained gear AND attained gear	≠ forward ≠ forward **intermediate speed sensor 1 or 2** ≠ **predicted direction** ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds ≥ 1st gear ≤ 10th gear = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	
			(raw TOS direction OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	≠ forward **intermediate speed sensor 1 or 2** ≠ **predicted direction** ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	**engine speed time for transmission hydraulic pressure available** ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds ≥ 1st gear ≤ 10th gear = FALSE = range shift complete ≥ 1.00 seconds		
			(raw TOS direction OR intermediate speed sensor 1 direction raw) AND attained gear AND attained gear	≠ forward **intermediate speed sensor 1 or 2** ≠ **predicted direction** ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds ≥ 1st gear ≤ 10th gear = FALSE	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					range shift state (auto trans shift complete) enable time	= range shift complete ≥ 1.00 seconds		
			(raw TOS direction OR raw TIS direction) AND attained gear AND attained gear	≠ forward ≠ forward ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds ≥ 1st gear ≤ 10th gear = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	
			raw TOS direction attained gear	≠ forward ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					engine speed	≥ 500.0 RPM		
					engine speed time	≥ **engine speed time for transmission hydraulic pressure available**		
					battery voltage	≥ 9.00 volts		
					for time	≥ 0.100 seconds		
					service fast learn active	= FALSE		
					run/crank voltage	≥ 9.00 volt		
					for time	≥ 0.100 seconds		
					(attained gear	≥ 1st gear		
					AND			
					attained gear)	≤ 10th gear		
					P0721 Fault Active	= FALSE		
					range shift state (auto trans shift complete)	= range shift complete		
					enable time	≥ 1.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Control System - Shift Limiting Active	P175E	The latent fault diagnostic monitors detects when the vehicle has been driven excessively with an emission MIL request. The DTCs requesting the emission MIL are all due to a safety critical system or component fault present in which a DTC is set fault active, test fail this key on or fault pending (fault pending is fail time ≠ 0). The safety critical systems or safety critical components include: transmission input, output and intermediate speed sensors, transmission range sensors, clutch pressure control solenoids including unintended deceleration detected due to clutch pressure control solenoids, driver accelerator pedal position, engine crankshaft position and engine torque. The DTCs for these safety critical systems or safety critical components include both electrical fault DTCs and performance fault DTCs. The latent fault diagnostic monitor	P0747 OR P0777 OR P0797 OR P2715 OR P2724 OR P2731 OR P2733 fault active due to unintended deceleration detection, increment unintended deceleration latent fault fail count		transmission default gear active (emission MIL active) calibration CeTRDR_e_DSG_DfltGrOpt5_Action any non-zero (0) option	> CeTRDR_e_DSG_DfltGrOptNone, zero (0) element in default gear array	unintended deceleration latent fault fail count ≥ 100 counts 25 millisecond update rate	Type A, 1 Trips
			P0747 OR P0777 OR P0797 OR P2715 OR P2724 OR P2731 OR P2733 clutch pressure control solenoid fault active due to clutch stuck on during shift, increment clutch pressure control solenoid latent fault fail count		transmission default gear active (emission MIL active) calibration CeTRDR_e_DSG_DfltGrOpt5_Action any non-zero (0) option	> CeTRDR_e_DSG_DfltGrOptNone, zero (0) element in default gear array	clutch pressure control solenoid latent fault fail count ≥ 100 counts 25 millisecond update rate	
			P2802 OR P2803 fault active, increment transmission range sensor latent fault fail count		transmission default gear active (emission MIL active) calibration CeTRDR_e_DSG_DfltGrOpt5_Action any non-zero (0) option	> CeTRDR_e_DSG_DfltGrOptNone, zero (0) element in default gear array	transmission range sensor latent fault fail count ≥ 100 counts 25 millisecond update rate	
			P0721 OR P0722 OR P0723 OR P077C OR P077D or P172A fault active, increment transmission output speed sensor latent fault fail count		transmission default gear active (emission MIL active) calibration CeTRDR_e_DSG_DfltGrOpt5_Action any non-zero (0) option	> CeTRDR_e_DSG_DfltGrOptNone, zero (0) element in default gear array	transmission output speed sensor latent fault fail count ≥ 100 counts 25 millisecond update rate	
			P0716 OR P0717 OR P0721 OR P07BF OR P07C0 fault active OR		transmission default gear active (emission MIL active) calibration	>	transmission input output speed sensor latent fault fail	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		counts the run/crank ignition cycles before the latent fault DTC is set fault active.	P077D OR P077D OR P1783 OR P17CE fault active OR P0722 OR P0723 OR P172A test fail this key on OR P0716 OR P0717 OR P0721 OR P0722 OR P0723 OR P077C OR P077D OR P07BF OR P07C0 Or P172A OR P172B OR P1783 OR P17CE fault pending (fail time ≠ 0) increment transmission input output speed sensor latent fault fail count		CeTRDR_e_DSG_DfltGrOpt5_Action any non-zero (0) option	CeTRDR_e_DSG_DfltGrOptNone, zero (0) element in default gear array	count ≥ 200 counts 25 millisecond update rate	
			AcceleratorPedalFailure OR EngineTorqueEstInaccurate OR P2534 fault active OR CrankSensor_FA OR P0707 OR P0708 fault active OR test fail this key on OR P2805 fault active OR P0716 OR P0717 OR P07BF OR P07C0 fault active OR P0722 OR P0723 test fail this key on OR P077C OR P077D fault active OR P176C OR P176D OR	= TRUE = TRUE = TRUE	transmission default gear active (emission MIL active) calibration CeTRDR_e_DSG_DfltGrOpt5_Action any non-zero (0) option ignition run crank voltage for time	> CeTRDR_e_DSG_DfltGrOptNone, zero (0) element in default gear array > 5.00 volts ≥ 12.5 milliseconds	system latent fault fail count ≥ 100 counts 6.25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			P17CC OR P17CD OR P176B OR P17D6 fault active OR test fail this key on OR P0747 OR P0777 OR P0797 OR P2715 OR P2724 OR P2733 OR P0746 OR P0776 OR P0796 OR P2714 OR P2723 OR P2732 OR P178F OR P17C4 OR P17C6 OR P172A OR P172B test fail this key on OR P0960 OR P0962 OR P0963 OR P0964 OR P0966 OR P0967 OR P0968 OR P0970 OR P0971 OR P2718 OR P2720 OR P2721 OR P2727 OR P2729 OR P2730 OR P2736 OR P2738 OR P2739 OR P17C5 OR P17D3OR P0721 fault active OR P0716 OR P0717 OR P0721 OR P0722 OR P0723 OR P077C OR P077D OR P07BF OR P07C0 fault pending (fail time ≠ 0) OR P176B OR P176C OR P176D OR P17CC OR P17CD OR P17D6 OR P1783 OR P178F OR P17C4 OR P17C5 OR P17C6 OR P17CE OR P17D3 OR P172A or P172B fault pending (fail					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			time ≠ 0) OR P1783 fault active OR P1783 fault pending (fail time ≠ 0) update system fault time when system fault time increment system latent fault fail count	≥ 10.0 seconds				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Acceleration Sensor Signal Message Counter Incorrect	P175F	The diagnostic monitor detects an alive rolling count error or checksum error in the CAN frame containing the lateral acceleration signal value and longitudinal acceleration sensor signal value. Emission neutral default state sets lateral and longitudinal acceleration signal = 0.0 g.	rolling count value received from EBCM and expected TCM calculated value not equal OR checksum lateral and longitudinal acceleration CAN frame message value error 50 millisecond update rate	= TRUE = TRUE	enable alive rolling count error detection: diagnostic monitor enable lateral and longitudinal acceleration CAN frame message received battery voltage run crank voltage enable checksum error detection: diagnostic monitor enable lateral and longitudinal acceleration CAN frame message received normal CAN battery voltage run crank voltage communication enabled DTCs not fault active	 = 1 Boolean = TRUE ≥ 11.0 volts ≥ 11.0 volts = 1 Boolean = TRUE ≥ 11.0 volts ≥ 11.0 volts = TRUE U0073	alive rolling count errors ≥ 54 out of 9 sample counts 50 millisecond update rate checksum error time ≥ 54.00 seconds	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Up and Down Shift Switch Signal Circuit	P1761	The alive rolling count normally cycles 0, 1, 2, and 3 as a serial data periodic frame is processed normally. The diagnostic monitor counts the number of times an alive rolling count error occurs over a period of time. The TCM receives a serial data frame at a periodic rate, during which, the receive data is processed the comparing the current value of the alive rolling count in the frame date to the incremented value of the diagnostic alive rolling count. When the two values of the alive rolling count do not agree, an alive rolling count error has occurred. The error indicator is saved in an array buffer, and when the number of error indicators in the buffer exceed the fail threshold the fail time is allowed to time up. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	alive rolling count error counter update fail time 100 millisecond update rate	≥ 3 counts	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time up and down shift serial data frame receive occurred when up and down shift serial data frame receive occurred: increment the diagnsotic alive rolling count data value, if the diagnsotic alive rolling count data value, set alive rolling count error to TRUE, when alive rolling count error AND previous alive rolling count error in 10 element arrary buffer, increment alive rolling count error counter	= FALSE = 1 Boolean ≥ 9.00 volts ≥ 0.100 seconds = TRUE ≠ frame alive rolling count data value = TRUE = FALSE	fail time ≥ 10.00 seconds	Emissions Neutral Diagnostics – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Planetary Gearset Ring Gear Speed Sensor Circuit Range/ Performance	P176B	The diagnostic monitor rationalizes the transmission intermediate shaft speed sensor by using the transmission output shaft output speed sensor and the known ratio between the transmission intermediate shaft speed and the transmission output shaft output speed based on the commanded gear and the transmission lever node design. The estimated transmission intermediate shaft speed is equal to the gear ratio times the transmission output shaft output speed. The absolute value of the delta between the measured transmission intermediate shaft speed and the estimated transmission intermediate shaft speed is used to determine if the measured transmission intermediate shaft speed is rational.	delta1 = ABS (transmission input speed - (transmission output speed * gear ratio commanded)) update faiil time 25 millisecond update rate	> 10.0 RPM	diagnostic monitor enable speed sensor configuration calibration is single OR dual ratio calibration is function of command gear and intermediate speed sesnor when not REVERSE ratio calibration is function of command gear and intermediate speed sesnor when REVERSE ****************************** delay time updates when: estimated transmission intermediate speed (transmission input speed / ratio calibration)	= 1 Boolean = CeTNSR_e_NSPD_Dual SpdSnsr = **P176B ratio calibration when not REVERSE** see supporting tables = **P176B ratio calibration when REVERSE** see supporting tables ****************************** ≥ **P176B minimum estimated transmission intermediate speed to enable fail evaluation**	fail time ≥ **P176B intermediate speed sensor fail time threshold** see supporting tables fail time threshold met increments fail count, fail count ≥ **P176B intermediate speed sensor fail count threshold** see supporting tables ****************** delay time ≥	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					with	see supporting tables	**P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation** see supporting tables	
					transmission input speed	≥ **P176B minimum transmission input speed to enable fail evaluation**		
					input speed sensor ready based on commaned gear and transmission intermediate speed sensor (state output must be FALSE to enable fail evaluation) with	see supporting tables = **P176B holding clutch states** see supporting tables		
					with attained gear	= REVERSE OR = 1st thru 10th		
					*****************************	******************************		
					transmission input speed	≥ 240.0 RPM		
					transmission output speed	≥ 36.0 RPM		
					range shift state	= range shift complete		
					P0716 fault active	= FALSE		
					P0717 fault active	= FALSE		
					P07BF fault active	= FALSE		
					P07C0 fault active	= FALSE		
					P0722 fault active	= FALSE		
					P0723 fault active	= FALSE		
					P077C fault active	= FALSE		
					P077D fault active	= FALSE		
					P176C fault active	= FALSE		
					P176D fault active	= FALSE		
					battery voltage	≥ 9.00 volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					service fast learn active run crank voltage hydraulic pressure avail	= FALSE ≥ 9.00 volts = TRUE	battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Planetary Gearset Ring Gear Speed Sensor Circuit Low	P176C	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	≤ volts (≤ 0.5 Ω impedance between signal and controller ground)	service mode $04 active diagnostic monitor enable P176D fault active service fast learn run crank voltage battery voltage P176C fault active P176C test fail this key on	= FALSE = **P176C Enable Boolean** Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = FALSE = FALSE	fail time ≥ **P176C Fail Timer** seconds, update fail count, fail count ≥ **P176C Fail Count Threshold** counts 6.25 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Planetary Gearset Ring Gear Speed Sensor Circuit High	P176D	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	**P176D Voltage Fail ≥Threshold** volts (≤ 0.5 Ω impedance between signal and controller power)	service mode $04 active diagnostic monitor enable P176C fault active service fast learn run crank voltage battery voltage P176D fault active P176D test fail this key on	= FALSE = **P176D Boolean Enable** Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = FALSE = FALSE	fail time ≥ **P176D Fail Time Threshold** seconds, update fail count, fail count ≥ **P176D Fail Count Threshold** counts 6.25 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
ETRS GMLAN Command Signal Message Incorrect	P1775	The diagnostic monitor detects an alive rolling count error or protection value (checksum) error in the CAN bus frame containing the Electronic Transmission Range Selector (ETRS) signal data. The alive rolling count sequences 0, 1, 2, 3 repeatedly. As each serial data frame is broadcast by the transmitting controller, the transmitting controller increments the alive rolling count in this sequence manner. The receiving controller compares the most recent received alive rolling count value to the previous value plus one. If the values are not equal, an alive rolling count error has occurred. The protection value is based on the checksum of the ETRS data parameters in the transmit message frame, and is incorporated in the transmit message frame. If the TCM receives the ECM/ CHCM ETRS data message frame, the	rolling count value received from ECM/ CHCM and expected TCM calculated value not equal	= TRUE	Loop rate calibration either 10 milliseconds or 12.5 milliseconds service mode $04 active battery voltage battery voltage time ETRS ECM/CH frame recieved	CeCFMD_e_DEC_Time Base_12p5 = FALSE ≥ 11.00 volts ≥ 300.000 seconds = TRUE	alive rolling count errors ≥ 8 out of 10 sample counts	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		TCM calculates the protection value, again based on the ETRS data parameters, in the receive message frame. If the TCM calculated protection value does not equal the protection value incorporated in the ECM/CHCM ETRS data message frame, a or protection value error has occurred. If continuous alive rolling count errors or protection value errors occur, the DTC is set.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Input Speed Sensor Direction Not Plausible - Forward	P1783	The TIS sensor is a directional sensor, and raw TIS direction is rationalized based on attained gear and multiple speed sensors. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. If the raw TIS direction is not reverse but attained gear is reverse, or, if the raw TIS direction is not forward but attained gear is a forward gear, the raw TIS direction is in error.	raw TIS direction AND attained gear	≠ FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	Type A, 1 Trips
			raw TIS direction AND attained gear AND attained gear	≠ FORWARD ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			intermediate speed sensor 1 direction raw AND TIS direction AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** ≠ FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	
			intermediate speed sensor 1 direction raw	**intermediate speed sensor 1 or 2** ≠ **predicted direction**	when the following conditions are met update the enable time: diagnsotic monitor enable	**speed sensor directional rationality** = **enable calibration**	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AND raw TIS direction AND attained gear AND attained gear	≠ FORWARD ≥ 1st gear ≤ 10th gear	TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	= CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			intermediate speed sensor 2 direction raw AND TIS direction AND attained gear	≠ **intermediate speed sensor 1 or 2 predicted direction** ≠ FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time	= **speed sensor directional rationality enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	= REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			intermediate speed sensor 2 direction raw AND raw TIS direction AND attained gear AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** ≠ FORWARD ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw)	**intermediate speed sensor 1 or 2** ≠ **predicted direction** **intermediate speed sensor 1 or 2** ≠ **predicted direction**	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AND TIS direction AND attained gear	≠ FORWARD = REVERSE	engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND raw TIS direction AND attained gear AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** **intermediate speed sensor 1 or 2** ≠ **predicted direction** ≠ FORWARD ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					trans shift complete)			
					enable time	≥ 1.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intermediate Speed Sensor 1 Direction Not Plausible - Forward	P178F	The intermediate speed sensor 1 is a directional sensor, and raw intermediate speed sensor 1 direction is rationalized based on attained gear. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. Intermediate speed sensor 1 direction can be predicted, based on a function of the attained gear. When the raw intermediate speed sensor 1 direction does not correlate to the predicted direction and does not correlate to the attained gear, the intermediate speed sensor 1 directional is in error.	intermediate speed sensor 1 direction raw AND attained gear	**intermediate speed sensor 1 or 2 ≠ predicted direction** = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	Type A, 1 Trips
			intermediate speed sensor 1 direction raw AND attained gear AND attained gear	**intermediate speed sensor 1 or 2 ≠ predicted direction** ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			intermediate speed sensor 1 direction raw AND TIS direction AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** ≠ FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	
			intermediate speed sensor 1 direction raw	**intermediate speed sensor 1 or 2** ≠ **predicted direction**	when the following conditions are met update the enable time: diagnsotic monitor enable	**speed sensor directional rationality** = **enable calibration**	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AND raw TIS direction AND attained gear AND attained gear	≠ FORWARD ≥ 1st gear ≤ 10th gear	TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	= CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** **intermediate speed sensor 1 or 2** ≠ **predicted direction** = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time	= **speed sensor directional rationality enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	= REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** **intermediate speed sensor 1 or 2** ≠ **predicted direction** ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR	**intermediate speed sensor 1 or 2** ≠ **predicted direction** **intermediate speed sensor 1 or 2** ≠ **predicted direction**	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			TIS direction) AND attained gear	≠ FORWARD = REVERSE	engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR TIS direction) AND attained gear AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** **intermediate speed sensor 1 or 2** ≠ **predicted direction** ≠ FORWARD ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					trans shift complete)			
					enable time	≥ 1.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intermediate Speed Sensor 2 Performance	P17C5	The diagnostic monitor determines if the direction transmission intermediate speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	when: (intermediate speed sensor raw direction when transitional period = FALSE AND intermediate speed sensor raw direction when transitional period = FALSE) OR intermediate speed sesnor raw when transitional period = TRUE update fail and sample time	≠ FORWARD ≠ REVERSE **P17C5 P17D3 intermediate speed** ≥ **sensor RPM**	service mode $04 active diagnostic monitor enable intermediate speed sesnor count sample period P17C5 fault active OR P17C5 test fail this key on senor type cailbration (senor type is directional) transitional period detected = FALSE when: on period OR on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward transitional period detected = TRUE when: on period on period when direction unknown	= FALSE = 1 Boolean ≠ 0 counts = FALSE = FALSE = CeTNSR_e_NSPD_DualSpdSnsr ≥ 0.4434 seconds ≤ 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds	fail time ≥ 3.500 seconds out of sample time < 5.000 seconds 6.25 millisecond update	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intermediate Speed Sensor 2 Direction Not Plausible - Forward	P17C6	The intermediate speed sensor 2 is a directional sensor, and raw intermediate speed sensor 2 direction is rationalized based on attained gear. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. Intermediate speed sensor 2 direction can be predicted, based on a function of the attained gear. When the raw intermediate speed sensor 2 direction does not correlate to the predicted direction and does not correlate to the attained gear, the intermediate speed sensor 2 directional is in error.	intermediate speed sensor 2 direction raw AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	Type A, 1 Trips
			intermediate speed sensor 2 direction raw AND attained gear AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			intermediate speed sensor 2 direction raw AND TIS direction AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** ≠ FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	
			intermediate speed sensor 2 direction raw	**intermediate speed sensor 1 or 2** ≠ **predicted direction**	when the following conditions are met update the enable time: diagnsotic monitor enable	**speed sensor directional rationality** = **enable calibration**	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AND raw TIS direction AND attained gear AND attained gear	≠ FORWARD ≥ 1st gear ≤ 10th gear	TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	= CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear	≠ **intermediate speed sensor 1 or 2 predicted direction** ≠ **intermediate speed sensor 1 or 2 predicted direction** = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time	= **speed sensor directional rationality enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	= REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** **intermediate speed sensor 1 or 2** ≠ **predicted direction** ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR	**intermediate speed sensor 1 or 2** ≠ **predicted direction** **intermediate speed sensor 1 or 2** ≠ **predicted direction**	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			TIS direction) AND attained gear	≠ FORWARD = REVERSE	engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR TIS direction) AND attained gear AND attained gear	≠ **intermediate speed sensor 1 or 2 predicted direction** ≠ **intermediate speed sensor 1 or 2 predicted direction** ≠ FORWARD ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto	 = **speed sensor directional rationality enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					trans shift complete)			
					enable time	≥ 1.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Intermediate Speed Sensor B Circuit Low	P17CC	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sensor raw voltage, update fail time, 12.5 millisecond update rate	≤ 0.250 volts (≤ 0.5 Ω impedance between signal and controller ground)	service mode $04 active diagnostic monitor enable P17CD fault active service fast learn run crank voltage battery voltage sensor configuration is single OR dual P17CC fault active OR P17CC test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = CeTNSR_e_NSPD_DualSpdSnsr = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count 12.5 millisecond update rate fail count ≥ 40 counts 12.5 millisecond update rate service fast learn, run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Intermediate Speed Sensor B Circuit High	P17CD	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	≥ 4.750 volts (≤ 0.5 Ω impedance between signal and controller power)	service mode $04 active diagnostic monitor enable P17CC fault active service fast learn run crank voltage battery voltage sensor configuration is single OR dual P17CD fault active OR P17CD test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = CeTNSR_e_NSPD_DualSpdSnsr = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count 12.5 millisecond update rate fail count ≥ 40 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Input Speed Sensor Direction Error	P17CE	The diagnostic monitor determines if the direction transmission input shaft speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	input shaft speed sesnor raw direction AND input shaft speed sesnor raw direction when transitional period = FALSE OR input shaft speed sesnor raw when transitional period = TRUE update fail and sample time, update rate defined in Secondary Parameters	≠ FORWARD ≠ REVERSE ≥ 225.0 RPM	determine update rate: 6.25 millisecond update rate calibration, TRUE, update rate = 6.25 millisecond FALSE, update rate = 25 millisecond service mode $04 active diagnostic monitor enable input shaft speed sesnor count sample period senor type cailbration (senor type is directional) P17CE fault active OR P17CE test fail this key on transitional period detected = FALSE when: on period OR on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward transitional period detected = TRUE when: on period on period when direction unknown	= 1 Boolean = FALSE = 1 Boolean ≠ 0 counts = CeTISR_e_Directional = FALSE = FALSE ≥ 0.4434 seconds ≤ 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds	fail time ≥ 3.500 seconds out of sample time < 5.000 seconds update rate defined in Secondary Parameters	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intermediate Speed Sensor 1 Direction Error	P17D3	The diagnostic monitor determines if the direction transmission intermediate speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	intermediate speed sesnor raw direction when transitional period = FALSE AND intermediate speed sesnor raw direction when transitional period = FALSE OR intermediate speed sesnor raw when transitional period = TRUE update fail and sample time 6.26 millisecond update rate	≠ FORWARD ≠ REVERSE **P17C5 P17D3 intermediate speed** ≥ **sensor RPM**	service mode $04 active diagnostic monitor enable intermediate speed sesnor count sample period P17D3 fault active OR P17D3 test fail this key on senor type cailbration (senor type is directional) transitional period detected = FALSE when: on period OR on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward transitional period detected = TRUE when: on period on period when direction unknown	= FALSE = 1 Boolean ≠ 0 counts = FALSE = FALSE = CeTNSR_e_NSPD_DualSpdSnsr ≥ 0.4434 seconds ≤ 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds	fail time ≥ 3.500 seconds out of sample time < 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Intermediate Speed Sensor B Circuit Range/ Performance	P17D6	The diagnostic monitor rationalizes the transmission intermediate shaft speed sensor by using the transmission output shaft output speed sensor and the known ratio between the transmission intermediate shaft speed and the transmission output shaft output speed based on the commanded gear and the transmission lever node design. The estimated transmission intermediate shaft speed is equal to the gear ratio times the transmission output shaft output speed. The absolute value of the delta between the measured transmission intermediate shaft speed and the estimated transmission intermediate shaft speed is used to determine if the measured transmission intermediate shaft speed is rational.	delta1 = ABS (transmission input speed - (transmission output speed * gear ratio commanded)) AND delta2 = ABS (transmission input speed - (transmission intermediate speed * ratio calibration)) update faiil time 25 millisecond update rate	> 10.0 RPM > **P17D6 intermediate speed sensor fail RPM threshold** see supporting tables	diagnostic monitor enable speed sesnor configuration calibration is dual ratio calibration is function of command gear and intermediate speed sesnor when not REVERSE ratio calibration is function of command gear and intermediate speed sesnor when REVERSE ****************************** delay time updates when: estimated transmission intermediate speed (transmission input speed / ratio calibration) with	= 1 Boolean = CeTNSR_e_NSPD_DualSpdSnsr = **P17D6 ratio calibration when not REVERSE** = **P17D6 ratio calibration when REVERSE** ****************************** ≥ **P17D6 minimum estimated transmission intermediate speed to enable fail evaluation**	fail time ≥ **P17D6 intermediate speed sensor fail time threshold** fail time threshold met increments fail count, fail count ≥ **P17D6 intermediate speed sensor fail count threshold** ******************* delay time ≥	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					transmission input speed	≥ **P17D6 minimum transmission input speed to enable fail evaluation**	**P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation**	
					input speed sensor ready based on commaned gear and transmission intermediate speed sensor (state output must be FALSE to enable fail evaluation) with	= **P17D6 holding clutch states**		
					with attained gear	= REVERSE OR = 1st thru 10th		
					****************************	******************************		
					transmission input speed	≥ 240.0 RPM		
					transmission output speed	≥ 36.0 RPM		
					neutral idle mode	= nuetral idle mode ON		
					range shift state	= range shift complete		
					P0716 fault active	= FALSE		
					P0717 fault active	= FALSE		
					P07BF fault active	= FALSE		
					P07C0 fault active	= FALSE		
					P0722 fault active	= FALSE		
					P0723 fault active	= FALSE		
					P077C fault active	= FALSE		
					P077D fault active	= FALSE		
					P17CC fault active	= FALSE		
					P17CD fault active	= FALSE		
					battery voltage	≥ 9.00 volts		
					service fast learn active	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					run crank voltage transmission hydraulic pressure	≥ 9.00 volts = TRUE	battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds see supporting tables	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch A Circuit/Open	P17F5	The diagnostic monitor detects an illegal voltage on the park valve position sensor circuit.	raw sensor voltage raw sensor voltage	> 1.263 volts < 1.504 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch A Circuit Low	P17F6	The diagnostic monitor detects a ground short or open circuit fault in the park valve position sensor circuit.	raw sensor voltage	< 0.414 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch A Circuit High	P17F7	The diagnostic monitor detects a short to voltage circuit fault in the park valve position sensor circuit.	raw sensor voltage	> 2.538 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch B Circuit/Open	P17FA	The diagnostic monitor detects an illegal voltage on the park valve position sensor circuit.	raw sensor voltage raw sensor voltage	> 1.263 volts < 1.504 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch B Circuit Low	P17FB	The diagnostic monitor detects a ground short or open circuit fault in the park valve position sensor circuit.	raw sensor voltage	< 0.414 volts	diagnostic monitor enable battery voltage battey voltage time ETRS system configuration is internal ERTS	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch B Circuit High	P17FC	The diagnostic monitor detects a short to voltage circuit fault in the park valve position sensor circuit.	raw sensor voltage	> 2.538 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Stuck On (GR10 Only)	P187D	This diagnostic monitor rationalizes the driver ETRS command direction of "out of PARK" against the actual park valve position, as the park valve position is measured by the park valve position sensor A or B.	when: out of park commanded only one valid park valve sensor (either Park Sensor A OR Park Sensor B) with sensor not indicating out of park OR two valid park sensors (Park Sensor A AND Park Sensor B) not indicating out of park transition delay for commanded park valve transition (not required for steady state commanded out of park conditions) increment fail time when fail time threshold met, increment fail count	 ≠ Park = Park = Park ≥ **P187D P18E7 Park to Out Of Park Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general park servo diagnostic enable park valve stuck on diagnostic enable high side driver 1 or high side driver 2 is on P187D, P187E (Park Servo DTC) Test Fail This Key On (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active) OR (P17FA, P17FB, P17FC (Park Sensor B) Fault Active) (mode valve A commanded high and mode valve A confirmed high) OR mode valve related fault disabled confirmation (P18AA OR P18AB OR P27EC Test Fail This Key) OR (P27EB OR P27ED OR P27EE Fault Active) pump out available (engine speed	= CeTRGR_e_InternalETRS ≥ 0.01 seconds ≥ 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = FALSE = TRUE = TRUE = TRUE = TRUE ≥ 250 RPM	steady state fail time ≥ 0.25 seconds OR transition fail time ≥ 0.25 seconds fail count ≥ 2 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for engine speed time) line pressure available (commanded) line pressure sufficient for pull out of park	**Pump Out Available** ≥ **Transition Time** ≥ 100.00 kPa ≥ 500.00 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Stuck Off (GR10 Only)	P187E	This diagnostic monitor rationalizes the driver ETRS command direction of “PARK” against the actual park valve position, as the park valve position is measured by the mode valve position sensor A and B.	when: park commanded only one valid park valve sensor (either Park Sensor A OR Park Sensor B) with sensor not indicating park OR two valid park senssors sensors (Park Sensor A AND Park Sensor B) not indicating park transition delay for commanded park valve transition OR transition delay for commanded park valve transition with min line (not required for steady state commanded park conditions) increment fail time when fail time threshold met, increment fail count	 = Park ≠ Park ≠ Park ≥ **P187E P18E8 Out Of Park to Park Transition Delay** ≥ **P187E P18E8 Out Of Park to Park Min Line Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general park servo diagnostic enable park valve stuck off diagnostic enable high side driver 1 or high side driver 2 is on P187D, P187E (Park Servo DTC) Test Fail This Key On (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active) OR (P17FA, P17FB, P17FC (Park Sensor B) Fault Active) ((((mode valve A commanded low and mode valve A confirmed low) OR mode valve related fault disabled confirmation (P18AA OR P18AB OR P27EC Test Fail This Key On) OR mode valve sensor fault (P27EB OR P27ED OR	= CeTRGR_e_InternalETRS ≥ 0.01 seconds ≥ 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = FALSE = TRUE = TRUE	steady state fail time ≥ 0.25 seconds OR transition fail time ≥ 1.80 seconds OR transition fail time (at min line) ≥ 1.80 seconds fail count ≥ 2.00 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P27EE Fault Active)) AND ((park inhibit solenoid electrically stuck on) OR (park inhibit solenoid electrically stuck on AND line pressure command))) OR min line commanded (line pressure command))	= TRUE = FALSE = TRUE ≥ **Park Inhibit Solenoid Override Line Pressure** < 100.00 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Command Message Performance	P189C	The diagnostic monitor detects a failure of the LIN serial communication failure between the TCM and the ECM/CHCM for Electronic Transmission Range Select (ETRS) vehicles.	LIN range command is undetected by TCM based on Rx LIN service fucntion Range Command Secondary Updated	= FALSE set to FALSE as part of normal background time updates, set to TRUE as part of normal LIN service fucntion when Rx messages are processed	diagnostic monitor calibration enable service mode $04 active run/crank voltage run/crank voltage time	= 1 Boolean = FALSE ≥ 5.00 volts ≥ 3,000.000 seconds	initial fail time ≥ 3.000 seconds final fail time ≥ 425.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electronic Transmission Range Select Valve Performance - Stuck On (GR10 Only)	P18A1	This diagnostic monitor detects the condition where the transmission is latching the drive state on a commanded drive to park shift due to the range select valve being stuck on. P18A1 is only active during pressure / solenoid controlled shifts, not min line pressure default shifts which will break drive latch regardless of the range select valve position.	when: commanded mode valve high to low transition (drive to park shift) mode valve position park valve postion remains out of park transition delay for solenoid commanded mode valve transition increment fail time when fail time threshold met, increment fail count	= LOW = HIGH ≠ Park ≥ **P18A1 P18AA P27EC Mode Valve High To Low Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general mode valve diagnostic enable range select valve stuck on diagnostic enable high side driver 1 or high side driver 2 is on mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND (P27EB, P27ED, P27EE Fault Active) drive latch possible (mode valve previously confirmed position AND calculated line pressure)	= CeTRGR_e_InternalETRS ≥ 0.01 seconds ≥ 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = HIGH ≥ 0.00	fail time ≥ 0.20 seconds fail count ≥ 3 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Inhibit Actuator Control Circuit Low (T93 GR10 Only)	P18A2	Controller specific circuit diagnoses internal ETRS park solenoid for an ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Controller specific circuit voltage thresholds are set to meet the following controller specification for an short to ground circuit Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration (1=enabled, 0=disabled) ((solenoid is mapped to high side driver 1 (= CeTSCR_e_HSD1) AND high side driver 1 on) OR (solenoid is mapped to high side driver 2 (= CeTSCR_e_HSD2) AND high side driver 2 on))	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 = CeTSCR_e_HSD1 = On = CeTSCR_e_HSD1 = On	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Inhibit Actuator Control Circuit (T93 GR10 Only)	P18A3	Controller specific circuit diagnoses internal ETRS park solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration (1=enabled, 0=disabled) ((solenoid is mapped to high side driver 1 (= CeTSCR_e_HSD1) AND high side driver 1 on) OR (solenoid is mapped to high side driver 2 (= CeTSCR_e_HSD2) AND high side driver 2 on))	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 = CeTSCR_e_HSD1 = On = CeTSCR_e_HSD1 = On	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Inhibit Actuator Control Circuit High	P18A4	Controller specific circuit diagnoses internal ETRS park solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration (1=enabled, 0=disabled) ((solenoid is mapped to high side driver 1 (= CeTSCR_e_HSD1) AND high side driver 1 on) OR (solenoid is mapped to high side driver 2 (= CeTSCR_e_HSD2) AND high side driver 2 on))	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 = CeTSCR_e_HSD1 = On = CeTSCR_e_HSD1 = On	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Park Inhibit Solenoid Stuck Off (GR10 Only)	P18A8	This diagnostic monitor detects when the park inhibit solenoid is unable to maintain out of park/neutral as expected when out of park oil is not available	when: neutral commanded out of park oil park inhibit solenoid commanded (only required to start fail time) only one valid park valve sensor (either Park Sensor A OR Park Sensor B) with sensor not indicating out of park OR two valid park sensors (Park Sensor A AND Park Sensor B) not indicating out of park increment fail time when fail time threshold met, increment fail count	 = Neutral = Not Available = HIGH ≠ Out Of Park ≠ Out Of Park	ETRS system type is internal ETRS time since controller init battery voltage general park servo diagnostic enable park inhibit solenoid stuck off diagnostic enable high side driver 1 or high side driver 2 is on P187D, P187E (Park Servo DTC) Test Fail This Key On (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active) OR (P17FA, P17FB, P17FC (Park Sensor B) Fault Active) (((mode valve A commanded low and mode valve A confirmed low) OR mode valve related fault (P18AA OR P18AB OR P27EC Test Fail This Key On) OR mode valve sensor fault (P27EB OR P27ED OR P27EE Fault Active)))	= CeTRGR_e_InternalETRS ≥ 0.01 seconds ≥ 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = FALSE = TRUE = TRUE = TRUE	fail time ≥ 0.13 seconds fail count ≥ 2.00 counts update rate 6.25 milliseconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					park inhibit solenoid not electrically stuck off (P18A3 OR P18A4 Fault Active) (pump out available (engine speed for engine speed low time OR min line commanded (line pressure command)) aux pump commanded on	= FALSE = FALSE < 250.00 ≥ 0.25 < 100.00 kPa = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control A Position Sensor/ Switch Circuit Stuck On (GR10 Only)	P18AA	This diagnostic monitor detects a Mode Valve A Position Sensor State in the "on" or "high" state while being commanded low or when pressure is insufficient to hold the mode valve high. After a failure of a pressure controlled mode valve high to low transition, a min line mode valve high to low transition is used for fault isolation between P18A1 and P18AA.	when: mode valve solenoid commaned state mode valve A position sensor state transition delay for solenoid controlled mode valve transition OR transition delay for solenoid min line mode valve transition (no transistion delay required for steady state commanded mode valve low conditions) increment fail time when fail time threshold met, increment fail count	= LOW = HIGH ≥ **P18A1 P18AA P27EC Mode Valve High To Low Transition Delay** ≥ **P18AA Mode Valve High To Low Min Line Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general mode valve diagnostic enable mode valve stuck on diagnostic enable high side driver 1 or high side driver 2 is on mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND mode valve sensor fault (P27EB, P27ED, P27EE Fault Active) AND ((pump out available (engine speed for engine speed high time) AND line pressure available (pressure commanded) AND out of park status) OR (pump out available OR line pressure available	= CeTRGR_e_InternalETRS ≥ 0.01 seconds ≥ 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = TRUE ≥ 250.00 **Pump Out Available** ≥ **Transition Time** = TRUE ≥ 100.00 kPa ≠ Park = FALSE = FALSE	steady state fail time ≥ 0.25 seconds OR high to low transition fail time ≥ 0.20 seconds OR high to low min line transition fail time ≥ 1.00 seconds fail count ≥ 2.00 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					)			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control A Position Sensor/ Switch Circuit Stuck Off (GR10 Only)	P18AB	This diagnostic monitor detects a Mode Valve A Position Sensor State in the "off" or "low" state, which is in error, when hydraulic pressure in the circuit used to move the mode valve is sufficient to overcome the mode valve return spring force, leaving the mode valve mechanically in the "on" or "high" state. The diagnostic monitor also executes during transitions of the mode valve to verify Mode Valve A Position Sensor State changes correctly with mode valve state command.	when: mode valve solenoid commaned state mode valve A position sensor state transition delay for solenoid controlled mode valve transition (no transistion delay required for steady state commanded mode valve high conditions) increment fail time when fail time threshold met, increment fail count	= HIGH = LOW ≥ **P18AB P27EC Mode Valve Low to High Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general mode valve diagnostic enable mode valve stuck off diagnostic enable high side driver 1 or high side driver 2 is on mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND mode valve sensor fault (P27EB, P27ED, P27EE Fault Active) pump out available (engine speed for engine speed high time) AND line pressure available (pressure commanded) AND out of park status	= CeTRGR_e_InternalETRS ≥ 0.01 seconds ≥ 9.00 volts = 1 Boolean = 1.00 Boolean = TRUE = FALSE = FALSE = TRUE ≥ 250.00 **Pump Out Available** ≥ **Transition Time** = TRUE ≥ 100.00 kPa = Park	steady state fail time ≥ 0.25 seconds OR low to high transition fail time 0.25 ≥seconds fail count ≥ 2.00 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control Enable Valve Stuck On (GR10 Only)	P18AE	This diagnostic monitor detects when the Enable Valve is not able to cut pressure from the pump to the rest of the hydraulic system within the transmission. The test checks for C2 incorrectly gaining capacity when commanded on with line pressure cut.	park commanded commanded gear only one valid park valve sensor (either Park Sensor A OR Park Sensor B) with sensor indicating park OR two valid park sensors (Park Sensor A AND Park Sensor B) with both sensors indicating park enable valve delay time C2 pressure command C2 slip increment enable valve stuck on fail time	= PARK = PARK w/ No clutches = Park = Park > **P18AE Enable Valve Test Delay** = 2,200.00 < 60.00	ETRS system type is internal ETRS high side driver 1 or high side driver 2 is on trans oil temp engine crank (only required to initiate test) engine off commanded line pressure pump out available (engine speed for engine speed high time) transmission input speed enable valve diagnostic not completed (P18AE Test Pass / Test Fail This Key) no C2 solenoid electrical (P0964 OR P0966 OR P0967 Fault Active) no line pressure solenoid short to ground (P2814 Fault Active) total test time	= CeTRGR_e_InternalETRS = TRUE > 0.00 = TRUE = FALSE = 0 = TRUE ≥ 250.00 **Pump Out Available** ≥ **Transition Time** > 300.00 = FALSE = FALSE = FALSE ≤ KePSDD_t_AntiBkFlwTmout	fail time > 3.00 update rate 6.25 milleseconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch "A" Performance (GR10 Only)	P18E7	This diagnostic monitor detects park valve position sensor A performance faults, the sensor is indicating not park when command is park, or sensor does not transition when park is not commanded.	when: out of park commanded Park Sensor A indicating park Park Sensor B not indicating park transition delay for commanded park valve transition (not required for steady state commanded out of park conditions) increment fail time when fail time threshold met, increment fail count	≠ Park = Park ≠ Park ≥ **P187D P18E7 Park to Out Of Park Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general park servo diagnostic enable park position sensor A performance diagnostic enable high side driver 1 or high side driver 2 is on P187D, P187E (Park Servo DTC) Test Fail This Key On (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active) OR (P17FA, P17FB, P17FC (Park Sensor B) Fault Active) mode valve A commanded high and mode valve A confirmed high mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND mode valve sensor fault (P27EB, P27ED, P27EE Fault Active) pump out available	= CeTRGR_e_InternalETRS ≥ 0.01 seconds ≥ 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = FALSE = TRUE = FALSE = FALSE = TRUE	steady state fail time ≥ 0.25 seconds transition fail time ≥ 0.25 seconds fail count ≥ 1.00 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(engine speed for engine speed time) line pressure available (commanded) line pressure sufficient for pull out of park	≥ 250 RPM **Pump Out Available** ≥ **Transition Time** ≥ 100.00 kPa ≥ 500.00 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch "B" Performance (GR10 Only)	P18E8	This diagnostic monitor detects park valve position sensor B performance faults, the sensor is indicating not park when command is park, or sensor does not transition when park is not commanded.	when: steady state out of park commanded Park Sensor A not indicating park Park Sensor B indicating park increment fail time when fail time threshold met, increment fail count	 ≠ Park ≠ Park = Park	ETRS system type is internal ETRS time since controller init battery voltage general park servo diagnostic enable park position sensor B performance diagnostic enable high side driver 1 or high side driver 2 is on P187D, P187E (Park Servo DTC) Test Fail This Key On (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active) OR (P17FA, P17FB, P17FC (Park Sensor B) Fault Active) mode valve A commanded high and mode valve A confirmed high mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND mode valve sensor fault (P27EB, P27ED, P27EE Fault Active) pump out available (engine speed	= CeTRGR_e_InternalETRS ≥ 0.01 seconds ≥ 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = FALSE = TRUE = FALSE = FALSE = TRUE ≥ 250 RPM	fail time ≥ 0.25 seconds fail count ≥ 2.00 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for engine speed time) line pressure available (commanded) line pressure sufficient for pull out of park	**Pump Out Available** ≥ **Transition Time** ≥ 100.00 kPa ≥ 500.00 kPa		
			when: park commanded Park Sensor A indicating park Park Sensor B not indicating park transition delay for commanded park valve transition OR transition delay for commanded park valve transition with min line (not required for steady state commanded park conditions) increment fail time when fail time threshold met, increment fail count	= Park = Park ≠ Park ≥ **P187E P18E8 Out Of Park to Park Transition Delay** ≥ **P187E P18E8 Out Of Park to Park Min Line Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general park servo diagnostic enable park position sensor B performance diagnostic enable high side driver 1 or high side driver 2 is on P187D, P187E (Park Servo DTC) Test Fail This Key On (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active) OR (P17FA, P17FB, P17FC (Park Sensor B) Fault Active) mode valve A commanded low and mode valve A confirmed low (park commanded)	= CeTRGR_e_InternalETRS ≥ 0.01 seconds ≥ 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = FALSE = TRUE	steady state fail time ≥ 0.25 seconds OR transition fail time ≥ 1.80 seconds OR transition fail time (at min line) ≥ 1.80 seconds fail count ≥ 2.00 counts update rate 6.25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND mode valve sensor fault (P27EB, P27ED, P27EE Fault Active)	= FALSE = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Run/ Start Position Circuit Low	P2534	Detects a low ignition switch run/start position curcuit. This diagnostic reports the DTC when this circut is low. Monitoring occurs when the TCM run/ crank is active.	Ignition switch Run/Start position circuit low	TCM Run / Crank = FALSE	Ignition switch Run/Start position circuit low diag enable and Run / Crank active ECM	= 1.00 = TRUE	280 failures out of 280 samples 25 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Run/ Start Position Circuit High	P2535	Detects a high ignition switch run/start position curcuit. This diagnostic reports the DTC when this circut is high. Monitoring occurs when the TCM run/ crank is NOT active.	Ignition switch Run/Start position circuit high	TCM Run / Crank = TRUE	Ignition switch Run/Start position circuit low diag enable and Run / Crank active ECM	= 1.00 = FALSE	280 failures out of 280 samples 25 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Actuator Supply Voltage B Circuit Low	P2670	Controller specific output driver circuit diagnoses the high sided driver circuit for a short to ground failure, or where controller H/W cannot differentiate, diagnoses the high sided driver circuit for a short to ground failure or open circuit failure, when the output is powered on, by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground or an open circuit.	≤ 0.5 Ω impedance between signal and controller ground OR ≥ 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail count and increment sample count, otherwise increment only sample count	(ground short diagnostic monitor enable calibration OR open circuit diagnostic monitor enable calibration) high side drive 2 ON service mode $04 active	= 1 Boolean = 1 Boolean = TRUE = FALSE	ground short fail count ≥ 6 counts within sample count of 2,400 counts OR open circuit fail count ≥ 6 counts within sample count of 2,400 counts 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Stuck Off (GR10)	P2714	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C4 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM			fail time ≥ 1.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update	Type A, 1 Trips
					******************************	******************************		
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					use run crank voltage calibration is FALSE	= 0 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 0 Boolean		
					AND			
					run crank voltage)	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control			procedure active hydraulic pressure available hydraulic line pressure **************************** enable C4 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR (accelerator pedal position OR engine speed) C4 clutch slip speed valid	= FALSE Boolean = TRUE ≥ -999.00 kPa **************************** = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE ≥ 36.0 RPM ≥ 0.50 % ≥ 1,000.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip	≥ 1.000 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C4 (GR10 C23467810R) clutch pressure control solenoid.			 C4 clutch pressured map (enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear) range shift state ****************************** DTCs not fault pending DTCs not fault active	speed calculation) = mapped to line pressure, C4 clutch pressure has reached fully applied state = 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE = range shift complete ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Stuck On	P2715	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C4 clutch slip speed OR shift type is garage shift: C4 clutch slip speed ELSE shift is another type: C4 clutch slip speed update fail time 6.25 milliscond update	 < 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time ≥ 0.60 seconds shift type is garage shift: fail time ≥ 0.25 shift type is another type: fail time ≥ 0.15 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			****************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)	****************************** = 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count ≥ 3 counts 6.25 millliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		is disabled. This diagnostic monitor is relative to GR10 C4 C23467810R clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					hydraulic pressure ****************************	≥ -999 kPa *****************************		
					range shift state	≠ range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	≥ 36.0 RPM		
					((C4 off going clutch pressure control ramp time out complete	= TRUE		
					AND off going clutch pressure ramp control ramp time out enable)	= 1 (1 to enable, 0 to disable)		
					OR			
					C4 off going clutch command pressure)	≤ 350 kPa	exhaust delay by shift type:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							closed throttle upshift: **C4 exhaust delay closed throttle lift foot up shift** open throttle upshift: **C4 exhaust delay open throttle power on up shift** garage shifts: **C4 exhaust delay garage shift** closed throttle downshift: **C4 exhaust delay closed throttle down shift** negative torque upshift: **C4 exhaust delay negative torque up shift** open throttle downshift: **C4 exhaust delay open throttle power down shift**	
					(engine torque AND	≥ 8,192 Nm		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	= 0 (0 is enable, 1 is enable) = TRUE ≠ clutch fill phase ≥ pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C1 Torque-Based Pressure Clip** OR **C2 Torque-Based Pressure Clip** OR **C3 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip** OR **C6 Torque-Based Pressure Clip** clip thresholds for all other	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C2_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						shift types: garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C4 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					****************************** conditions needed to trigger test:	******************************		
					(current shift type AND shift type enable cal for current shift type) OR	≠ Garage shift = **Clutch Stuck On Shift Type Enable** (0 table value will disable, 1 will enable)		
					(Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND	= FALSE = 1 (0 will enable, 1 will enable) = NEUTRAL OR commanded gear		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ******************************* DTCs not fault pending	= 1 (0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to TestState or TUT_HOLD (see note below about state transitions) ******************************* P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					*****************************	*****************************		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Control Circuit Open	P2718	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch, solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	≥ 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Control Circuit Low	P2720	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch, solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	≤ 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.10 seconds out of sample time ≥ 0.17 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Control Circuit High	P2721	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch, solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	≤ 0.5 Ω impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Stuck Off (GR10)	P2723	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C5 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM			fail time ≥ 1.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update	Type A, 1 Trips
					******************************	******************************		
					system-level enables:			
					use battery voltage calibration is FALSE OR	= 1 Boolean		
					(use battery voltage calibration is TRUE AND	= 1 Boolean		
					battery voltage)	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					use run crank voltage calibration is FALSE OR	= 0 Boolean		
					(use run crank voltage calibration is TRUE AND	= 0 Boolean		
					run crank voltage)	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control			procedure active hydraulic pressure available hydraulic line pressure **************************** enable C5 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR (accelerator pedal position OR engine speed) C5 clutch slip speed valid	= FALSE Boolean = TRUE ≥ -999.00 kPa **************************** = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE ≥ 36.0 RPM ≥ 0.50 % ≥ 1,000.0 RPM = TRUE (all speed sensors are functional for	≥ 1.000 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C5 (GR10 C1356789) clutch pressure control solenoid.				lever node clutch slip speed calculation)		
					C5 clutch pressured map	= mapped to line pressure, C5 clutch pressure has reached fully applied state		
					(enable forward gear cal AND	= 1 (1 to enable, 0 to disable)		
					driver direction request AND	= FORWARD		
					Attained Gear) OR	= a FORWARD gear		
					(enable reverse gear cal AND	= 0 (1 to enable, 0 to disable)		
					driver direction request AND	= REVERSE		
					Attained Gear)	= REVERSE		
					range shift state	= range shift complete		
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Stuck On	P2724	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C5 clutch slip speed OR shift type is garage shift: C5 clutch slip speed ELSE shift is another type: C5 clutch slip speed update fail time 6.25 milliscond update	 < 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time ≥ 0.60 seconds shift type is garage shift: fail time ≥ 0.25 shift type is another type: fail time ≥ 0.15 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test					**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count ≥ 3 counts 6.25 millliscond update	
					******************************	******************************		
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					use run crank voltage calibration is FALSE	= 0 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 0 Boolean		
					AND			
					run crank voltage)	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		is disabled. This diagnostic monitor is relative to the GR10 C5 C1356789 clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					hydraulic pressure ****************************	≥ -999 kPa *****************************		
					range shift state	≠ range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	≥ 36.0 RPM		
					((C5 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable) OR	= TRUE = 1 (1 to enable, 0 to disable)		
					C5 off going clutch command pressure)	≤ 350 kPa	exhaust delay by shift type:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							closed throttle upshift: **C5 exhaust delay closed throttle lift foot up shift** open throttle upshift: **C5 exhaust delay open throttle power on up shift** garage shifts: **C5 exhaust delay garage shift** closed throttle downshift: **C5 exhaust delay closed throttle down shift** negative torque upshift: **C5 exhaust delay negative torque up shift** open throttle downshift: **C5 exhaust delay open throttle power down shift**	
					(engine torque AND Primary oncoming stuck	≥ 8,192 Nm = 0 (0 is enable, 1 is		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	enable) = TRUE ≠ clutch fill phase ≥ pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C1 Torque-Based Pressure Clip** OR **C2 Torque-Based Pressure Clip** OR **C3 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR **C6 Torque-Based Pressure Clip** clip thresholds for all other shift types:	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C2_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C5 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					*****************************	*****************************		
					conditions needed to trigger test:			
					(current shift type AND shift type enable cal for current shift type) OR	≠ Garage shift **Clutch Stuck On Shift** = **Type Enable** (0 table value will disable, 1 will enable)		
					(Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts	= FALSE = 1 (0 will enable, 1 will enable) = NEUTRAL OR commanded gear = 1 (0 to disable, 1 to		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ****************************** DTCs not fault pending DTCs not fault active	enable) = FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to TestState or TUT_HOLD (see note below about state transitions) ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					*****************************	*****************************		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747,			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Control Circuit Open	P2727	Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, or 8 speed C45678R clutch solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	≥ 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Control Circuit Low	P2729	Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, or 8 speed C45678R clutch solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	≤ 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.10 seconds out of sample time ≥ 0.17 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Control Circuit High	P2730	Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, or 8 speed C45678R clutch solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	≤ 0.5 Ω impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Stuck Off (GR10)	P2732	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C6 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM			fail time ≥ 1.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update	Type A, 1 Trips
					******************************	******************************		
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					use run crank voltage calibration is FALSE	= 0 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 0 Boolean		
					AND			
					run crank voltage)	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control			procedure active hydraulic pressure available hydraulic line pressure **************************** enable C6 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR (accelerator pedal position OR engine speed) C6 clutch slip speed valid	= FALSE Boolean = TRUE ≥ -999.00 kPa **************************** = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE ≥ 36.0 RPM ≥ 0.50 % ≥ 1,000.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip	≥ 1.000 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C6 GR10 C45678910R clutch pressure control solenoid.			 C6 clutch pressured map (enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear) range shift state ***************************** DTCs not fault pending DTCs not fault active	speed calculation) = mapped to line pressure, C6 clutch pressure has reached fully applied state = 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE = range shift complete ***************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Stuck On (GR10)	P2733	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C6 clutch slip speed OR shift type is garage shift: C6 clutch slip speed ELSE shift is another type: C6 clutch slip speed update fail time 6.25 milliscond update	 < 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time ≥ 0.60 seconds shift type is garage shift: fail time ≥ 0.25 shift type is another type: fail time ≥ 0.15 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			****************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)	****************************** = 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		is disabled. This diagnostic monitor is relative to the GR10 C6 C45678910R clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active hydraulic pressure available hydraulic pressure **************************** range shift state diagnostic clutch test transmission output shaft speed ((C6 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable) OR C6 off going clutch command pressure)	= TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE ≥ -999 kPa ***************************** ≠ range shift complete = OFF GOING CLUTCH TEST ≥ 36.0 RPM = TRUE = 1 (1 to enable, 0 to disable) ≤ 350 kPa	exhaust delay by shift type:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							closed throttle upshift: **C6 exhaust delay closed throttle lift foot up shift** open throttle upshift: **C6 exhaust delay open throttle power on up shift** garage shifts: **C6 exhaust delay garage shift** closed throttle downshift: **C6 exhaust delay garage shift** negative torque upshift: **C6 exhaust delay negative torque up shift** open throttle downshift: **C6 exhaust delay open throttle power down shift**	
					(engine torque AND Primary oncoming stuck	≥ 8,192 Nm = 0 (0 is enable, 1 is		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	enable) = TRUE ≠ clutch fill phase ≥ pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C1 Torque-Based Pressure Clip** OR **C2 Torque-Based Pressure Clip** OR **C3 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip** clip thresholds for all other shift types:	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C2_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C6 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test:			
					(current shift type AND shift type enable cal for current shift type)	≠ Garage shift **Clutch Stuck On Shift** = **Type Enable** (0 table value will disable, 1 will enable)		
					OR			
					(Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts AND	= FALSE = 1 (0 will enable, 1 will enable) = NEUTRAL OR commanded gear = 1 (0 to disable, 1 to enable)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ****************************** DTCs not fault pending DTCs not fault active	= FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to TestState or TUT_HOLD (see note below about state transitions) ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
					*****************************	*****************************		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715,			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Control Circuit Open	P2736	Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1) clutch, 10 speed C45678910R clutch, 8 speed Line Pressure Control Circuit, or CVT binary pump, solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	≥ 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Control Circuit Low	P2738	Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1, 10 speed C45678910R clutch, 8 speed line pressure control, or CVT binary pump, solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	≤ 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.10 seconds out of sample time ≥ 0.17 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Control Circuit High	P2739	Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1), 10 speed C45678910R clutch, 8 speed line pressure control, or CVT binary pump, solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	≤ 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Control Circuit Open	P2796	Controller specific auxiliary transmission fluid pump motor control circuit diagnoses the pump motor and wiring for an open circuit fault by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit update fail and sample count	≥ 200 K Ω impedance between signal and controller ground	diagnostic report enable diagnostic monitor enable run crank voltage run crank voltage time	= 1 Boolean = 1 Boolean > 5.00 volts ≥ 25 milliseconds	≥ 20 fail counts out of ≥ 25 sample counts update rate 100 milliseconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Performance	P2797	Detects when the transmission auxiliary pump system, used to provide transmission hydraulic pressure, is not capable of supplying adequate hydraulic pressure during an engine auto-start. The transmission holding clutch pressures are commanded to meet the engine crank shaft torque output, to prevent clutch slip to those holding clutches, during the engine auto-start. The diagnostic monitors transmission input shaft speed during the auto-start event as the primary malfunction criteria. Measured input shaft speed that is excessive is an indication the holding clutches are slipping due to inadequate hydraulic pressure, as a result of a failed surge accumulator transmission auxiliary pump system.	Transmission turbine speed is greater than predicted turbine speed during autostart event, update initial fail count	**P2797 predicted ≥ turbine speed error** Refer to "Transmission Supporting Tables" for details	PRNDL state defaulted Transmission shift lever position Propulsion system active Ignition voltage Ignition voltage Transmission fluid temp Transmission fluid temp Hybrid state AutoStop duration min During autostop Engine speed was **************************** If above conditions are met then the following must occur: Turbine speed Engine speed Hydraulic pressure delay time If above conditions are met then increment time-out timer. Time-out timer Note: The initial fail	= False = Forward range A = True > 9.00 volts < 31.99 volts > 0.00 °C < 110.00 °C = Engine off ≥ 1.200 seconds < 5.0 RPM ≥ 80.0 RPM ≥ 450.0 RPM **P2797 hydraulic ≥ pressure delay** Refer to "Transmission Supporting Tables" for details ≤ 0.38 seconds	≥ 8 counts (initial fail count) Frequency =12.5ms Once the above counts are achieved then increment the final fail counter once. The final fail counter can only increment once per autostart event ≥ 3 counts (final fail counter) If above counter is greater than threshold then report DTC failed. Frequency = 12.5ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					counter must achieve it's fail threshold in less than the time-out time.			
					*****************************			
					If vehicle is launched then:			
					Transmission gear ratio	= 4.696 1st gear ratio = 2.985 2nd gear ratio = 2.146 3rd gear ratio = 1.769 4th gear ratio = 1.520 5th gear ratio = 1.275 6th gear ratio		
					Trans 1st gear ratio	≤ 1.120 % of 1st gear ratio		
					Trans 1st gear ratio	≥ 0.880 % of 1st gear ratio		
					Trans gear ratio not 1st gear	≤ 1.070 % of gear ratio		
					Trans gear ratio not 1st gear	≥ 0.930 % of gear ratio		
					Valid transmission gear ratio achieved time	≥ 0.500 seconds		
					OR			
					If vehicle is not launched but autostart occurs then:			
					Turbine speed	≤ 5.00 RPM		
					Turbine speed less then above threshold for	≥ 0.500 seconds		
					Note: During an autostart event the lack of hydraulic pressure will result in momentary clutch slip in			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					the C1234 clutch. After the clutch slip event, the main transmission pump and clutch will gain capacity, clutch slip will go to zero. If the vehicle is launching (moving) then a valid transmission ratio can be achieved. Or if the brake is continually applied and an autostart occurs naturally, then no ratio can be measured. In this case turbine speed will return to near zero rpm. ***************************** DTCs not fault active	 CrankSensor_FA Transmission Output Shaft Angular Velocity Validity Transmission Turbine Angular Velocity Validity Transmission Oil Temperature Validity P171A P171B P171C U0101 P182E P1915		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Control Circuit Low	P2798	Controller specific auxiliary transmission fluid pump motor control circuit diagnoses the pump motor and wiring for a ground short circuit fault by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short update fail and sample count	≤ 0.5 Ω impedance between signal and controller ground	diagnostic report enable diagnostic monitor enable run crank voltage run crank voltage time	= 1 Boolean = 1 Boolean ≥ 5.00 volts ≥ 25 milliseconds	≥ 20 fail counts out of ≥ 25 sample counts update rate 100 milliseconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Control Circuit High	P2799	Controller specific auxiliary transmission fluid pump motor control circuit diagnoses the pump motor and wiring for a short to power circuit fault by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a voltage short Controller specific circuit voltage thresholds are set to meet the following controller specification for a voltage short Increment fail and sample count	≤ 0.5 Ω impedance between signal and controller voltage source	diagnostic report enable diagnostic monitor enable run crank voltage run crank voltage time	= 1 Boolean = 1 Boolean ≥ 5.00 volts ≥ 25 milliseconds	≥ 20 fail counts out of ≥ 25 sample counts update rate 100 milliseconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Calibration Incorrect	P27A7	The diagnostic monitor verifies that the pressure control solenoid A (GF9 line or GR10 C1 C123456R clutch or CVT secondary pulley) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid A electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Calibration Incorrect	P27A8	The diagnostic monitor verifies that the pressure control solenoid B (GF9 TCC or GR10 C2 C128910R clutch or CVT primary pulley) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid B electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power event during the controller initialization before normal time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Calibration Incorrect	P27A9	The diagnostic monitor verifies that the pressure control solenoid C (GF9 C1 CB123456 clutch or GR10 C3 C23457910 clutch or CVT line) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid C electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Calibration Incorrect	P27AA	The diagnostic monitor verifies that the pressure control solenoid D (GF9 C2 CB29 clutch or GR10 C5 C1356789 clutch pressure or CVT C1 clutch) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid D electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Calibration Incorrect	P27AB	The diagnostic monitor verifies that the pressure control solenoid E (GF9 C3 CB38 clutch or GR10 C4 C23467810R clutch or CVT TCC) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid E electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Calibration Incorrect	P27AC	The diagnostic monitor verifies that the pressure control solenoid F (GF9 C4 C4 clutch or GR10 C6 C45678910R clutch or CVT binary pump) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid F electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid G Calibration Incorrect	P27AD	The diagnostic monitor verifies that the pressure control solenoid G (GF9 C5 C57R clutch or GR10 line or CVT mode valve A ETRS only) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid G electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid H Calibration Incorrect	P27AE	The diagnostic monitor verifies that the pressure control solenoid H (GF9 C6 C6789 clutch or GR10 TCC or CVT mode valve B ETRS only) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid H electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control A Position Sensor/ Switch Circuit/Open	P27EB	The diagnostic monitor detects an illegal voltage on the mode valve A position sensor circuit.	raw sensor voltage raw sensor voltage	> 1.263 volts < 1.504 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control A Position Sensor/ Switch Circuit Stuck On (GR10 Only)	P27EC	Sensor signal fails to transition when solenoid mode valve control commands to PARK, DRIVE or REVERSE occur.	when: mode valve solenoid commaned state mode valve A position sensor state confirmed park servo position transition delay for solenoid controlled mode valve transition (not required for steady state mode valve low conditions) increment fail time when fail time threshold met, increment fail count	 = LOW = HIGH = PARK ≥ **P18A1 P18AA P27EC Mode Valve High To Low Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general mode valve diagnostic enable mode valve sensor performance enable high side driver 1 or high side driver 2 is on mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND move valve sensor fault (P27EB, P27ED, P27EE Fault Active) AND park servo fault (P187D, P187E Test Fail This Key On) one good park sensor (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active OR P17FA, P17FB, P17FC (Park Sensor B) Fault Active) pump out available (engine speed for engine speed high time) AND	= CeTRGR_e_InternalETRS ≥ 0.01 seconds ≥ 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = TRUE ≥ 250.00 ≥ **Pump Out Available Transition Time**	steady state fail time ≥ 0.02 seconds OR transition fail time ≥ 0.02 seconds fail count ≥ 4.00 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					line pressure available (pressure commanded)	= TRUE ≥ 100.00 kPa		
			when: mode valve solenoid commaned state mode valve A position sensor state confirmed park servo position transition delay for solenoid controlled mode valve transition (not required for steady state mode valve high conditions) increment fail time when fail time threshold met, increment fail count	 = HIGH = LOW = OUT OF PARK ≥ **P18AB P27EC Mode Valve Low to High Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general mode valve diagnostic enable mode valve sensor performance enable high side driver 1 or high side driver 2 is on mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND move valve sensor fault (P27EB, P27ED, P27EE Fault Active) AND park servo fault (P187D, P187E Test Fail This Key On) one good park sensor (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active OR P17FA, P17FB, P17FC (Park Sensor B) Fault Active)	= CeTRGR_e_InternalETRS ≥ 0.01 seconds ≥ 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE	steady state fail time ≥ 0.25 seconds transition fail time ≥ 0.25 seconds fail count ≥ 4.00 counts update rate 6.25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					pump out available (engine speed for engine speed high time) AND line pressure available (pressure commanded)	= TRUE ≥ 250.00 **Pump Out Available** ≥ **Transition Time** = TRUE ≥ 100.00 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control A Position Sensor/ Switch Circuit Low	P27ED	The diagnostic monitor detects a ground short or open circuit fault on the mode valve A position sensor circuit.	raw sensor voltage	< 0.414 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control A Position Sensor/ Switch Circuit High	P27EE	The diagnostic monitor detects a short to voltage on the mode valve A position sensor circuit.	raw sensor voltage	> 2.538 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid G Control Circuit Open	P2812	Controller specific circuit diagnoses 9 speed Line Pressure Control Circuit, 10 speed Line Pressure Control Circuit, or 8 speed TCC Control Circuit for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	≥ 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid G Control Circuit Low	P2814	Controller specific circuit diagnoses 9 speed Line Pressure Circuit, 10 speed Line Pressure Circuit, or 8 speed TCC Control Circuit for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	≤ 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid G Control Circuit High	P2815	Controller specific circuit diagnoses 9 speed Line Pressure Circuit, 10 speed Line Pressure Circuit, or 8 speed TCC Control Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	≤ 0.5 Ω impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Performance /Stuck Off	P2817	The diagnostic monitor detects the transmission torque converter control valve solenoid failed hydraulically off. The monitor executes when the transmission torque converter is commanded to a "lock" mode during which the torque converter will be controlled to near zero (0.0) RPM slip speed, or, an "on" mode during which the torque converter will be controlled to target slip speed using slip speed error. The transmission torque converter control valve solenoid is considered failed hydraulically off when the "lock" mode slip speed is excessive, or, when the 'on" mode slip speed error is excessive.	if use TCC slip speed error OR TCC control mode TCC slip speed error = TCC slip speed - TCC comand slip speed else if TCC control mode torque convert slip = engine speed - transmission input shaft speed then update fail time 25 millisecond update rate	= 0 Boolean = ON mode (controlled slip mode) ≥ **P2817 TCC stuck off fail TCC slip speed** see supporting table = LOCK ≥ 130.0 RPM	diagnostic monitor enable TCC command capacity TCC command pressure (TCC control mode previous TCC control mode previous TCC control mode previous) AND (TCC control mode current OR TCC control mode current) (TCC stuck off enable OR TCC stuck on enable) hydraulic pressure available: engine speed	= 1 Boolean ≥ 0.00 % ≥ 400.0 kPa ≠ TCC control mode current ≠ ON mode (controlled slip mode) ≠ LOCK = ON mode (controlled slip mode) = LOCK = 1 Boolean = 1 Boolean ≥ 500.0 RPM	fail time ≥ 4.000 seconds increment fail count fail count ≥ 3 counts 25 millisecond update rate TCC command capacity time ≥ 0.00 seconds TCC command pressure time ≥ 2.00 seconds engine speed time ≥ **engine speed time for transmission hydraulic pressure available**	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							see supporting table	
					service fast learn active	= FALSE		
					battery voltage	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					P281B falut active	= FALSE		
					P281D falut active	= FALSE		
					P281E falut active	= FALSE		
					P0722 fault pending	= FALSE		
					P0723 fault pending	= FALSE		
					P0716 fault pending	= FALSE		
					P0717 fault pending	= FALSE		
					P07BF fault pending	= FALSE		
					P07C0 fault pending	= FALSE		
					(PTO active OR	= FALSE		
					PTO disable calibration)	= 1 Boolean		
					accelerator pedal position	≥ 8.0 %		
					accelerator pedal position	≤ 99.0 %		
					range shift state	= range shift complete		
					transmission fluid temperature	≥ -6.66 °C		
					transmission fluid temperature	≤ 130.0 °C		
					engine torque	≥ 50.0 Nm		
					engine torque	≤ 8,191.8 Nm		
					P2817 test fail this key on	= FALSE		
					(TCC control mode OR	= ON mode (controlled slip mode)		
					TCC control mode)	= LOCK		
					break latch state (clutch select valve solenoid)	= disabled (clutch select valve not transitioning)		
					attained gear	≥ CeCGSR_e_CR_Second		
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate P0716, P0717, P07BF,		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P07C0 P0722, P0723, P077C, P077D		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Stuck On - GR10 specific	P2818	UPDATE UPDATE UPDATE The diagnostic monitor detects the transmission torque converter control valve solenoid failed hydraulically on. The torque converter hydraulic control circuit is multiplexed with the transmission clutch select valve hydraulic control circuit, allowing for the torque converter control valve solenoid stuck on test to execute when the clutch select valve solenoid is commanded ON. When the clutch select valve solenoid is commanded ON as the vehicle speed decreases toward zero KPH, and, if the torque converter control valve solenoid is stuck on, the torque converter slip speed rate of change will have a large slope while decreasing toward zero RPM, and the torque converter slip speed will remain low near zero RPM.	when: [active clutch control ABS(TCC slip speed) (set point engine speed - engine speed) (maximum engine speed during garage shift - engine speed) engine torque update TCC stuck on fail time garage shift] OR when: [active clutch control ABS(TCC slip speed) engine torque (set point engine speed - engine speed) rate of change of engine speed update TCC stuck on stall pending time]	 = garage shift ≤ 30.0 RPM ≥ 50.0 RPM ≥ 50.0 RPM ≥ 50.0 Nm ≠ garage shift ≤ 30.0 RPM ≥ 70.0 Nm ≥ 200.0 RPM ≤ -2,000.0 RPM/ second	(TCC stuck off enable OR TCC stuck on enable) hydraulic pressure available: engine speed	= 1 Boolean = 1 Boolean ≥ 500.0 RPM	when: TCC stuck on fail time garage shift ≥ **P2818 TCC stuck on fail time garage shift - GR10** update fail count when: fail count ≥ 3 counts set DTC fault active 25 millisecond update rate when: TCC stuck on stall pending time ≥ **P2818 TCC stuck on fail time stall pending - GR10** when: fail count ≥ 4 counts set DTC fault active 25 millisecond update rate engine speed time ≥	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					service fast learn active	= FALSE	**engine speed time for transmission hydraulic pressure available**	
					battery voltage	≥ 9.00 volts		
					run crank voltage	≥ 9.00 volts		
					P281B falut active	= FALSE	battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	
					P281D falut active	= FALSE		
					P281E falut active	= FALSE		
					P0722 fault pending	= FALSE		
					P0723 fault pending	= FALSE		
					P0716 fault pending	= FALSE		
					P0717 fault pending	= FALSE		
					P07BF fault pending	= FALSE		
					P07C0 fault pending	= FALSE		
					P0746 fault pending	= FALSE		
					P0747 fault pending	= FALSE		
					P0776 fault pending	= FALSE		
					P0777 fault pending	= FALSE		
					P0796 fault pending	= FALSE		
					P0797 fault pending	= FALSE		
					P2714 fault pending	= FALSE		
					P2715 fault pending	= FALSE		
					P2723 fault pending	= FALSE		
					P2724 fault pending	= FALSE		
					P2732 fault pending	= FALSE		
					P2733 fault pending	= FALSE		
					P2820 fault pending	= FALSE		
					P2821 fault pending	= FALSE		
					PRNDL	≠ NEUTRAL		
					PRNDL	≠ REVERSE		
					diagnostic monitor enable	1 Boolean		
					TCC command mode	= OFF		
					(PTO active OR	= FALSE		
					PTO disable calibration)	= 1 Boolean		
					transmission fluid	≥ -6.66 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					temperature			
					transmission fluid temperature	≤ 130.00 °C		
					engine torque	≥ -25.0 Nm		
					engine torque	≤ 800.0 Nm		
					P2818 test fail this key on	= FALSE		
					vehicle speed (garage shift)	≤ 4.0 KPH		
					vehicle speed (not garage shift)	≤ 15.0 KPH		
					engine speed	≥ 200.0 RPM		
					engine speed	≤ 600.0 RPM		
					accelerator pedal position	≤ 5.0 %		
					4WD low state	= FALSE		
					(driver shift mode active OR	= FALSE		
					driver shift mode calibration)	= 0 Boolean		
					(misfire requests TCC off OR	= FALSE		
					misfire TCC off calibration)	= 0 Boolean		
					clucth control solenoid stuck ON AND stuck OFF	= FALSE		
					intrusive shift active	= FALSE		
					TCC solenoid pulse request	= FALSE		
					minumum trubine speed	≤ set point engine speed - 50.0 RPM		
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Control Circuit Open	P281B	Controller specific circuit diagnoses 9 speed TCC Control Circuit, 10 speed TCC Control Circuit, or 8 speed T93 Default Valve Control Circuit for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	≥ 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Control Circuit Low	P281D	Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit, 10 speed TCC Control Circuit, or 8 speed Default Valve Control Circuit for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds. For 8 speed T87a controllers, an open circuit on the Default Valve Control Circuit will also set P281D.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	≤ 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Control Circuit High	P281E	Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit, 10 speed TCC Control Circuit, or 8 speed Default Valve Control Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	≤ 0.5 Ω impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid J Stuck Off (GR10)	P2820	Each pressure control solenoid stuck off diagnostic monitor detects a control solenoid failed hydraulically off, while the solenoid is electrically functional. This diagnostic monitor detects the default disable valve solenoid failed hydraulically off. The default disable valve is used to route hydraulic fluid to transmission clutches to achieve a hydraulic default gear in the event that a fault occurs which requires the solenoid electrical drivers to be turned off. If the default disable solenoid is hydraulically stuck off, the transmission will enter hydraulic default unintentionally while the control system is actively commanding another gear, which can result in a tie-up condition. When the default disable valve solenoid is hydraulically off while in drive, hydraulic fluid will be routed to clutches to achieve either 7th or 2nd gear. If the vehicle is moving	(gear ratio AND gear ratio) OR (gear ratio AND gear ratio) (C1 clutch slip speed C2 clutch slip speed C3 clutch slip speed C4 clutch slip speed OR C3 clutch slip speed C4 clutch slip speed C5 clutch slip speed C6 clutch slip speed) update fail time 6.25 milliscond update	≥ 3.250 ≤ 2.750 ≥ 0.980 ≤ 1.020 ≤ 50.00 ≤ 50.00 ≤ 50.00 ≤ 50.00 ≤ 50.00 ≤ 50.00 ≤ 50.00 ≤ 50.00	****************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage) TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active	****************************** = 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean	fail time ≥ 0.25 seconds 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		and the control system is commanding a different gear, the solenoid fault can be detected as either a clutch tie-up or startle mitigation event. Shifting to neutral while monitoring gear ratio will isolate the fault as either a stuck on clutch solenoid or a stuck off default disable valve solenoid. For GR10 non-ETRS applications, the stuck off solenoid can be dected by monitoring transmission input speed deceleration magnitude and timing during a stationary shift into drive from park, neutral, or reverse while commanding neutral.			hydraulic pressure available hydraulic line pressure ***************************** conditions to trigger start of test: (clutch control solenoid test state OR clutch control solenoid test state) Offgoing clutch stuck on test result (for any clutch) Default disable stuck off enable cal for tie-up events current predicted hydraulic default gear if solenoid drivers are turned off (current attained gear OR current attained gear) ***************************** conditions needed through duration of test:	= TRUE ≥ -999.00 kPa ***************************** = Tie Up Test Active = Tie Up Test Hold = Test Failing = 1 (1 to enable, 0 to disable) = a drive gear (i.e. 2nd or 7th gear) = CeCGSR_e_Seventh (low gear hydraulic default) = CeCGSR_e_Seventh (high gear hydraulic default) ***************************** = NEUTRAL		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					commanded gear transmission output speed driver direction request ****************************** DTCs not fault pending DTCs not test fail this key on DTCs not fault active	≥ 36.00 RPM = FORWARD ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
			(gear ratio AND gear ratio)	≥ 3.250 ≤ 2.750			fail time ≥ 0.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR (gear ratio AND gear ratio) (C1 clutch slip speed C2 clutch slip speed C3 clutch slip speed C4 clutch slip speed OR C3 clutch slip speed C4 clutch slip speed C5 clutch slip speed C6 clutch slip speed) update fail time 6.25 milliscond update	 ≥ 0.980 ≤ 1.020 ≤ 40.00 ≤ 40.00 ≤ 40.00 ≤ 40.00 ≤ 40.00 ≤ 40.00 ≤ 40.00 ≤ 40.00	****************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage) TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active hydraulic pressure available	****************************** = 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE	6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					hydraulic line pressure	≥ -999.00 kPa		
					******************************	******************************		
					conditions to trigger start of test:			
					(clutch control solenoid test state	= Tie Up Test Active		
					OR			
					clutch control solenoid test state)	= Tie Up Test Hold		
					Offgoing clutch stuck on test result (for any clutch)	= Test Failing		
					Default disable stuck off enable cal for tie-up events	= 1 (1 to enable, 0 to disable)		
					(current attained gear	= CeCGSR_e_Seventh (low gear hydraulic default)		
					OR			
					current attained gear)	= CeCGSR_e_Seventh (high gear hydraulic default)		
					hydraulic default at launch test active	= FALSE		
					******************************	******************************		
					conditions needed through duration of test:			
					current predicted hydraulic default gear if solenoid drivers are turned off	= a drive gear (i.e. 2nd or 7th gear)		
						= NEUTRAL		
					commanded gear	= FORWARD		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					driver direction request ******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not test fail this key on	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not fault active	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		
			input speed deceleration	> **P2820 GR10 hydraulic default input speed deceleration threshold**			fail time ≥ 0.10 seconds observed within:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			transmission output shaft speed update fail time 6.25 millisecond update	≤ 16 RPM	**************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage) TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active	**************************** = 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean	**P2820 GR10 hydraulic default at launch test window** 6.25 milliscond update	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					hydraulic pressure available	= TRUE		
					hydraulic line pressure	≥ -999.00 kPa		
					******************************	******************************		
					conditions needed to trigger test:			
					Driver direction change request	= TRUE		
					default disable stuck off at launch enable cal	= 0 (1 to enable, 0 to disable)		
					ETRS system type	= CeTRGR_e_InternalETRS (CeTRGR_e_NoETRS to enable)		
					deceleration test on previous shift into drive failed	= TRUE		
					******************************	******************************		
					conditions needed through duration of test:			
					commanded gear	= NEUTRAL		
					Driver direction request	= FORWARD		
					current predicted hydraulic default gear if solenoid drivers are turned off	= a drive gear (i.e. 2nd)		
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not test fail this key on	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not fault active	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172A P172B		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid J Stuck On (Default Disable Solenoid Stuck On) (GR10 Only)	P2821	The diagnostic monitor tests for the default disable solenoid stuck on at engine start (pump out pressure transition)	when: mode valve solenoid commaned state mode valve position in park engine crank active (required to initiate test) increment fail time when fail time threshold met, increment fail count	 = LOW = HIGH = TRUE	ETRS system type is internal ETRS time since controller init battery voltage general mode valve diagnostic enable default disable solenoid stuck on diagnostic enable high side driver 1 or high side driver 2 is on mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND (P27EB, P27ED, P27EE Fault Active) pump out available (engine speed for engine speed high time)	= CeTRGR_e_InternalETRS ≥ 0.01 seconds ≥ 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = TRUE ≥ 250.00 **Pump Out Available** ≥ **Transition Time**	fail time ≥ 0.25 seconds fail count ≥ 2.00 counts update rate 6.25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid J Control Circuit Open (T93 Controller only)	P2824	Controller specific circuit diagnoses 10 speed Default Disable Control Circuit for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	≥ 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid J Control Circuit Low	P2826	Controller specific circuit diagnoses 9 speed Clutch Select Valve Control Circuit, 10 speed Default Disable Control Circuit, or 8 speed Boost Valve Control Circuit for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds. For T87a controllers, an open circuit on solenoid I/J will also set P2826	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	≤ 0.5 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	≥ 9.00 volts and ≤ 32.00 volts	≥ 1.00 seconds	
					(run crank voltage OR accessory voltage active)	≥ 5.00 volts = TRUE	≥ 25 milliseconds ≥ 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid J Control Circuit High	P2827	Controller specific circuit diagnoses 9 speed Clutch Valve Control Circuit, 10 speed Default Disable Control Circuit, or 8 speed Boost Valve Control Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	≤ 0.5 Ω impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time ≥ 0.30 seconds out of sample time ≥ 0.50 seconds ≥ 1.00 seconds ≥ 25 milliseconds ≥ 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Stall Prevention Active Signal Message Counter Incorrect	P30BD	The diagnostic monitor detects an alive rolling count error in the CAN frame containing the engine stall protection signal value. The alive rolling count sequences 0, 1, 2, 3 repeatedly. As each serial data frame is broadcast by the transmitting controller, the transmitting controller increments the alive rolling count in this sequence manner. The receiving controller compares the most recent received alive rolling count value to the previous value plus one. If the values are not equal, an alive rolling count error has occurred. If continuous alive rolling count errors occur the DTC is set.	rolling count value received from ECM and expected TCM calculated value not equal	= TRUE	Loop rate calibration either 10 milliseconds or 12.5 milliseconds service mode $04 active battery voltage battery voltage time engine stall protection ECM frame recieved	= CeCFMD_e_DEC_Time Base_12p5 = FALSE ≥ 11.00 volts ≥ 300.000 seconds = TRUE	alive rolling count errors ≥ 8 out of 10 sample counts	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 1	P30D□	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message □ithin the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid □receive□message □ithin the main processor.		Run□Cran□voltage	□= 8.00 □olts, else the failure □ill be reported for all conditions	In the primary processor, 8 □1□ counts intermittent 12.5 ms □count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 2	P30D7	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>= 8.00 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures exceeds	3 counts (equivalent to 0.04 seconds)	General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
					U0073	Not Active on Current Key Cycle		
			before the sample time of is reached	800.00 milliseconds				
					Normal CAN transmission on Bus A	Enabled		
					CAN hardware is bus OFF for	> 160.0000 milliseconds		
					The following criteria have been enabled for	>= 5,000.00 milliseconds		
					Transition from accessory mode to off is pending	= False		
					Battery Voltage	> 11.00 Volts		
					Ignition Voltage Criteria:			
					Power Mode	= Run		
					Run/Crank Voltage	>= 11.00 Volts		
					Off Cycle Enable Criteria:			
					KeCMGD_b_OffKeyCycleDiagEnbl	1.00 (1 indicates enabled)		
					KeDFIR_e_OBD_ControllerType is an OBD Controller	OBD Controller		
					Controller shutdown impending	= False		
					Power Mode	= Not Run/Crank		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With ECM	U0100	This DTC monitors for a loss of communication with the engine control module	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
					U0073	Not Active on Current Key Cycle		
			Message $0C9	≥ 500.00 milliseconds				
			Message $287	≥ 12,000.00 milliseconds	Normal CAN transmission on Bus A	Enabled		
			Message $3E9	≥ 12,000.00 milliseconds	The following criteria have been enabled for	>= 5,000.00 milliseconds		
			Message $4C1	≥ 12,000.00 milliseconds	Transition from accessory mode to off is pending	= False		
			Message $4D1	≥ 12,000.00 milliseconds	Battery Voltage	> 11.00 Volts		
					Ignition Voltage Criteria:			
			Message $4F1	≥ 12,000.00 milliseconds	Power Mode	= Run		
					Run/Crank Voltage	>= 11.00 Volts		
					Off Cycle Enable Criteria:			
					KeCMGD_b_OffKeyCycleDiagEnbl	1.00 (1 indicates enabled)		
					KeDFIR_e_OBD_ControllerType is an OBD Controller	OBD Controller		
					Controller shutdown impending	= False		
					Power Mode	= Not Run/Crank		
					U0100	Not Active on Current Key Cycle		
					ECM	is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Anti-Lock Brake System (ABS) Control Module	U0121	This DTC monitors for a loss of communication with the Anti-Lock Brake System (ABS) Control Module (Non-OBD Module ID 243).	Message is not received from controller for Message $0C1 Message $0C5 Message $1E9 Message $2F9	 ≥ 12,000.00 milliseconds ≥ 12,000.00 milliseconds ≥ 12,000.00 milliseconds ≥ 12,000.00 milliseconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A The following criteria have been enabled for Transition from accessory mode to off is pending Battery Voltage Ignition Voltage Criteria: Power Mode Run/Crank Voltage Off Cycle Enable Criteria: KeCMGD_b_OffKeyCycleDiagEnbl KeDFIR_e_OBD_ControllerType is an OBD Controller Controller shutdown impending Power Mode U0121 Anti-Lock Brake System Control Module	 Not Active on Current Key Cycle Enabled >= 5,000.00 milliseconds = False > 11.00 Volts = Run >= 11.00 Volts 1.00 (1 indicates enabled) OBD Controller = False = Not Run/Crank Not Active on Current Key Cycle is present on the bus	Diagnostic runs in 12.5 ms loop	"Emissions Neutral Diagnostics – Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Power Steering Control Module	U0131	This DTC monitors for a loss of communication with the Power Steering Control Module	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Safety Emissions Neutral Diagnostic
					U0073	Not Active on Current Key Cycle		
			Message $1E5	≥ 12,000.00 milliseconds				
					Normal CAN transmission on Bus A	Enabled		
					The following criteria have been enabled for	>= 5,000.00 milliseconds		
					Transition from accessory mode to off is pending	= False		
					Battery Voltage	> 11.00 Volts		
					Ignition Voltage Criteria:			
					Power Mode	= Run		
					Run/Crank Voltage	>= 11.00 Volts		
					Off Cycle Enable Criteria:			
					KeCMGD_b_OffKeyCycleDiagEnbl	1.00 (1 indicates enabled)		
					KeDFIR_e_OBD_ControllerType is an OBD Controller	OBD Controller		
					Controller shutdown impending	= False		
					Power Mode	= Not Run/Crank		
					U0131	Not Active on Current Key Cycle		
					Power Steering Control Module	is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Body Control Module	U0140	This DTC monitors for a loss of communication with the Body Control Module.	Message is not received from controller for Message $0F1 Message $12A Message $1F1 Message $1F3 Message $4E1 Message $4E9	≥ 500.00 milliseconds ≥ 500.00 milliseconds ≥ 12,000.00 milliseconds ≥ 12,000.00 milliseconds ≥ 12,000.00 milliseconds ≥ 12,000.00 milliseconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A The following criteria have been enabled for Transition from accessory mode to off is pending Battery Voltage Ignition Voltage Criteria: Power Mode Run/Crank Voltage Off Cycle Enable Criteria: KeCMGD_b_OffKeyCycleDiagEnbl KeDFIR_e_OBD_ControllerType is an OBD Controller Controller shutdown impending Power Mode U0140 Body Control Module	 Not Active on Current Key Cycle Enabled >= 5,000.00 milliseconds = False > 11.00 Volts = Run >= 11.00 Volts 1.00 (1 indicates enabled) OBD Controller = False = Not Run/Crank Not Active on Current Key Cycle is present on the bus	Diagnostic runs in 12.5 ms loop	"Emissions Neutral Diagnostics – Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Gateway A	U0146	This DTC monitors for a loss of communication with Gateway A	Message is not received from controller for Message $3CF	 ≥ 12,000.00 milliseconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A The following criteria have been enabled for Transition from accessory mode to off is pending Battery Voltage Ignition Voltage Criteria: Power Mode Run/Crank Voltage Off Cycle Enable Criteria: KeCMGD_b_OffKeyCycleDiagEnbl KeDFIR_e_OBD_ControllerType is an OBD Controller Controller shutdown impending Power Mode U0146 Gateway Module	 Not Active on Current Key Cycle Enabled >= 5,000.00 milliseconds = False > 11.00 Volts = Run >= 11.00 Volts 1.00 (1 indicates enabled) OBD Controller = False = Not Run/Crank Not Active on Current Key Cycle is present on the bus	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Initial Supporting table - 10 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 10 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = C123456R	C2 = C1289-10R	C3 = C234579-10	C4 = C234678-10R	C5 = C1356789	C6 = C456789-10R	C7 = OWC12
2	1st gear braking	applied	applied	released	released	applied	released	applied
3	1st gear free wheel	applied	applied	released	released	applied	released	released
4	2nd gear braking	applied	applied	applied	applied	released	released	applied
5	2nd gear free wheel	applied	applied	applied	applied	released	released	released
6	3rd gear	applied	released	applied	applied	applied	released	released
7	4th gear	applied	released	applied	applied	released	applied	released
8	5th gear	applied	released	applied	released	applied	applied	released
9	6th gear	applied	released	released	released	applied	applied	released
10	7th gear	released	released	applied	applied	applied	applied	released
11	8th gear	released	applied	released	applied	applied	applied	released
12	9th gear	released	applied	applied	released	applied	applied	released
13	10th gear	released	applied	applied	applied	released	applied	released
14	reverse gear	applied	applied	released	applied	released	released	released

Initial Supporting table - 9 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 9 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = CB123456	C2 = C6789	C3 = CB1R	C4 = CB29	C5 = CB38	C6 = C4	C7 = C57R
2	1st gear braking	applied	released	applied	released	released	released	released
3	1st gear free wheel	applied	released	released	released	released	released	released
4	2nd gear	applied	released	released	applied	released	released	released
5	3rd gear	applied	released	released	released	applied	released	released
6	4th gear	applied	released	released	released	released	applied	released
7	5th gear	applied	released	released	released	released	released	applied
8	6th gear	applied	applied	released	released	released	released	released
9	7th gear	released	applied	released	released	released	released	applied
10	8th gear	released	applied	released	released	applied	released	released
11	9th gear	released	applied	released	applied	released	released	released
12	reverse gear	released	released	applied	released	released	released	applied

Initial Supporting table - NumClchTieUp

Description: NumClchTieUp

Value Units: minimum # of clutches
X Unit: command gear or attained gear
Y Units: not applicable, no units, single row table f(gear)

NumClchTieUp - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5
1	5	5	4	4	4	4	4

NumClchTieUp - Part 2

y/x	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3
1	4	4	3	3	3	3	3

NumClchTieUp - Part 3

y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
1	3	3	3	3	3	3	3

NumClchTieUp - Part 4

y/x	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4
1	3	1	5	4	4	4	4

NumClchTieUp - Part 5

y/x	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	4	4	4	3	3	3	3

NumClchTieUp - Part 6

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6
1	3	3	3	3	3	3	1

NumClchTieUp - Part 7

y/x	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth
1	1	1	2	1	2	1	1

NumClchTieUp - Part 8

y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	

Initial Supporting table - NumClchTieUp

1	1	1	1	1	1	1	

Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

Value Units: Max Time for Last Seed Timeout (ms)
X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	200.000	200.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

Value Units: Fail threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	2	2	2	2	2	2	2	2

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	2	1	1	1	1	2	2	2

Initial Supporting table - P0606_PSW Sequence Sample f(Loop Time)

Description: Sample threshold for PSW per operating loop.

Value Units: Sample threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	2	2	2	2	3	3	3

Initial Supporting table - P2797 hydraulic pressure delay

Description: Time to delay the initial x of y counter due to hydraulic transients. Thresholds are a function of transmission fluid temperature. Horizontal axis is transmission fluid temperature (DegC) and table output is delay time (seconds).

Value Units: delay time seconds
X Unit: transmission fluid temperature DegC

y/x	-40	0	20	30	40	50	60
1	0.090	0.090	0.080	0.050	0.050	0.050	0.050

Initial Supporting table - P2797 predicted turbine speed error

Description: Predicted turbine speed vs actual turbine speed error. Thresholds are a function of engine speed and transmission fliud temperature. Diagnostic is considered failing above these values. Table vertical axis is engine speed (RPM), horizontal axis is transmission fluid temperature (DegC) and table output is predicted turbine speed error (RPM).

Value Units: turbine speed RPM error
X Unit: transmission fluid temperature DegC
Y Units: engine speed RPM

y/x	-40	0	10	20	40
0	300	300	300	300	300
500	300	300	300	300	300
1,100	300	300	300	300	300
1,500	300	300	300	300	300
2,500	300	300	300	300	300

Initial Supporting table - P2D2 Cltch Slip Sum

Description:

Value Units: rate of change of output rpm (dn) per 25 milliseconds
X Unit: % brake pedal position
Y Units: not applicable, no units, single row table f(brake pedal position)

y/x	0	15	20	30	35	50	75	88	100
1	-4	-4	-4	-4	-4	-4	-4	-4	-4

Initial Supporting table - P2D2 Decel Pressure - C1

Description: clutch 1 command pressure threshold below which clutch 1 is considered released, such that, clutch 1 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C1 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	446.5	446.5	99,999.0	294.6	446.5

P2D2 Decel Pressure - C1 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	446.5	446.5	446.5	99,999.0	99,999.0

P2D2 Decel Pressure - C1 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999.0	99,999.0	99,999.0	294.6	294.6

P2D2 Decel Pressure - C1 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	287.1	294.6	446.5	446.5	446.5

P2D2 Decel Pressure - C1 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	446.5	446.5	446.5	446.5	99,999.0

P2D2 Decel Pressure - C1 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	294.6	446.5	446.5	446.5	446.5

P2D2 Decel Pressure - C1 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999.0	99,999.0	294.6	294.6	287.1

P2D2 Decel Pressure - C1 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	294.6	446.5	446.5	446.5	446.5

P2D2 Decel Pressure - C1 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C1

1	446.5	446.5	99,999.0	99,999.0	99,999.0

P2D2 Decel Pressure - C1 - Part 10

y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999.0	99,999.0	99,999.0	99,999.0	99,999.0

P2D2 Decel Pressure - C1 - Part 11

y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999.0	446.5	287.1	273.6	294.6

P2D2 Decel Pressure - C1 - Part 12

y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C2

Description: clutch 2 command pressure threshold below which clutch 2 is considered released, such that, clutch 2 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C2 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	662	662	352	99,999	662

P2D2 Decel Pressure - C2 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	662	662	662	99,999	99,999

P2D2 Decel Pressure - C2 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	352	352	352	99,999	99,999

P2D2 Decel Pressure - C2 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	99,999	662	662	662

P2D2 Decel Pressure - C2 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	662	662	99,999	662	352

P2D2 Decel Pressure - C2 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	662	662	662	662

P2D2 Decel Pressure - C2 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C2 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	662	662	662	662

P2D2 Decel Pressure - C2 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C2

1	662	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C2 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	352	228	252
P2D2 Decel Pressure - C2 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	231	662	99,999	99,999	99,999
P2D2 Decel Pressure - C2 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C3

Description: clutch 3 command pressure threshold below which clutch 3 is considered released, such that, clutch 3 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C3 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	99,999	1,652	99,999	99,999

P2D2 Decel Pressure - C3 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	1,652	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	1,652	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	99,999	99,999	99,999	1,652

P2D2 Decel Pressure - C3 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	1,652	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,652	99,999	99,999	99,999	1,652

P2D2 Decel Pressure - C3 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C3

1	1,652	99,999	193	99,999	99,999

P2D2 Decel Pressure - C3 - Part 10

y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 11

y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	896	99,999	1,652	99,999	99,999

P2D2 Decel Pressure - C3 - Part 12

y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C4

Description: clutch 4 command pressure threshold below which clutch 4 is considered released, such that, clutch 4 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C4 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	2,706	2,706	2,706	1,994	2,706

P2D2 Decel Pressure - C4 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	2,706	2,706	99,999	368

P2D2 Decel Pressure - C4 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	2,706	99,999	99,999	1,994	99,999

P2D2 Decel Pressure - C4 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	1,994	1,994	99,999	2,706	2,706

P2D2 Decel Pressure - C4 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	99,999	99,999	2,706	2,706

P2D2 Decel Pressure - C4 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	1,994	2,706	99,999	2,706	2,706

P2D2 Decel Pressure - C4 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	368	1,994	99,999	1,994

P2D2 Decel Pressure - C4 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,994	99,999	2,706	2,706	99,999

P2D2 Decel Pressure - C4 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C4

1	99,999	99,999	99,999	368	368

P2D2 Decel Pressure - C4 - Part 10

y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	2,706

P2D2 Decel Pressure - C4 - Part 11

y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	1,994	99,999

P2D2 Decel Pressure - C4 - Part 12

y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C5

Description: clutch 5 command pressure threshold below which clutch 5 is considered released, such that, clutch 5 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C5 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	2,302	2,302	1,183	2,302	2,302

P2D2 Decel Pressure - C5 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	1,183	99,999	1,183	99,999	750

P2D2 Decel Pressure - C5 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	1,183	1,183	99,999	2,302	2,302

P2D2 Decel Pressure - C5 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	2,302	2,302	99,999	2,302

P2D2 Decel Pressure - C5 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	2,302	99,999	2,302	1,183

P2D2 Decel Pressure - C5 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	2,302	2,302	1,183	99,999	1,183

P2D2 Decel Pressure - C5 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	750	2,302	2,302	99,999

P2D2 Decel Pressure - C5 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	2,302	2,302	99,999	2,302	99,999

P2D2 Decel Pressure - C5 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C5

1	2,302	99,999	196	99,999	99,999

P2D2 Decel Pressure - C5 - Part 10

y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	750	750	99,999	1,183	99,999

P2D2 Decel Pressure - C5 - Part 11

y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	2,302

P2D2 Decel Pressure - C5 - Part 12

y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C6

Description: clutch 6 command pressure threshold below which clutch 6 is considered released, such that, clutch 6 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C6 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	666	666	666	248	666

P2D2 Decel Pressure - C6 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	666	666	99,999	99,999	248

P2D2 Decel Pressure - C6 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	666	666	666	248	248

P2D2 Decel Pressure - C6 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	142	99,999	666	666	99,999

P2D2 Decel Pressure - C6 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	666	99,999	666	666	666

P2D2 Decel Pressure - C6 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	248	666	666	666	99,999

P2D2 Decel Pressure - C6 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	248	248	248	142

P2D2 Decel Pressure - C6 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	666	666	99,999	666

P2D2 Decel Pressure - C6 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C6

1	99,999	666	99,999	142	142

P2D2 Decel Pressure - C6 - Part 10

y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	248	248	666	99,999	99,999

P2D2 Decel Pressure - C6 - Part 11

y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C6 - Part 12

y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C7

Description: clutch 7 command pressure threshold below which clutch 7 is considered released, such that, clutch 7 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C7 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C7

1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 10

y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 11

y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 12

y/x					
1					

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,400.0	1,000.0	500.0	10.0

Initial Supporting table - 10 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 10 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = C123456R	C2 = C1289-10R	C3 = C234579-10	C4 = C234678-10R	C5 = C1356789	C6 = C456789-10R	C7 = OWC12
2	1st gear braking	applied	applied	released	released	applied	released	applied
3	1st gear free wheel	applied	applied	released	released	applied	released	released
4	2nd gear braking	applied	applied	applied	applied	released	released	applied
5	2nd gear free wheel	applied	applied	applied	applied	released	released	released
6	3rd gear	applied	released	applied	applied	applied	released	released
7	4th gear	applied	released	applied	applied	released	applied	released
8	5th gear	applied	released	applied	released	applied	applied	released
9	6th gear	applied	released	released	released	applied	applied	released
10	7th gear	released	released	applied	applied	applied	applied	released
11	8th gear	released	applied	released	applied	applied	applied	released
12	9th gear	released	applied	applied	released	applied	applied	released
13	10th gear	released	applied	applied	applied	released	applied	released
14	reverse gear	applied	applied	released	applied	released	released	released

Initial Supporting table - 9 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 9 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = CB123456	C2 = C6789	C3 = CB1R	C4 = CB29	C5 = CB38	C6 = C4	C7 = C57R
2	1st gear braking	applied	released	applied	released	released	released	released
3	1st gear free wheel	applied	released	released	released	released	released	released
4	2nd gear	applied	released	released	applied	released	released	released
5	3rd gear	applied	released	released	released	applied	released	released
6	4th gear	applied	released	released	released	released	applied	released
7	5th gear	applied	released	released	released	released	released	applied
8	6th gear	applied	applied	released	released	released	released	released
9	7th gear	released	applied	released	released	released	released	applied
10	8th gear	released	applied	released	released	applied	released	released
11	9th gear	released	applied	released	applied	released	released	released
12	reverse gear	released	released	applied	released	released	released	applied

Initial Supporting table - C1 exhaust delay closed throttle down shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay closed throttle lift foot up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay garage shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C1 exhaust delay negative torque up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C1 exhaust delay open throttle power down shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay open throttle power on up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - C1 Torque-Based Pressure Clip

Description: Pressure clip values for C1 based on clutch torque. Clutch torque calculated from engine torque using torque lever ratios, which are hardware and shift specific.

Value Units: Clutch Pressure (kPa)
X Unit: C1 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	690	690	690	690	690

Initial Supporting table - C1_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C1 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C2 exhaust delay closed throttle down shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C2 exhaust delay garage shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C2 exhaust delay negative torque up shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C2 exhaust delay open throttle power down shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C2 exhaust delay open throttle power on up shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - C2 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C2 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	300	400	500	500	500

Initial Supporting table - C2_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C2 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C3 exhaust delay closed throttle down shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay closed throttle lift foot up shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay garage shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C3 exhaust delay negative torque up shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C3 exhaust delay open throttle power down shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay open throttle power on up shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	3.000	0.750	0.750	0.750	0.750

Initial Supporting table - C3 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C3 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	300	400	500	575	800

Initial Supporting table - C3_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C3 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C4 exhaust delay closed throttle down shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay closed throttle lift foot up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay garage shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C4 exhaust delay negative torque up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C4 exhaust delay open throttle power down shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay open throttle power on up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - C4 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C4 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	400	650	750	800	900

Initial Supporting table - C4_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C4 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C5 exhaust delay closed throttle down shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay closed throttle lift foot up shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay garage shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C5 exhaust delay negative torque up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C5 exhaust delay open throttle power down shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay open throttle power on up shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - C5 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C5 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	300	600	700	750	900

Initial Supporting table - C5_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C5 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C6 exhaust delay closed throttle lift foot up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C6 exhaust delay garage shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C6 exhaust delay negative torque up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C6 exhaust delay open throttle power down shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C6 exhaust delay open throttle power on up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - C6 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C6 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	350	650	750	800	950

Initial Supporting table - C6_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C6 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Clip Press CD Shifts

Description: Oncoming clutch clip pressure for closed throttle down shifts

Value Units: kPa
X Unit: Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	250	400	400	400	400	400

Initial Supporting table - Clutch Clip Press GS Shifts

Description: Oncoming clutch clip pressure for garage shifts

Value Units: kPa
X Unit: Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	450	750	850	400	400	400

Initial Supporting table - Clutch Clip Press NU Shifts

Description: Oncoming clutch clip pressure for negative torque up shifts

Value Units: kPa
X Unit: Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	450	450	450	600	450	450

Initial Supporting table - Clutch Clip Press PD Shifts

Description: Oncoming clutch clip pressure for open throttle power down shifts

Value Units: kPa
X Unit: Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	450	500	600	750	750	500

Initial Supporting table - Clutch Stuck On Fail Offset Time CD Shifts

Description: Used for closed throttle down shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time GS Shifts

Description: Used for garage shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time PD Shifts

Description: Used for open throttle power down shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time PU Shifts

Description: Used for powered up shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	1	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time STGR Shifts

Description: Used for clutch staging shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Shift Type Enable

Description: Calibration to enable the clutch stuck on test for each shift type

X Unit: Shift Type
Y Units: Boolean

y/x	CeTSER_e_STGR	CeTSER_e_GSCR	CeTSER_e_NUCR	CeTSER_e_PUCR	CeTSER_e_CDCR	CeTSER_e_PDCR	CeTSER_e_CLAR
1	0	1	1	1	1	1	0

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	1.525	1.500	0.981	0.938	0.800

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	1.525	1.500	0.981	0.938	0.800

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description: intermediate speed sensor 1 or 2 predicted direction

Value Units: predicted direction: forward, reverse, unknown
X Unit: attained gear
Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1

y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 3

y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 4

y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSR_e_CR_Eighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

Initial Supporting table - NumClchTieUp

Description: NumClchTieUp

Value Units: minimum # of clutches
X Unit: command gear or attained gear
Y Units: not applicable, no units, single row table f(gear)

NumClchTieUp - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5
1	5	5	4	4	4	4	4

NumClchTieUp - Part 2

y/x	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3
1	4	4	3	3	3	3	3

NumClchTieUp - Part 3

y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
1	3	3	3	3	3	3	3

NumClchTieUp - Part 4

y/x	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4
1	3	1	5	4	4	4	4

NumClchTieUp - Part 5

y/x	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	4	4	4	3	3	3	3

NumClchTieUp - Part 6

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6
1	3	3	3	3	3	3	1

NumClchTieUp - Part 7

y/x	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth
1	1	1	2	1	2	1	1

NumClchTieUp - Part 8

y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	

Initial Supporting table - NumClchTieUp

1	1	1	1	1	1	1	

Initial Supporting table - P0606 Program Sequence Watch Enable f(CPU#, loop time or event)

Description: P0606 program sequence watch enable calibration

Value Units: Boolean
X Unit: column 1 calibration definition, column 2 calibration value
Y Units: rows of: calibration / calibration value

y/x	1	2
1	ProgSeqWatchEnbl[CeTSKR_e_CPU][CePISR_e_100msSeq]	0
2	ProgSeqWatchEnbl[CeTSKR_e_CPU][CePISR_e_10msSeq]	0
3	ProgSeqWatchEnbl[CeTSKR_e_CPU][CePISR_e_12p5msSeq]	1
4	ProgSeqWatchEnbl[CeTSKR_e_CPU][CePISR_e_20msSeq]	0
5	ProgSeqWatchEnbl[CeTSKR_e_CPU][CePISR_e_250msSeq]	0
6	ProgSeqWatchEnbl[CeTSKR_e_CPU][CePISR_e_25msSeq]	1
7	ProgSeqWatchEnbl[CeTSKR_e_CPU][CePISR_e_2p5msSeq]	0
8	ProgSeqWatchEnbl[CeTSKR_e_CPU][CePISR_e_3p125msSeq]	0
9	ProgSeqWatchEnbl[CeTSKR_e_CPU][CePISR_e_40msSeq]	0
10	ProgSeqWatchEnbl[CeTSKR_e_CPU][CePISR_e_50msSeq]	1
11	ProgSeqWatchEnbl[CeTSKR_e_CPU][CePISR_e_5msSeq]	0
12	ProgSeqWatchEnbl[CeTSKR_e_CPU][CePISR_e_6p25msSeq]	1
13	ProgSeqWatchEnbl[CeTSKR_e_CPU][CePISR_e_80msSeq]	0
14	ProgSeqWatchEnbl[CeTSKR_e_CPU][CePISR_e_EventA_Seq]	0
15	ProgSeqWatchEnbl[CeTSKR_e_CPU][CePISR_e_EventB_Seq]	0
16	ProgSeqWatchEnbl[CeTSKR_e_CPU][CePISR_e_EventC_Seq]	0
17	ProgSeqWatchEnbl[CeTSKR_e_CPU2][CePISR_e_100msSeq]	0
18	ProgSeqWatchEnbl[CeTSKR_e_CPU2][CePISR_e_10msSeq]	0
19	ProgSeqWatchEnbl[CeTSKR_e_CPU2][CePISR_e_12p5msSeq]	1
20	ProgSeqWatchEnbl[CeTSKR_e_CPU2][CePISR_e_20msSeq]	0
21	ProgSeqWatchEnbl[CeTSKR_e_CPU2][CePISR_e_250msSeq]	0
22	ProgSeqWatchEnbl[CeTSKR_e_CPU2][CePISR_e_25msSeq]	1
23	ProgSeqWatchEnbl[CeTSKR_e_CPU2][CePISR_e_2p5msSeq]	0
24	ProgSeqWatchEnbl[CeTSKR_e_CPU2]	0

Initial Supporting table - P0606 Program Sequence Watch Enable f(CPU#, loop time or event)

	[CePISR_e_3p125msSeq]	
25	ProgSeqWatchEnbl[CeTSKR_e_CPU2][CePISR_e_40msSeq]	0
26	ProgSeqWatchEnbl[CeTSKR_e_CPU2][CePISR_e_50msSeq]	1
27	ProgSeqWatchEnbl[CeTSKR_e_CPU2][CePISR_e_5msSeq]	0
28	ProgSeqWatchEnbl[CeTSKR_e_CPU2] [CePISR_e_6p25msSeq]	1
29	ProgSeqWatchEnbl[CeTSKR_e_CPU2][CePISR_e_80msSeq]	0
30	ProgSeqWatchEnbl[CeTSKR_e_CPU2] [CePISR_e_EventA_Seq]	0
31	ProgSeqWatchEnbl[CeTSKR_e_CPU2] [CePISR_e_EventB_Seq]	0
32	ProgSeqWatchEnbl[CeTSKR_e_CPU2] [CePISR_e_EventC_Seq]	0
33	ProgSeqWatchEnbl[CeTSKR_e_CPU3] [CePISR_e_100msSeq]	0
34	ProgSeqWatchEnbl[CeTSKR_e_CPU3][CePISR_e_10msSeq]	0
35	ProgSeqWatchEnbl[CeTSKR_e_CPU3] [CePISR_e_12p5msSeq]	0
36	ProgSeqWatchEnbl[CeTSKR_e_CPU3][CePISR_e_20msSeq]	0
37	ProgSeqWatchEnbl[CeTSKR_e_CPU3] [CePISR_e_250msSeq]	0
38	ProgSeqWatchEnbl[CeTSKR_e_CPU3][CePISR_e_25msSeq]	0
39	ProgSeqWatchEnbl[CeTSKR_e_CPU3] [CePISR_e_2p5msSeq]	0
40	ProgSeqWatchEnbl[CeTSKR_e_CPU3] [CePISR_e_3p125msSeq]	0
41	ProgSeqWatchEnbl[CeTSKR_e_CPU3][CePISR_e_40msSeq]	0
42	ProgSeqWatchEnbl[CeTSKR_e_CPU3][CePISR_e_50msSeq]	0
43	ProgSeqWatchEnbl[CeTSKR_e_CPU3][CePISR_e_5msSeq]	0
44	ProgSeqWatchEnbl[CeTSKR_e_CPU3] [CePISR_e_6p25msSeq]	0
45	ProgSeqWatchEnbl[CeTSKR_e_CPU3][CePISR_e_80msSeq]	0
46	ProgSeqWatchEnbl[CeTSKR_e_CPU3] [CePISR_e_EventA_Seq]	0
47	ProgSeqWatchEnbl[CeTSKR_e_CPU3] [CePISR_e_EventB_Seq]	0
48	ProgSeqWatchEnbl[CeTSKR_e_CPU3] [CePISR_e_EventC_Seq]	0
49	ProgSeqWatchEnbl[CeTSKR_e_CPU4] [CePISR_e_100msSeq]	0
50	ProgSeqWatchEnbl[CeTSKR_e_CPU4][CePISR_e_10msSeq]	0

Initial Supporting table - P0606 Program Sequence Watch Enable f(CPU#, loop time or event)

51	ProgSeqWatchEnbl[CeTSKR_e_CPU4][CePISR_e_12p5msSeq]	0
52	ProgSeqWatchEnbl[CeTSKR_e_CPU4][CePISR_e_20msSeq]	0
53	ProgSeqWatchEnbl[CeTSKR_e_CPU4][CePISR_e_250msSeq]	0
54	ProgSeqWatchEnbl[CeTSKR_e_CPU4][CePISR_e_25msSeq]	0
55	ProgSeqWatchEnbl[CeTSKR_e_CPU4][CePISR_e_2p5msSeq]	0
56	ProgSeqWatchEnbl[CeTSKR_e_CPU4][CePISR_e_3p125msSeq]	0
57	ProgSeqWatchEnbl[CeTSKR_e_CPU4][CePISR_e_40msSeq]	0
58	ProgSeqWatchEnbl[CeTSKR_e_CPU4][CePISR_e_50msSeq]	0
59	ProgSeqWatchEnbl[CeTSKR_e_CPU4][CePISR_e_5msSeq]	0
60	ProgSeqWatchEnbl[CeTSKR_e_CPU4][CePISR_e_6p25msSeq]	0
61	ProgSeqWatchEnbl[CeTSKR_e_CPU4][CePISR_e_80msSeq]	0
62	ProgSeqWatchEnbl[CeTSKR_e_CPU4][CePISR_e_EventA_Seq]	0
63	ProgSeqWatchEnbl[CeTSKR_e_CPU4][CePISR_e_EventB_Seq]	0
64	ProgSeqWatchEnbl[CeTSKR_e_CPU4][CePISR_e_EventC_Seq]	0

Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

Value Units: Max Time for Last Seed Timeout (ms)
X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	200.000	200.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

Value Units: Fail threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	2	2	2	2	2	2	2	2

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	2	1	1	1	1	2	2	2

Initial Supporting table - P0606_PSW Sequence Sample f(Loop Time)

Description: Sample threshold for PSW per operating loop.

Value Units: Sample threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	2	2	2	2	3	3	3

Initial Supporting table - P0722 OSS Direction Change Delay

Description:

Value Units: seconds
X Unit: DegC

y/x	-40	-20	20
1	5	3	1

Initial Supporting table - P0723 transmission engaged state time threshold

Description: time necessary after transmission engaged state indicates transmsision engaged to allow P0723 enable

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.000	-20.000	20.000
1	5.000	3.000	1.000

Initial Supporting table - P0741 GR10 torque converter K factor fail limit

Description:

Value Units: transmission torque converter K factor
X Unit: transmission torque converter speed ratio = transmission turbine shaft speed / engine speed

y/x	0.000	0.100	0.200	0.300	0.500	0.700	0.800	0.945	0.950
1	400.0	350.0	250.0	250.0	250.0	250.0	500.0	700.0	16,383.8

Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P176C Enable Boolean

Description:

Value Units: Boolean

y/x	0	1
1	1	1

Initial Supporting table - P176C Fail Count Threshold

Description:

Value Units: Count

y/x	0	1
1	40	40

Initial Supporting table - P176C Fail Timer

Description:

Value Units: seconds
X Unit: intermediate speed sensor index

y/x	0	1
1	0	0

Initial Supporting table - P176D Boolean Enable

Description:

Value Units: Boolean
X Unit: Speed Sensor Index

y/x	0	1
1	1	1

Initial Supporting table - P176D Fail Count Threshold

Description:

Value Units: Count
X Unit: Speed Sensor Index

y/x	0	1
1	40	40

Initial Supporting table - P176D Fail Time Threshold

Description:

Value Units: seconds
X Unit: Speed Sensor Index

y/x	0	1
1	0	0

Initial Supporting table - P176D Voltage Fail Threshold

Description:

Value Units: Volts
X Unit: Speed Sensor Index

y/x	0	1
1	5	5

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	350	225

Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P17D6 holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

Description: P17D6 intermediate speed sensor fail RPM speed threshold

Value Units: RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

Description: P17D6 intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P187D P18E7 Park to Out Of Park Transition Delay

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1	4.00	2.00	1.00	0.80	0.80

Initial Supporting table - P187E P18E8 Out Of Park to Park Min Line Transition Delay

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	4.80	2.40	1.20	1.20	1.20

Initial Supporting table - P187E P18E8 Out Of Park to Park Transition Delay

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	2.40	1.20	0.60	0.60	0.60

Initial Supporting table - P18A1 P18AA P27EC Mode Valve High To Low Transition Delay

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	1.60	0.80	0.25	0.13	0.08

Initial Supporting table - P18AA Mode Valve High To Low Min Line Transition Delay

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	4.70	2.00	0.80	0.43	0.26

Initial Supporting table - P18AB P27EC Mode Valve Low to High Transition Delay

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	1.20	0.60	0.20	0.10	0.08

Initial Supporting table - P18AE Enable Valve Test Delay

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	0.50	0.30	0.16	0.08	0.08

Initial Supporting table - P2797 hydraulic pressure delay

Description: Time to delay the initial x of y counter due to hydraulic transients. Thresholds are a function of transmission fluid temperature. Horizontal axis is transmission fluid temperature (DegC) and table output is delay time (seconds).

Value Units: delay time seconds
X Unit: transmission fluid temperature DegC

y/x	-40	0	20	30	40	50	60
1	0.090	0.090	0.080	0.050	0.050	0.050	0.050

Initial Supporting table - P2797 predicted turbine speed error

Description: Predicted turbine speed vs actual turbine speed error. Thresholds are a function of engine speed and transmission fliud temperature. Diagnostic is considered failing above these values. Table vertical axis is engine speed (RPM), horizontal axis is transmission fluid temperature (DegC) and table output is predicted turbine speed error (RPM).

Value Units: turbine speed RPM error
X Unit: transmission fluid temperature DegC
Y Units: engine speed RPM

y/x	-40	0	10	20	40
0	300	300	300	300	300
500	300	300	300	300	300
1,100	300	300	300	300	300
1,500	300	300	300	300	300
2,500	300	300	300	300	300

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM
X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Initial Supporting table - P2818 TCC stuck on fail time garage shift - GR10

Description: GR10 P2818 TCC stuck on fail time garage shift

Value Units: seconds
X Unit: rate of change of engine speed, RPM/second
Y Units: unitless

y/x	50	100	150	250	300
1	0.250	0.200	0.125	0.100	0.100

Initial Supporting table - P2818 TCC stuck on fail time stall pending - GR10

Description: GR10 P2818 TCC stuck on fail time stall pending

Value Units: seconds
X Unit: rate of change of engine speed, RPM/second
Y Units: unitless

y/x	50	100	150	250	300
1	0.750	0.300	0.300	0.200	0.100

Initial Supporting table - P2820 GR10 hydraulic default at launch test window

Description:

Value Units: RPM/sec
X Unit: °C

y/x	-10	5	15	30	110
1	0	0	1	1	1

Initial Supporting table - P2820 GR10 hydraulic default input speed deceleration threshold

Description: Negative acceleration needed to increment fail timer for GR10 default disable solenoid stuck off at launch diagnostic

Value Units: RPM/sec
X Unit: °C

y/x	-10	5	15	30	110
1	-32,768	-32,768	-3,500	-2,000	-2,000

Initial Supporting table - P2D2 Cltch Slip Sum

Description:

Value Units: rate of change of output rpm (dn) per 25 milliseconds
X Unit: % brake pedal position
Y Units: not applicable, no units, single row table f(brake pedal position)

y/x	0	15	20	30	35	50	75	88	100
1	-4	-4	-4	-4	-4	-4	-4	-4	-4

Initial Supporting table - P2D2 Decel Pressure - C1

Description: clutch 1 command pressure threshold below which clutch 1 is considered released, such that, clutch 1 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C1 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	446.5	446.5	99,999.0	294.6	446.5

P2D2 Decel Pressure - C1 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	446.5	446.5	446.5	99,999.0	99,999.0

P2D2 Decel Pressure - C1 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999.0	99,999.0	99,999.0	294.6	294.6

P2D2 Decel Pressure - C1 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	287.1	294.6	446.5	446.5	446.5

P2D2 Decel Pressure - C1 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	446.5	446.5	446.5	446.5	99,999.0

P2D2 Decel Pressure - C1 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	294.6	446.5	446.5	446.5	446.5

P2D2 Decel Pressure - C1 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999.0	99,999.0	294.6	294.6	287.1

P2D2 Decel Pressure - C1 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	294.6	446.5	446.5	446.5	446.5

P2D2 Decel Pressure - C1 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C1

1	446.5	446.5	99,999.0	99,999.0	99,999.0

P2D2 Decel Pressure - C1 - Part 10

y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999.0	99,999.0	99,999.0	99,999.0	99,999.0

P2D2 Decel Pressure - C1 - Part 11

y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999.0	446.5	287.1	273.6	294.6

P2D2 Decel Pressure - C1 - Part 12

y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C2

Description: clutch 2 command pressure threshold below which clutch 2 is considered released, such that, clutch 2 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C2 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	662	662	352	99,999	662

P2D2 Decel Pressure - C2 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	662	662	662	99,999	99,999

P2D2 Decel Pressure - C2 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	352	352	352	99,999	99,999

P2D2 Decel Pressure - C2 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	99,999	662	662	662

P2D2 Decel Pressure - C2 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	662	662	99,999	662	352

P2D2 Decel Pressure - C2 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	662	662	662	662

P2D2 Decel Pressure - C2 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C2 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	662	662	662	662

P2D2 Decel Pressure - C2 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C2

1	662	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C2 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	352	228	252
P2D2 Decel Pressure - C2 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	231	662	99,999	99,999	99,999
P2D2 Decel Pressure - C2 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C3

Description: clutch 3 command pressure threshold below which clutch 3 is considered released, such that, clutch 3 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C3 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	99,999	1,652	99,999	99,999

P2D2 Decel Pressure - C3 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	1,652	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	1,652	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	99,999	99,999	99,999	1,652

P2D2 Decel Pressure - C3 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	1,652	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,652	99,999	99,999	99,999	1,652

P2D2 Decel Pressure - C3 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C3

1	1,652	99,999	193	99,999	99,999
P2D2 Decel Pressure - C3 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C3 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	896	99,999	1,652	99,999	99,999
P2D2 Decel Pressure - C3 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C4

Description: clutch 4 command pressure threshold below which clutch 4 is considered released, such that, clutch 4 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C4 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	2,706	2,706	2,706	1,994	2,706

P2D2 Decel Pressure - C4 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	2,706	2,706	99,999	368

P2D2 Decel Pressure - C4 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	2,706	99,999	99,999	1,994	99,999

P2D2 Decel Pressure - C4 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	1,994	1,994	99,999	2,706	2,706

P2D2 Decel Pressure - C4 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	99,999	99,999	2,706	2,706

P2D2 Decel Pressure - C4 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	1,994	2,706	99,999	2,706	2,706

P2D2 Decel Pressure - C4 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	368	1,994	99,999	1,994

P2D2 Decel Pressure - C4 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,994	99,999	2,706	2,706	99,999

P2D2 Decel Pressure - C4 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C4

1	99,999	99,999	99,999	368	368

P2D2 Decel Pressure - C4 - Part 10

y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	2,706

P2D2 Decel Pressure - C4 - Part 11

y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	1,994	99,999

P2D2 Decel Pressure - C4 - Part 12

y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C5

Description: clutch 5 command pressure threshold below which clutch 5 is considered released, such that, clutch 5 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C5 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	2,302	2,302	1,183	2,302	2,302

P2D2 Decel Pressure - C5 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	1,183	99,999	1,183	99,999	750

P2D2 Decel Pressure - C5 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	1,183	1,183	99,999	2,302	2,302

P2D2 Decel Pressure - C5 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	2,302	2,302	99,999	2,302

P2D2 Decel Pressure - C5 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	2,302	99,999	2,302	1,183

P2D2 Decel Pressure - C5 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	2,302	2,302	1,183	99,999	1,183

P2D2 Decel Pressure - C5 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	750	2,302	2,302	99,999

P2D2 Decel Pressure - C5 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	2,302	2,302	99,999	2,302	99,999

P2D2 Decel Pressure - C5 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C5

1	2,302	99,999	196	99,999	99,999
P2D2 Decel Pressure - C5 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	750	750	99,999	1,183	99,999
P2D2 Decel Pressure - C5 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	2,302
P2D2 Decel Pressure - C5 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C6

Description: clutch 6 command pressure threshold below which clutch 6 is considered released, such that, clutch 6 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C6 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	666	666	666	248	666

P2D2 Decel Pressure - C6 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	666	666	99,999	99,999	248

P2D2 Decel Pressure - C6 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	666	666	666	248	248

P2D2 Decel Pressure - C6 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	142	99,999	666	666	99,999

P2D2 Decel Pressure - C6 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	666	99,999	666	666	666

P2D2 Decel Pressure - C6 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	248	666	666	666	99,999

P2D2 Decel Pressure - C6 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	248	248	248	142

P2D2 Decel Pressure - C6 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	666	666	99,999	666

P2D2 Decel Pressure - C6 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C6

1	99,999	666	99,999	142	142

P2D2 Decel Pressure - C6 - Part 10

y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	248	248	666	99,999	99,999

P2D2 Decel Pressure - C6 - Part 11

y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C6 - Part 12

y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C7

Description: clutch 7 command pressure threshold below which clutch 7 is considered released, such that, clutch 7 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C7 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C7

1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 10

y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 11

y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 12

y/x					
1					

Initial Supporting table - Park Inhibit Solenoid Override Line Pressure

Description:

Value Units: kPa
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	2,000.00	2,000.00	2,000.00	2,000.00	2,000.00

Initial Supporting table - Pump Out Available Transition Time

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	0.05	0.02	0.02	0.02	0.02

Initial Supporting table - speed sensor directional rationalit   enable calibration

Description: speed sensor directional rationality enable calibration

Value Units: Boolean
X Unit: direction commanded
□ **Units:** unitless

y/x	CeCGSR_FwdCmded	CeCGSR_NeutCmded	CeCGSR_RvrsCmded	CeCGSR_ParkCmded
1	1	1	1	1

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,400.0	1,000.0	500.0	10.0

Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	200.000	200.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	2	2	2	2	2	2	2	2

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	2	1	1	1	1	2	2	2

Initial Supporting table - P0606_PSW Sequence Sample f(Loop Time)

Description: Sample threshold for PSW per operating loop.

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	2	2	2	2	3	3	3

Initial Supporting table - 10 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 10 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = C123456R	C2 = C1289-10R	C3 = C234579-10	C4 = C234678-10R	C5 = C1356789	C6 = C456789-10R	C7 = OWC12
2	1st gear braking	applied	applied	released	released	applied	released	applied
3	1st gear free wheel	applied	applied	released	released	applied	released	released
4	2nd gear braking	applied	applied	applied	applied	released	released	applied
5	2nd gear free wheel	applied	applied	applied	applied	released	released	released
6	3rd gear	applied	released	applied	applied	applied	released	released
7	4th gear	applied	released	applied	applied	released	applied	released
8	5th gear	applied	released	applied	released	applied	applied	released
9	6th gear	applied	released	released	released	applied	applied	released
10	7th gear	released	released	applied	applied	applied	applied	released
11	8th gear	released	applied	released	applied	applied	applied	released
12	9th gear	released	applied	applied	released	applied	applied	released
13	10th gear	released	applied	applied	applied	released	applied	released
14	reverse gear	applied	applied	released	applied	released	released	released

Initial Supporting table - 9 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 9 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = CB123456	C2 = C6789	C3 = CB1R	C4 = CB29	C5 = CB38	C6 = C4	C7 = C57R
2	1st gear braking	applied	released	applied	released	released	released	released
3	1st gear free wheel	applied	released	released	released	released	released	released
4	2nd gear	applied	released	released	applied	released	released	released
5	3rd gear	applied	released	released	released	applied	released	released
6	4th gear	applied	released	released	released	released	applied	released
7	5th gear	applied	released	released	released	released	released	applied
8	6th gear	applied	applied	released	released	released	released	released
9	7th gear	released	applied	released	released	released	released	applied
10	8th gear	released	applied	released	released	applied	released	released
11	9th gear	released	applied	released	applied	released	released	released
12	reverse gear	released	released	applied	released	released	released	applied

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	1.525	1.500	0.981	0.938	0.800

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	1.525	1.500	0.981	0.938	0.800

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description: intermediate speed sensor 1 or 2 predicted direction

Value Units: predicted direction: forward, reverse, unknown
X Unit: attained gear
Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1

y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 3

y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 4

y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSR_e_CR_Eighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

Initial Supporting table - NumClchTieUp

Description: NumClchTieUp

Value Units: minimum # of clutches
X Unit: command gear or attained gear
Y Units: not applicable, no units, single row table f(gear)

NumClchTieUp - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5
1	5	5	4	4	4	4	4

NumClchTieUp - Part 2

y/x	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3
1	4	4	3	3	3	3	3

NumClchTieUp - Part 3

y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
1	3	3	3	3	3	3	3

NumClchTieUp - Part 4

y/x	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4
1	3	1	5	4	4	4	4

NumClchTieUp - Part 5

y/x	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	4	4	4	3	3	3	3

NumClchTieUp - Part 6

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6
1	3	3	3	3	3	3	1

NumClchTieUp - Part 7

y/x	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth
1	1	1	2	1	2	1	1

NumClchTieUp - Part 8

y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	

Initial Supporting table - NumClchTieUp

1	1	1	1	1	1	1	

Initial Supporting table - P0722 OSS Direction Change Delay

Description:

Value Units: seconds
X Unit: DegC

y/x	-40	-20	20
1	5	3	1

Initial Supporting table - P0723 transmission engaged state time threshold

Description: time necessary after transmission engaged state indicates transmsision engaged to allow P0723 enable

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.000	-20.000	20.000
1	5.000	3.000	1.000

Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P176C Enable Boolean

Description:

Value Units: Boolean

y/x	0	1
1	1	1

Initial Supporting table - P176C Fail Count Threshold

Description:

Value Units: Count

y/x	0	1
1	40	40

Initial Supporting table - P176C Fail Timer

Description:

Value Units: seconds
X Unit: intermediate speed sensor index

y/x	0	1
1	0	0

Initial Supporting table - P176D Boolean Enable

Description:

Value Units: Boolean
X Unit: Speed Sensor Index

y/x	0	1
1	1	1

Initial Supporting table - P176D Fail Count Threshold

Description:

Value Units: Count
X Unit: Speed Sensor Index

y/x	0	1
1	40	40

Initial Supporting table - P176D Fail Time Threshold

Description:

Value Units: seconds
X Unit: Speed Sensor Index

y/x	0	1
1	0	0

Initial Supporting table - P176D Voltage Fail Threshold

Description:

Value Units: Volts
X Unit: Speed Sensor Index

y/x	0	1
1	5	5

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	350	225

Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P17D6 holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

Description: P17D6 intermediate speed sensor fail RPM speed threshold

Value Units: RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

Description: P17D6 intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P2797 hydraulic pressure delay

Description: Time to delay the initial x of y counter due to hydraulic transients. Thresholds are a function of transmission fluid temperature. Horizontal axis is transmission fluid temperature (DegC) and table output is delay time (seconds).

Value Units: delay time seconds
X Unit: transmission fluid temperature DegC

y/x	-40	0	20	30	40	50	60
1	0.090	0.090	0.080	0.050	0.050	0.050	0.050

Initial Supporting table - P2797 predicted turbine speed error

Description: Predicted turbine speed vs actual turbine speed error. Thresholds are a function of engine speed and transmission fliud temperature. Diagnostic is considered failing above these values. Table vertical axis is engine speed (RPM), horizontal axis is transmission fluid temperature (DegC) and table output is predicted turbine speed error (RPM).

Value Units: turbine speed RPM error
X Unit: transmission fluid temperature DegC
Y Units: engine speed RPM

y/x	-40	0	10	20	40
0	300	300	300	300	300
500	300	300	300	300	300
1,100	300	300	300	300	300
1,500	300	300	300	300	300
2,500	300	300	300	300	300

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM
X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Initial Supporting table - P2D2 Cltch Slip Sum

Description:

Value Units: rate of change of output rpm (dn) per 25 milliseconds
X Unit: % brake pedal position
Y Units: not applicable, no units, single row table f(brake pedal position)

y/x	0	15	20	30	35	50	75	88	100
1	-4	-4	-4	-4	-4	-4	-4	-4	-4

Initial Supporting table - P2D2 Decel Pressure - C1

Description: clutch 1 command pressure threshold below which clutch 1 is considered released, such that, clutch 1 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C1 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	446.5	446.5	99,999.0	294.6	446.5

P2D2 Decel Pressure - C1 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	446.5	446.5	446.5	99,999.0	99,999.0

P2D2 Decel Pressure - C1 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999.0	99,999.0	99,999.0	294.6	294.6

P2D2 Decel Pressure - C1 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	287.1	294.6	446.5	446.5	446.5

P2D2 Decel Pressure - C1 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	446.5	446.5	446.5	446.5	99,999.0

P2D2 Decel Pressure - C1 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	294.6	446.5	446.5	446.5	446.5

P2D2 Decel Pressure - C1 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999.0	99,999.0	294.6	294.6	287.1

P2D2 Decel Pressure - C1 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	294.6	446.5	446.5	446.5	446.5

P2D2 Decel Pressure - C1 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C1

1	446.5	446.5	99,999.0	99,999.0	99,999.0

P2D2 Decel Pressure - C1 - Part 10

y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999.0	99,999.0	99,999.0	99,999.0	99,999.0

P2D2 Decel Pressure - C1 - Part 11

y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999.0	446.5	287.1	273.6	294.6

P2D2 Decel Pressure - C1 - Part 12

y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C2

Description: clutch 2 command pressure threshold below which clutch 2 is considered released, such that, clutch 2 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C2 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	662	662	352	99,999	662

P2D2 Decel Pressure - C2 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	662	662	662	99,999	99,999

P2D2 Decel Pressure - C2 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	352	352	352	99,999	99,999

P2D2 Decel Pressure - C2 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	99,999	662	662	662

P2D2 Decel Pressure - C2 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	662	662	99,999	662	352

P2D2 Decel Pressure - C2 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	662	662	662	662

P2D2 Decel Pressure - C2 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C2 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	662	662	662	662

P2D2 Decel Pressure - C2 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C2

1	662	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C2 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	352	228	252
P2D2 Decel Pressure - C2 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	231	662	99,999	99,999	99,999
P2D2 Decel Pressure - C2 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C3

Description: clutch 3 command pressure threshold below which clutch 3 is considered released, such that, clutch 3 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C3 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	99,999	1,652	99,999	99,999

P2D2 Decel Pressure - C3 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	1,652	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	1,652	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	99,999	99,999	99,999	1,652

P2D2 Decel Pressure - C3 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	1,652	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,652	99,999	99,999	99,999	1,652

P2D2 Decel Pressure - C3 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C3

1	1,652	99,999	193	99,999	99,999

P2D2 Decel Pressure - C3 - Part 10

y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 11

y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	896	99,999	1,652	99,999	99,999

P2D2 Decel Pressure - C3 - Part 12

y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C4

Description: clutch 4 command pressure threshold below which clutch 4 is considered released, such that, clutch 4 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C4 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	2,706	2,706	2,706	1,994	2,706

P2D2 Decel Pressure - C4 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	2,706	2,706	99,999	368

P2D2 Decel Pressure - C4 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	2,706	99,999	99,999	1,994	99,999

P2D2 Decel Pressure - C4 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	1,994	1,994	99,999	2,706	2,706

P2D2 Decel Pressure - C4 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	99,999	99,999	2,706	2,706

P2D2 Decel Pressure - C4 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	1,994	2,706	99,999	2,706	2,706

P2D2 Decel Pressure - C4 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	368	1,994	99,999	1,994

P2D2 Decel Pressure - C4 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,994	99,999	2,706	2,706	99,999

P2D2 Decel Pressure - C4 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C4

1	99,999	99,999	99,999	368	368

P2D2 Decel Pressure - C4 - Part 10

y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	2,706

P2D2 Decel Pressure - C4 - Part 11

y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	1,994	99,999

P2D2 Decel Pressure - C4 - Part 12

y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C5

Description: clutch 5 command pressure threshold below which clutch 5 is considered released, such that, clutch 5 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C5 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	2,302	2,302	1,183	2,302	2,302

P2D2 Decel Pressure - C5 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	1,183	99,999	1,183	99,999	750

P2D2 Decel Pressure - C5 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	1,183	1,183	99,999	2,302	2,302

P2D2 Decel Pressure - C5 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	2,302	2,302	99,999	2,302

P2D2 Decel Pressure - C5 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	2,302	99,999	2,302	1,183

P2D2 Decel Pressure - C5 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	2,302	2,302	1,183	99,999	1,183

P2D2 Decel Pressure - C5 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	750	2,302	2,302	99,999

P2D2 Decel Pressure - C5 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	2,302	2,302	99,999	2,302	99,999

P2D2 Decel Pressure - C5 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C5

1	2,302	99,999	196	99,999	99,999
P2D2 Decel Pressure - C5 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	750	750	99,999	1,183	99,999
P2D2 Decel Pressure - C5 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	2,302
P2D2 Decel Pressure - C5 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C6

Description: clutch 6 command pressure threshold below which clutch 6 is considered released, such that, clutch 6 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C6 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	666	666	666	248	666

P2D2 Decel Pressure - C6 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	666	666	99,999	99,999	248

P2D2 Decel Pressure - C6 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	666	666	666	248	248

P2D2 Decel Pressure - C6 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	142	99,999	666	666	99,999

P2D2 Decel Pressure - C6 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	666	99,999	666	666	666

P2D2 Decel Pressure - C6 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	248	666	666	666	99,999

P2D2 Decel Pressure - C6 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	248	248	248	142

P2D2 Decel Pressure - C6 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	666	666	99,999	666

P2D2 Decel Pressure - C6 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C6

1	99,999	666	99,999	142	142
P2D2 Decel Pressure - C6 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	248	248	666	99,999	99,999
P2D2 Decel Pressure - C6 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C6 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C7

Description: clutch 7 command pressure threshold below which clutch 7 is considered released, such that, clutch 7 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C7 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C7

1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 10

y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 11

y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 12

y/x					
1					

Initial Supporting table - speed sensor directional rationality enable calibration

Description: speed sensor directional rationality enable calibration

Value Units: Boolean
X Unit: direction commanded
Y Units: unitless

y/x	CeCGSR_FwdCmded	CeCGSR_NeutCmded	CeCGSR_RvrsCmded	CeCGSR_ParkCmded
1	1	1	1	1

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,400.0	1,000.0	500.0	10.0

Initial Supporting table - 10 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 10 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = C123456R	C2 = C1289-10R	C3 = C234579-10	C4 = C234678-10R	C5 = C1356789	C6 = C456789-10R	C7 = OWC12
2	1st gear braking	applied	applied	released	released	applied	released	applied
3	1st gear free wheel	applied	applied	released	released	applied	released	released
4	2nd gear braking	applied	applied	applied	applied	released	released	applied
5	2nd gear free wheel	applied	applied	applied	applied	released	released	released
6	3rd gear	applied	released	applied	applied	applied	released	released
7	4th gear	applied	released	applied	applied	released	applied	released
8	5th gear	applied	released	applied	released	applied	applied	released
9	6th gear	applied	released	released	released	applied	applied	released
10	7th gear	released	released	applied	applied	applied	applied	released
11	8th gear	released	applied	released	applied	applied	applied	released
12	9th gear	released	applied	applied	released	applied	applied	released
13	10th gear	released	applied	applied	applied	released	applied	released
14	reverse gear	applied	applied	released	applied	released	released	released

Initial Supporting table - 9 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 9 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = CB123456	C2 = C6789	C3 = CB1R	C4 = CB29	C5 = CB38	C6 = C4	C7 = C57R
2	1st gear braking	applied	released	applied	released	released	released	released
3	1st gear free wheel	applied	released	released	released	released	released	released
4	2nd gear	applied	released	released	applied	released	released	released
5	3rd gear	applied	released	released	released	applied	released	released
6	4th gear	applied	released	released	released	released	applied	released
7	5th gear	applied	released	released	released	released	released	applied
8	6th gear	applied	applied	released	released	released	released	released
9	7th gear	released	applied	released	released	released	released	applied
10	8th gear	released	applied	released	released	applied	released	released
11	9th gear	released	applied	released	applied	released	released	released
12	reverse gear	released	released	applied	released	released	released	applied

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	1.525	1.500	0.981	0.938	0.800

Initial Supporting table - NumClchTieUp

Description: NumClchTieUp

Value Units: minimum # of clutches
X Unit: command gear or attained gear
Y Units: not applicable, no units, single row table f(gear)

NumClchTieUp - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5
1	5	5	4	4	4	4	4

NumClchTieUp - Part 2

y/x	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3
1	4	4	3	3	3	3	3

NumClchTieUp - Part 3

y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
1	3	3	3	3	3	3	3

NumClchTieUp - Part 4

y/x	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4
1	3	1	5	4	4	4	4

NumClchTieUp - Part 5

y/x	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	4	4	4	3	3	3	3

NumClchTieUp - Part 6

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6
1	3	3	3	3	3	3	1

NumClchTieUp - Part 7

y/x	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth
1	1	1	2	1	2	1	1

NumClchTieUp - Part 8

y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	

Initial Supporting table - NumClchTieUp

1	1	1	1	1	1	1	

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM
X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Initial Supporting table - P2D2 Cltch Slip Sum

Description:

Value Units: rate of change of output rpm (dn) per 25 milliseconds
X Unit: % brake pedal position
Y Units: not applicable, no units, single row table f(brake pedal position)

y/x	0	15	20	30	35	50	75	88	100
1	-4	-4	-4	-4	-4	-4	-4	-4	-4

Initial Supporting table - P2D2 Decel Pressure - C1

Description: clutch 1 command pressure threshold below which clutch 1 is considered released, such that, clutch 1 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C1 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	446.5	446.5	99,999.0	294.6	446.5

P2D2 Decel Pressure - C1 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	446.5	446.5	446.5	99,999.0	99,999.0

P2D2 Decel Pressure - C1 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999.0	99,999.0	99,999.0	294.6	294.6

P2D2 Decel Pressure - C1 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	287.1	294.6	446.5	446.5	446.5

P2D2 Decel Pressure - C1 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	446.5	446.5	446.5	446.5	99,999.0

P2D2 Decel Pressure - C1 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	294.6	446.5	446.5	446.5	446.5

P2D2 Decel Pressure - C1 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999.0	99,999.0	294.6	294.6	287.1

P2D2 Decel Pressure - C1 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	294.6	446.5	446.5	446.5	446.5

P2D2 Decel Pressure - C1 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C1

1	446.5	446.5	99,999.0	99,999.0	99,999.0

P2D2 Decel Pressure - C1 - Part 10

y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999.0	99,999.0	99,999.0	99,999.0	99,999.0

P2D2 Decel Pressure - C1 - Part 11

y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999.0	446.5	287.1	273.6	294.6

P2D2 Decel Pressure - C1 - Part 12

y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C2

Description: clutch 2 command pressure threshold below which clutch 2 is considered released, such that, clutch 2 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C2 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	662	662	352	99,999	662

P2D2 Decel Pressure - C2 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	662	662	662	99,999	99,999

P2D2 Decel Pressure - C2 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	352	352	352	99,999	99,999

P2D2 Decel Pressure - C2 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	99,999	662	662	662

P2D2 Decel Pressure - C2 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	662	662	99,999	662	352

P2D2 Decel Pressure - C2 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	662	662	662	662

P2D2 Decel Pressure - C2 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C2 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	662	662	662	662

P2D2 Decel Pressure - C2 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C2

1	662	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C2 - Part 10

y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	352	228	252

P2D2 Decel Pressure - C2 - Part 11

y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	231	662	99,999	99,999	99,999

P2D2 Decel Pressure - C2 - Part 12

y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C3

Description: clutch 3 command pressure threshold below which clutch 3 is considered released, such that, clutch 3 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C3 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	99,999	1,652	99,999	99,999

P2D2 Decel Pressure - C3 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	1,652	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	1,652	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	99,999	99,999	99,999	1,652

P2D2 Decel Pressure - C3 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	1,652	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,652	99,999	99,999	99,999	1,652

P2D2 Decel Pressure - C3 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C3

1	1,652	99,999	193	99,999	99,999

P2D2 Decel Pressure - C3 - Part 10

y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 11

y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	896	99,999	1,652	99,999	99,999

P2D2 Decel Pressure - C3 - Part 12

y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C4

Description: clutch 4 command pressure threshold below which clutch 4 is considered released, such that, clutch 4 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C4 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	2,706	2,706	2,706	1,994	2,706

P2D2 Decel Pressure - C4 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	2,706	2,706	99,999	368

P2D2 Decel Pressure - C4 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	2,706	99,999	99,999	1,994	99,999

P2D2 Decel Pressure - C4 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	1,994	1,994	99,999	2,706	2,706

P2D2 Decel Pressure - C4 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	99,999	99,999	2,706	2,706

P2D2 Decel Pressure - C4 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	1,994	2,706	99,999	2,706	2,706

P2D2 Decel Pressure - C4 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	368	1,994	99,999	1,994

P2D2 Decel Pressure - C4 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,994	99,999	2,706	2,706	99,999

P2D2 Decel Pressure - C4 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C4

1	99,999	99,999	99,999	368	368
P2D2 Decel Pressure - C4 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	2,706
P2D2 Decel Pressure - C4 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	1,994	99,999
P2D2 Decel Pressure - C4 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C5

Description: clutch 5 command pressure threshold below which clutch 5 is considered released, such that, clutch 5 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C5 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	2,302	2,302	1,183	2,302	2,302

P2D2 Decel Pressure - C5 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	1,183	99,999	1,183	99,999	750

P2D2 Decel Pressure - C5 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	1,183	1,183	99,999	2,302	2,302

P2D2 Decel Pressure - C5 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	2,302	2,302	99,999	2,302

P2D2 Decel Pressure - C5 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	2,302	99,999	2,302	1,183

P2D2 Decel Pressure - C5 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	2,302	2,302	1,183	99,999	1,183

P2D2 Decel Pressure - C5 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	750	2,302	2,302	99,999

P2D2 Decel Pressure - C5 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	2,302	2,302	99,999	2,302	99,999

P2D2 Decel Pressure - C5 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C5

1	2,302	99,999	196	99,999	99,999
P2D2 Decel Pressure - C5 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	750	750	99,999	1,183	99,999
P2D2 Decel Pressure - C5 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	2,302
P2D2 Decel Pressure - C5 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C6

Description: clutch 6 command pressure threshold below which clutch 6 is considered released, such that, clutch 6 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C6 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	666	666	666	248	666

P2D2 Decel Pressure - C6 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	666	666	99,999	99,999	248

P2D2 Decel Pressure - C6 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	666	666	666	248	248

P2D2 Decel Pressure - C6 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	142	99,999	666	666	99,999

P2D2 Decel Pressure - C6 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	666	99,999	666	666	666

P2D2 Decel Pressure - C6 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	248	666	666	666	99,999

P2D2 Decel Pressure - C6 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	248	248	248	142

P2D2 Decel Pressure - C6 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	666	666	99,999	666

P2D2 Decel Pressure - C6 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C6

1	99,999	666	99,999	142	142

P2D2 Decel Pressure - C6 - Part 10

y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	248	248	666	99,999	99,999

P2D2 Decel Pressure - C6 - Part 11

y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C6 - Part 12

y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C7

Description: clutch 7 command pressure threshold below which clutch 7 is considered released, such that, clutch 7 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C7 - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 2

y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 3

y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 4

y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 5

y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 6

y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 7

y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 8

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 9

y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C7

1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 12					
y/x					
1					

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,400.0	1,000.0	500.0	10.0

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
Group 1 - Wheel Speed Sensor							
WSS_OPEN_FRONT_LEFT	C0502	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris ASIC sets FL Open Sensor bit = TRUE when High side current < 3.5mA	Polaris ASIC Open Sensor Bit= True	• Wheel speed sensor supply is enabled	100 ms	Type A. MIL Illumination.
WSS_OPEN_FRONT_RIGHT	C0508	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris ASIC sets FR Open Sensor bit = TRUE when High side current < 3.5mA	Polaris ASIC Open Sensor Bit= True	• Wheel speed sensor supply is enabled	100 ms	Type A. MIL Illumination.
WSS_OPEN_REAR_LEFT	C050E	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris ASIC sets RL Open Sensor bit = TRUE when High side current < 3.5mA	Polaris ASIC Open Sensor Bit= True	• Wheel speed sensor supply is enabled	100 ms	Type A. MIL Illumination.
WSS_OPEN_REAR_RIGHT	C0514	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris ASIC sets RR Open Sensor bit = TRUE when High side current < 3.5mA	Polaris ASIC Open Sensor Bit= True	• Wheel speed sensor supply is enabled	100 ms	Type A. MIL Illumination.
WSS_SHORT_FRONT_LEFT	C0503	This monitor checks if: • HS Shorted to Battery • LS Shorted to Battery • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX HS OC = TRUE when High side current > 40mA	Low side over current bit= True	• Wheel speed sensor supply is enabled	100 ms	Type A. MIL Illumination.
WSS_SHORT_FRONT_RIGHT	C0509	This monitor checks if: • HS Shorted to Battery • LS Shorted to Battery • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX HS OC = TRUE when High side current > 40mA	Low side over current bit= True	• Wheel speed sensor supply is enabled	100 ms	Type A. MIL Illumination.
WSS_SHORT_REAR_LEFT	C050F	This monitor checks if: • HS Shorted to Battery • LS Shorted to Battery • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX HS OC = TRUE when High side current > 40mA	Low side over current bit= True	• Wheel speed sensor supply is enabled	100 ms	Type A. MIL Illumination.
WSS_SHORT_REAR_RIGHT	C0515	This monitor checks if: • HS Shorted to Battery • LS Shorted to Battery • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX HS OC = TRUE when High side current > 40mA	Low side over current bit= True	• Wheel speed sensor supply is enabled	100 ms	Type A. MIL Illumination.
WSS_LS_SHORT_TO_GND_FRONT_LEFT	C0502	This monitor checks if: • LS Shorted to Ground • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Wheel speed sensor supply is enabled • Tested only during power up or after clear DTC.	100 ms	Type A. MIL Illumination.
WSS_LS_SHORT_TO_GND_FRONT_RIGHT	C0508	This monitor checks if: • LS Shorted to Battery • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Wheel speed sensor supply is enabled • Tested only during power up or after clear DTC.	100 ms	Type A. MIL Illumination.
WSS_LS_SHORT_TO_GND_REAR_LEFT	C050E	This monitor checks if: • LS Shorted to Battery • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Wheel speed sensor supply is enabled • Tested only during power up or after clear DTC.	100 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
WSS_LS_SHORT_TO_GND_REAR_RIGHT	C0514	This monitor checks if: • LS Shorted to Battery • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Wheel speed sensor supply is enabled • Tested only during power up or after clear DTC.	100 ms	Type A. MIL Illumination.
WSS_MISSING_FRONT_LEFT	C0505	This monitor checks if: • Wheel speed sensor not mounted correctly. • Wheel speed sensor to tone-ring gap out of tolerance. • Demagnetized tone-ring.	Missing Wheel Speed Sensor If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs. The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undroven wheel speed is greater than 6km/h, the fault detection time is faster. The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during TC, ABS or MOCO then the detection is run and the detection time is increased. The failsafe will not run in case • exactly one axle is moving (other axle is standstill) while the moving axle shows an average velocity of less than 10km/h (to prevent setting Missing Wss faults on a roller bench). • the dynamic failsafe is currently disabled because the system is currently in Diagnostic mode. Counter type: Counter up and the fault counter reset If all sensors show a speed greater than 6 km/h or the vehicle is in standstill (all sensors lower than 1.5 km/h)	If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs. The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undriven wheel speed is greater than 6km/h the fault detection time is faster. The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during ABS, only if the wheel is in pressure dump state, then the detection is run and the detection time is increased.	• Wheel speed sensor supply is enabled. • No Ohmic wheel speed sensor failure present. • No Wss Erratic or Wss Dropout fault present • At least one WSS > 6kph • No excessive high or low voltage • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	3-120s depending on number of missing wss and situation	Type A. MIL Illumination.
			Fault maturation time for one Wss missing: a. TC active: 60 sec b. ABS or MOCO not active: 3 sec. c. ABS or MOCO active: 15 sec Fault maturation time for two Wss missing: a. ABS or MOCO active: 15 sec b. If ABS or MOCO not active: 1. If undriven wheel is moving then: Fault maturation if velocity greater than 50 km/hr: 3 sec. If velocity is less than 50 km/hr then fault maturation is: 10 sec. 2. If driven wheel is moving then: Fault maturation if velocity greater than 50 km/hr: 10 sec. If velocity is less than 50 km/hr then fault maturation is: 30 sec. Fault maturation time for three Wss missing: 120 sec				
WSS_MISSING_FRONT_RIGHT	C050B	This monitor checks if: • Wheel speed sensor not mounted correctly. • Wheel speed sensor to tone-ring gap out of tolerance. • Demagnetized tone-ring.	Missing Wheel Speed Sensor If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs. The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undroven wheel speed is greater than 6km/h, the fault detection time is faster. The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during TC, ABS or MOCO then the detection is run and the detection time is increased. The failsafe will not run in case • exactly one axle is moving (other axle is standstill) while the moving axle shows an average velocity of less than 10km/h (to prevent setting Missing Wss faults on a roller bench). • the dynamic failsafe is currently disabled because the system is currently in Diagnostic mode. Counter type: Counter up and the fault counter reset If all sensors show a speed greater than 6 km/h or the vehicle is in standstill (all sensors lower than 1.5 km/h) Fault maturation time for one Wss missing: a. TC active: 60 sec b. ABS or MOCO not active: 3 sec. c. ABS or MOCO active: 15 sec	If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs. The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undriven wheel speed is greater than 6km/h the fault detection time is faster. The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during ABS, only if the wheel is in pressure dump state, then the detection is run and the detection time is increased.	• Wheel speed sensor supply is enabled. • No Ohmic wheel speed sensor failure present. • No Wss Erratic or Wss Dropout fault present • At least one WSS > 6kph • No excessive high or low voltage • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	3-120s depending on number of missing wss and situation	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
			Fault maturation time for two Wss missing: a. ABS or MOCO active: 15 sec b. If ABS or MOCO not active: 1. If undriven wheel is moving then: Fault maturation if velocity greater than 50 km/hr: 3 sec. If velocity is less than 50 km/hr then fault maturation is: 10 sec. 2. If driven wheel is moving then: Fault maturation if velocity greater than 50 km/hr: 10 sec. If velocity is less than 50 km/hr then fault maturation is: 30 sec. Fault maturation time for three Wss missing: 120 sec				
WSS_MISSING_REAR_LEFT	C0511	This monitor checks if: • Wheel speed sensor not mounted correctly. • Wheel speed sensor to tone-ring gap out of tolerance. • Demagnetized tone-ring.	Missing Wheel Speed Sensor If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs. The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undroven wheel speed is greater than 6km/h, the fault detection time is faster. The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during TC, ABS or MOCO then the detection is run and the detection time is increased. The failsafe will not run in case • exactly one axle is moving (other axle is standstill) while the moving axle shows an average velocity of less than 10km/h (to prevent setting Missing Wss faults on a roller bench). • the dynamic failsafe is currently disabled because the system is currently in Diagnostic mode. Counter type: Counter up and the fault counter reset If all sensors show a speed greater than 6 km/h or the vehicle is in standstill (all sensors lower than 1.5 km/h) Fault maturation time for one Wss missing: a. TC active: 60 sec b. ABS or MOCO not active: 3 sec. c. ABS or MOCO active: 15 sec	If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs. The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undriven wheel speed is greater than 6km/h the fault detection time is faster. The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during ABS, only if the wheel is in pressure dump state, then the detection is run and the detection time is increased.	• Wheel speed sensor supply is enabled. • No Ohmic wheel speed sensor failure present. • No Wss Erratic or Wss Dropout fault present • At least one WSS > 6kph • No excessive high or low voltage • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	3-120s depending on number of missing wss and situation	Type A. MIL Illumination.
			Fault maturation time for two Wss missing: a. ABS or MOCO active: 15 sec b. If ABS or MOCO not active: 1. If undriven wheel is moving then: Fault maturation if velocity greater than 50 km/hr: 3 sec. If velocity is less than 50 km/hr then fault maturation is: 10 sec. 2. If driven wheel is moving then: Fault maturation if velocity greater than 50 km/hr: 10 sec. If velocity is less than 50 km/hr then fault maturation is: 30 sec. Fault maturation time for three Wss missing: 120 sec				
WSS_MISSING_REAR_RIGHT	C0517	This monitor checks if: • Wheel speed sensor not mounted correctly. • Wheel speed sensor to tone-ring gap out of tolerance. • Demagnetized tone-ring.	Missing Wheel Speed Sensor If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs. The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undroven wheel speed is greater than 6km/h, the fault detection time is faster. The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during TC, ABS or MOCO then the detection is run and the detection time is increased. The failsafe will not run in case • exactly one axle is moving (other axle is standstill) while the moving axle shows an average velocity of less than 10km/h (to prevent setting Missing Wss faults on a roller bench). • the dynamic failsafe is currently disabled because the system is currently in Diagnostic mode. Counter type: Counter up and the fault counter reset If all sensors show a speed greater than 6 km/h or the vehicle is in standstill (all sensors lower than 1.5 km/h) Fault maturation time for one Wss missing: a. TC active: 60 sec b. ABS or MOCO not active: 3 sec. c. ABS or MOCO active: 15 sec.	If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs. The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undriven wheel speed is greater than 6km/h the fault detection time is faster. The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during ABS, only if the wheel is in pressure dump state, then the detection is run and the detection time is increased.	• Wheel speed sensor supply is enabled. • No Ohmic wheel speed sensor failure present. • No Wss Erratic or Wss Dropout fault present • At least one WSS > 6kph • No excessive high or low voltage • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	3-120s depending on number of missing wss and situation	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
			Fault maturation time for two Wss missing: a. ABS or MOCO active: 15 sec b. If ABS or MOCO not active: 1. If undriven wheel is moving then: Fault maturation if velocity greater than 50 km/hr: 3 sec. If velocity is less than 50 km/hr then fault maturation is: 10 sec. 2. If driven wheel is moving then: Fault maturation if velocity greater than 50 km/hr: 10 sec. If velocity is less than 50 km/hr then fault maturation is: 30 sec. Fault maturation time for three Wss missing: 120 sec				
WSS_ERRATIC_FRONT_LEFT	C0504	This monitor checks if: • Wheel speed sensor not mounted correctly. • Missing tooth or teeth on the wheel speed sensor tone-ring. • Electro-magnetic interference (EMI).	Erratic Wheel Speed Sensor · If the absolute value of the unfiltered wheel acceleration is greater than 491 m/s/s and the wheel or vehicle speed is above 3.58 m/s, an erratic wheel speed sensor may be present. The fault occurrence counter will be incremented by "Fault Maturation Weight". If the fault occurrence counter reaches "Fault Goal", then an erratic wheel speed sensor fault is set. · If the wheel acceleration is less than or equal to the above threshold, then the fault occurrence counter is decremented by monitor rate. This allows the system to slowly decay the fault occurrence counter so that only a very erratic wheel speed sensor with unrealistic acceleration values will set this fault. · Counter: 1000 · Monitor Rate: 5ms · Fault maturation time (Goal): 200ms	|Wheel_Accel| > 491 m/s²	• reference_vehicle_velocity > 3.58 m/s • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	Goal: 40000 Continuous failure Time: 200ms	Type A. MIL Illumination.
WSS_ERRATIC_FRONT_RIGHT	C050A	This monitor checks if: • Wheel speed sensor not mounted correctly. • Missing tooth or teeth on the wheel speed sensor tone-ring. • Electro-magnetic interference (EMI).	Erratic Wheel Speed Sensor · If the absolute value of the unfiltered wheel acceleration is greater than 491 m/s/s and the wheel or vehicle speed is above 3.58 m/s, an erratic wheel speed sensor may be present. The fault occurrence counter will be incremented by "Fault Maturation Weight". If the fault occurrence counter reaches "Fault Goal", then an erratic wheel speed sensor fault is set. · If the wheel acceleration is less than or equal to the above threshold, then the fault occurrence counter is decremented by monitor rate. This allows the system to slowly decay the fault occurrence counter so that only a very erratic wheel speed sensor with unrealistic acceleration values will set this fault. · Counter: 1000 · Monitor Rate: 5ms · Fault maturation time (Goal): 200ms	|Wheel_Accel| > 491 m/s²	• reference_vehicle_velocity > 3.58 m/s • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	Goal: 40000 Continuous failure Time: 200ms	Type A. MIL Illumination.
WSS_ERRATIC_REAR_LEFT	C0510	This monitor checks if: • Wheel speed sensor not mounted correctly. • Missing tooth or teeth on the wheel speed sensor tone-ring. • Electro-magnetic interference (EMI).	Erratic Wheel Speed Sensor · If the absolute value of the unfiltered wheel acceleration is greater than 491 m/s/s and the wheel or vehicle speed is above 3.58 m/s, an erratic wheel speed sensor may be present. The fault occurrence counter will be incremented by "Fault Maturation Weight". If the fault occurrence counter reaches "Fault Goal", then an erratic wheel speed sensor fault is set. · If the wheel acceleration is less than or equal to the above threshold, then the fault occurrence counter is decremented by monitor rate. This allows the system to slowly decay the fault occurrence counter so that only a very erratic wheel speed sensor with unrealistic acceleration values will set this fault. · Counter: 1000 · Monitor Rate: 5ms · Fault maturation time (Goal): 200ms	|Wheel_Accel| > 491 m/s²	• reference_vehicle_velocity > 3.58 m/s • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	Goal: 40000 Continuous failure Time: 200ms	Type A. MIL Illumination.
WSS_ERRATIC_REAR_RIGHT	C0516	This monitor checks if: • Wheel speed sensor not mounted correctly. • Missing tooth or teeth on the wheel speed sensor tone-ring. • Electro-magnetic interference (EMI).	Erratic Wheel Speed Sensor · If the absolute value of the unfiltered wheel acceleration is greater than 491 m/s/s and the wheel or vehicle speed is above 3.58 m/s, an erratic wheel speed sensor may be present. The fault occurrence counter will be incremented by "Fault Maturation Weight". If the fault occurrence counter reaches "Fault Goal", then an erratic wheel speed sensor fault is set. · If the wheel acceleration is less than or equal to the above threshold, then the fault occurrence counter is decremented by monitor rate. This allows the system to slowly decay the fault occurrence counter so that only a very erratic wheel speed sensor with unrealistic acceleration values will set this fault. · Counter: 1000 · Monitor Rate: 5ms · Fault maturation time (Goal): 200ms	|Wheel_Accel| > 491 m/s²	• reference_vehicle_velocity > 3.58 m/s • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	Goal: 40000 Continuous failure Time: 200ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
WSS_DROPOUT_FRONT_LEFT	C0505	This monitor checks if: • Defective wheel speed sensor. • Wheel speed sensor not mounted correctly. • Defective wheel speed sensor wiring harness. • Missing tooth or teeth on the wheel speed sensor tone-ring.	• Wheel Speed Sensor Dropout • When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. • Once the timer decays to zero (or is already zero), the wheel speed sensor dropout monitor checks if any wheel speed sensor edges have been detected. If wheel speed sensor edges have been detected then we check if the wheel velocity is greater than 0.2236 m/s. If it is then we can pass this failsafe. If not we reset the fault monitor because we can not monitor this fault condition at this time. • If no wheel speed sensor edges have been detected for more than 150ms while the last valid wheel velocity (which was calculated based on real speed edges) was greater than 30km/h a WSS Dropout fault will be detected. Furthermore the filtered vehicle velocity must be greater than 3.58m/s to detect the fault. • Counter: Count 1-up • Monitor Rate: 7ms	When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. If no wheel speed sensor edges have been detected then we see which axle the wheel is on because there can be different wheel speed thresholds. We also check if the brake pedal is applied. Wheels can decelerate much faster when the brake pedal is applied than when it is not applied so the brake pedal is used to determine the speed threshold at which the sensor dropout monitor can be executed. If the brake pedal is applied, a higher wheel speed threshold is used than when the brake pedal is not applied. If the brake pedal is applied the wheel speed sensor velocity threshold is 9 m/s for wheels on the front axle and 9 m/s for wheels on the back axle. If the brake pedal is not applied then the wheel speed sensor velocity threshold is 5.38 m/s for wheels on the front axle and 5.38 m/s for wheels on the back axle. If the last valid wheel velocity is greater than the wheel speed velocity threshold set above, the difference in time from the last time we checked for this fault is greater than 40 msec, and the filtered vehicle velocity is above 3.58 m/s then a wheel speed sensor dropout fault is detected. If any of these conditions are not true then conditions are not correct to do dropout detection so reset the fault monitor.	• Wheel speed sensor supply is enabled. • No ohmic wheel speed sensor failure present • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	40 ms	Type A. MIL Illumination.
WSS_DROPOUT_FRONT_RIGHT	C050B	This monitor checks if: • Defective wheel speed sensor. • Wheel speed sensor not mounted correctly. • Defective wheel speed sensor wiring harness. • Missing tooth or teeth on the wheel speed sensor tone-ring.	• Wheel Speed Sensor Dropout • When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. • Once the timer decays to zero (or is already zero), the wheel speed sensor dropout monitor checks if any wheel speed sensor edges have been detected. If wheel speed sensor edges have been detected then we check if the wheel velocity is greater than 0.2236 m/s. If it is then we can pass this failsafe. If not we reset the fault monitor because we can not monitor this fault condition at this time. • If no wheel speed sensor edges have been detected for more than 150ms while the last valid wheel velocity (which was calculated based on real speed edges) was greater than 30km/h a WSS Dropout fault will be detected. Furthermore the filtered vehicle velocity must be greater than 3.58m/s to detect the fault. • Counter: Count 1-up • Monitor Rate: 7ms	When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. If no wheel speed sensor edges have been detected then we see which axle the wheel is on because there can be different wheel speed thresholds. We also check if the brake pedal is applied. Wheels can decelerate much faster when the brake pedal is applied than when it is not applied so the brake pedal is used to determine the speed threshold at which the sensor dropout monitor can be executed. If the brake pedal is applied, a higher wheel speed threshold is used than when the brake pedal is not applied. If the brake pedal is applied the wheel speed sensor velocity threshold is 9 m/s for wheels on the front axle and 9 m/s for wheels on the back axle. If the brake pedal is not applied then the wheel speed sensor velocity threshold is 5.38 m/s for wheels on the front axle and 5.38 m/s for wheels on the back axle. If the last valid wheel velocity is greater than the wheel speed velocity threshold set above, the difference in time from the last time we checked for this fault is greater than 40 msec, and the filtered vehicle velocity is above 3.58 m/s then a wheel speed sensor dropout fault is detected. If any of these conditions are not true then conditions are not correct to do dropout detection so reset the fault monitor.	• Wheel speed sensor supply is enabled. • No ohmic wheel speed sensor failure present • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	40 ms	Type A. MIL Illumination.
WSS_DROPOUT_REAR_LEFT	C0511	This monitor checks if: • Defective wheel speed sensor. • Wheel speed sensor not mounted correctly. • Defective wheel speed sensor wiring harness. • Missing tooth or teeth on the wheel speed sensor tone-ring.	• Wheel Speed Sensor Dropout • When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. • Once the timer decays to zero (or is already zero), the wheel speed sensor dropout monitor checks if any wheel speed sensor edges have been detected. If wheel speed sensor edges have been detected then we check if the wheel velocity is greater than 0.2236 m/s. If it is then we can pass this failsafe. If not we reset the fault monitor because we can not monitor this fault condition at this time. • If no wheel speed sensor edges have been detected for more than 150ms while the last valid wheel velocity (which was calculated based on real speed edges) was greater than 30km/h a WSS Dropout fault will be detected. Furthermore the filtered vehicle velocity must be greater than 3.58m/s to detect the fault. • Counter: Count 1-up • Monitor Rate: 7ms	When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. If no wheel speed sensor edges have been detected then we see which axle the wheel is on because there can be different wheel speed thresholds. We also check if the brake pedal is applied. Wheels can decelerate much faster when the brake pedal is applied than when it is not applied so the brake pedal is used to determine the speed threshold at which the sensor dropout monitor can be executed. If the brake pedal is applied, a higher wheel speed threshold is used than when the brake pedal is not applied. If the brake pedal is applied the wheel speed sensor velocity threshold is 9 m/s for wheels on the front axle and 9 m/s for wheels on the back axle. If the brake pedal is not applied then the wheel speed sensor velocity threshold is 5.38 m/s for wheels on the front axle and 5.38 m/s for wheels on the back axle. If the last valid wheel velocity is greater than the wheel speed velocity threshold set above, the difference in time from the last time we checked for this fault is greater than 40 msec, and the filtered vehicle velocity is above 3.58 m/s then a wheel speed sensor dropout fault is detected. If any of these conditions are not true then conditions are not correct to do dropout detection so reset the fault monitor.	• Wheel speed sensor supply is enabled. • No ohmic wheel speed sensor failure present • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	40 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
WSS_DROPOUT_REAR_RIGHT	C0517	This monitor checks if: • Defective wheel speed sensor. • Wheel speed sensor not mounted correctly. • Defective wheel speed sensor wiring harness. • Missing tooth or teeth on the wheel speed sensor tone-ring.	• Wheel Speed Sensor Dropout • When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. • Once the timer decays to zero (or is already zero), the wheel speed sensor dropout monitor checks if any wheel speed sensor edges have been detected. If wheel speed sensor edges have been detected then we check if the wheel velocity is greater than 0.2236 m/s. If it is then we can pass this failsafe. If not we reset the fault monitor because we can not monitor this fault condition at this time. • If no wheel speed sensor edges have been detected for more than 150ms while the last valid wheel velocity (which was calculated based on real speed edges) was greater than 30km/h a WSS Dropout fault will be detected. Furthermore the filtered vehicle velocity must be greater than 3.58m/s to detect the fault. • Counter: Count 1-up • Monitor Rate: 7ms	When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. If no wheel speed sensor edges have been detected then we see which axle the wheel is on because there can be different wheel speed thresholds. We also check if the brake pedal is applied. Wheels can decelerate much faster when the brake pedal is applied than when it is not applied so the brake pedal is used to determine the speed threshold at which the sensor dropout monitor can be executed. If the brake pedal is applied, a higher wheel speed threshold is used than when the brake pedal is not applied. If the brake pedal is applied the wheel speed sensor velocity threshold is 9 m/s for wheels on the front axle and 9 m/s for wheels on the back axle. If the brake pedal is not applied then the wheel speed sensor velocity threshold is 5.38 m/s for wheels on the front axle and 5.38 m/s for wheels on the back axle. If the last valid wheel velocity is greater than the wheel speed velocity threshold set above, the difference in time from the last time we checked for this fault is greater than 40 msec, and the filtered vehicle velocity is above 3.58 m/s then a wheel speed sensor dropout fault is detected. If any of these conditions are not true then conditions are not correct to do dropout detection so reset the fault monitor.	• Wheel speed sensor supply is enabled. • No ohmic wheel speed sensor failure present • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	40 ms	Type A. MIL Illumination.
WSS_FAST_MISSING_FRONT_LEFT	C0505	This monitor checks if: • Wheel speed sensor not mounted correctly. • Wheel speed sensor to tone-ring gap out of tolerance. • Demagnetized tone-ring.	• Fast Missing Wheel Speed Sensor • This failsafe is only active from • Ignition On until the vehicle reaches • 15km/h for the first time. • During this time the wheel speeds and wheel • speed pulses are monitored	The wheel speed monitor starts at velocities above 4k. If a wheel speed sensor shows a velocity slower than 1.2km/h the wheel speed is considered to be missing and corresponding internal fault counter of the failsafe will be incremented. At the time the vehicle reaches 15km/h, these fault counters and the wheel speed pulse counters are used to decide whether a fault has to be latched or not. The failsafe will only latch a fault if only one wheel speed signal seems to be missing. If more than one wheel speed signal is missing, no fault will be latched by this failsafe because this is not required to be detected until 15km/h. If a fast missing fault has been detected the failsafe monitors the conditions until either the failure condition disappears for enough time to remove the fault code or the fault can be removed in case it has been confirmed by another wss fault code.	• Wheel speed sensor supply is enabled. • No other wheel speed sensor failure present • 15 km/h not reached this ignition cycle • Diagnostic Mode Inactive • Emissions Rolls Test Inactive SYSTEM_VOLTAGE_EXCESSIVE_LOW not latched	1 count	Type A. MIL Illumination.
WSS_FAST_MISSING_FRONT_RIGHT	C050B	This monitor checks if: • Wheel speed sensor not mounted correctly. • Wheel speed sensor to tone-ring gap out of tolerance. • Demagnetized tone-ring.	• Fast Missing Wheel Speed Sensor • This failsafe is only active from • Ignition On until the vehicle reaches • 15km/h for the first time. • During this time the wheel speeds and wheel • speed pulses are monitored	The wheel speed monitor starts at velocities above 4k. If a wheel speed sensor shows a velocity slower than 1.2km/h the wheel speed is considered to be missing and corresponding internal fault counter of the failsafe will be incremented. At the time the vehicle reaches 15km/h, these fault counters and the wheel speed pulse counters are used to decide whether a fault has to be latched or not. The failsafe will only latch a fault if only one wheel speed signal seems to be missing. If more than one wheel speed signal is missing, no fault will be latched by this failsafe because this is not required to be detected until 15km/h. If a fast missing fault has been detected the failsafe monitors the conditions until either the failure condition disappears for enough time to remove the fault code or the fault can be removed in case it has been confirmed by another wss fault code.	• Wheel speed sensor supply is enabled. • No other wheel speed sensor failure present • 15 km/h not reached this ignition cycle • Diagnostic Mode Inactive • Emissions Rolls Test Inactive SYSTEM_VOLTAGE_EXCESSIVE_LOW not latched	1 count	Type A. MIL Illumination.
WSS_FAST_MISSING_REAR_LEFT	C0511	This monitor checks if: • Wheel speed sensor not mounted correctly. • Wheel speed sensor to tone-ring gap out of tolerance. • Demagnetized tone-ring. (should come from FMEA)	• Fast Missing Wheel Speed Sensor • This failsafe is only active from • Ignition On until the vehicle reaches • 15km/h for the first time. • During this time the wheel speeds and wheel • speed pulses are monitored	The wheel speed monitor starts at velocities above 4k. If a wheel speed sensor shows a velocity slower than 1.2km/h the wheel speed is considered to be missing and corresponding internal fault counter of the failsafe will be incremented. At the time the vehicle reaches 15km/h, these fault counters and the wheel speed pulse counters are used to decide whether a fault has to be latched or not. The failsafe will only latch a fault if only one wheel speed signal seems to be missing. If more than one wheel speed signal is missing, no fault will be latched by this failsafe because this is not required to be detected until 15km/h. If a fast missing fault has been detected the failsafe monitors the conditions until either the failure condition disappears for enough time to remove the fault code or the fault can be removed in case it has been confirmed by another wss fault code.	• Wheel speed sensor supply is enabled. • No other wheel speed sensor failure present • 15 km/h not reached this ignition cycle • Diagnostic Mode Inactive • Emissions Rolls Test Inactive SYSTEM_VOLTAGE_EXCESSIVE_LOW not latched	1 count	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
WSS_FAST_MISSING_REAR_RIGHT	C0517	This monitor checks if: • Wheel speed sensor not mounted correctly. • Wheel speed sensor to tone-ring gap out of tolerance. • Demagnetized tone-ring.	• Fast Missing Wheel Speed Sensor • This failsafe is only active from • Ignition On until the vehicle reaches • 15km/h for the first time. • During this time the wheel speeds and wheel • speed pulses are monitored	The wheel speed monitor starts at velocities above 4k. If a wheel speed sensor shows a velocity slower than 1.2km/h the wheel speed is considered to be missing and corresponding internal fault counter of the failsafe will be incremented. At the time the vehicle reaches 15km/h, these fault counters and the wheel speed pulse counters are used to decide whether a fault has to be latched or not. The failsafe will only latch a fault if only one wheel speed signal seems to be missing. If more than one wheel speed signal is missing, no fault will be latched by this failsafe because this is not required to be detected until 15km/h. If a fast missing fault has been detected the failsafe monitors the conditions until either the failure condition disappears for enough time to remove the fault code or the fault can be removed in case it has been confirmed by another wss fault code.	• Wheel speed sensor supply is enabled. • No other wheel speed sensor failure present • 15 km/h not reached this ignition cycle • Diagnostic Mode Inactive • Emissions Rolls Test Inactive SYSTEM_VOLTAGE_EXCESSIVE_LOW not latched	1 count	Type A. MIL Illumination.
WSS_TOO_FAST_SENSOR_FRONT_LEFT	C0505	This monitor checks if: - Wheel speed sensor not mounted correctly. - Wheel speed sensor to tone-ring gap out of tolerance. - Demagnitized tone-ring	If this wheelspeed sensor reaches a speed over 3.73mph (6 km/h) while the other three show a speed of less than 0.93mph (1.5 km/h) the fault is detected.	If fault detection criteria is fulfilled then WSS_TOO_FAST_SENSOR_XX will latch if WSS_MISSING_XX or WSS_FAST_MISSING_XX or WSS_DROPOUT_XX faults are not latched.	• No electrical failure is currently present	40 msec	Type A. MIL Illumination.
WSS_TOO_FAST_SENSOR_FRONT_RIGHT	C050B	This monitor checks if: - Wheel speed sensor not mounted correctly. - Wheel speed sensor to tone-ring gap out of tolerance. - Demagnitized tone-ring	If this wheelspeed sensor reaches a speed over 3.73mph (6 km/h) while the other three show a speed of less than 0.93mph (1.5 km/h) the fault is detected.	If fault detection criteria is fulfilled then WSS_TOO_FAST_SENSOR_XX will latch if WSS_MISSING_XX or WSS_FAST_MISSING_XX or WSS_DROPOUT_XX faults are not latched.	• No electrical failure is currently present	40 msec	Type A. MIL Illumination.
WSS_TOO_FAST_SENSOR_REAR_LEFT	C0511	This monitor checks if: - Wheel speed sensor not mounted correctly. - Wheel speed sensor to tone-ring gap out of tolerance. - Demagnitized tone-ring	If this wheelspeed sensor reaches a speed over 3.73mph (6 km/h) while the other three show a speed of less than 0.93mph (1.5 km/h) the fault is detected.	If fault detection criteria is fulfilled then WSS_TOO_FAST_SENSOR_XX will latch if WSS_MISSING_XX or WSS_FAST_MISSING_XX or WSS_DROPOUT_XX faults are not latched.	• No electrical failure is currently present	40 msec	Type A. MIL Illumination.
WSS_TOO_FAST_SENSOR_REAR_RIGHT	C0517	This monitor checks if: - Wheel speed sensor not mounted correctly. - Wheel speed sensor to tone-ring gap out of tolerance. - Demagnitized tone-ring	If this wheelspeed sensor reaches a speed over 3.73mph (6 km/h) while the other three show a speed of less than 0.93mph (1.5 km/h) the fault is detected.	If fault detection criteria is fulfilled then WSS_TOO_FAST_SENSOR_XX will latch if WSS_MISSING_XX or WSS_FAST_MISSING_XX or WSS_DROPOUT_XX faults are not latched.	• No electrical failure is currently present	40 msec	Type A. MIL Illumination.
WSS_SHADOWZONE_FRONT_LEFT	C0501	This monitor checks if: • High resistance of wiring harness • High side wheel speed sensor supply shorted to battery voltage with a resistance (leakage current)	• Detection is handled by the Polaris ASIC	Polaris ASIC Low Grey Zone Detect bit = True (The low grey zone is 7 to 14mA) or Polaris ASIC High Grey Zone Detect bit = True (The high grey zone is 14 to 28mA)	• No electrical failure is currently present	750 ms	Type A. MIL Illumination.
WSS_SHADOWZONE_FRONT_RIGHT	C0507	This monitor checks if: • High resistance of wiring harness • High side wheel speed sensor supply shorted to battery voltage with a resistance (leakage current)	• Detection is handled by the Polaris ASIC	Polaris ASIC Low Grey Zone Detect bit = True (The low grey zone is 7 to 14mA) or Polaris ASIC High Grey Zone Detect bit = True (The high grey zone is 14 to 28mA)	• No electrical failure is currently present	750 ms	Type A. MIL Illumination.
WSS_SHADOWZONE_REAR_LEFT	C050D	This monitor checks if: • High resistance of wiring harness • High side wheel speed sensor supply shorted to battery voltage with a resistance (leakage current)	• Detection is handled by the Polaris ASIC	Polaris ASIC Low Grey Zone Detect bit = True (The low grey zone is 7 to 14mA) or Polaris ASIC High Grey Zone Detect bit = True (The high grey zone is 14 to 28mA)	• No electrical failure is currently present	750 ms	Type A. MIL Illumination.
WSS_SHADOWZONE_REAR_RIGHT	C0513	This monitor checks if: • High resistance of wiring harness • High side wheel speed sensor supply shorted to battery voltage with a resistance (leakage current)	• Detection is handled by the Polaris ASIC	Polaris ASIC Low Grey Zone Detect bit = True (The low grey zone is 7 to 14mA) or Polaris ASIC High Grey Zone Detect bit = True (The high grey zone is 14 to 28mA)	• No electrical failure is currently present	750 ms	Type A. MIL Illumination.
WSS_HS_OC_FRONT_LEFT	C0503	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC sets any of these bits = TRUE	Polaris ASIC sets HS Over Current = TRUE High Side Over Current (HS current > 40mA)	• Wheel speed sensor supply is enabled. • High Side failsafe is not blocked	100 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
WSS_HS_OC_FRONT_RIGHT	C0509	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC sets any of these bits = TRUE	Polaris ASIC sets any of these bits = TRUE High Side Over Current (HS current > 40mA)	• Wheel speed sensor supply is enabled. • High Side failsafe is not blocked	100 msec	Type A. MIL Illumination.
WSS_HS_OC_REAR_LEFT	C050F	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC sets any of these bits = TRUE	Polaris ASIC sets any of these bits = TRUE High Side Over Current (HS current > 40mA)	• Wheel speed sensor supply is enabled. • High Side failsafe is not blocked	100 msec	Type A. MIL Illumination.
WSS_HS_OC_REAR_RIGHT	C0515	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC sets any of these bits = TRUE	Polaris ASIC sets any of these bits = TRUE High Side Over Current (HS current > 40mA)	• Wheel speed sensor supply is enabled. • High Side failsafe is not blocked	100 msec	Type A. MIL Illumination.
WSS_UNDER_VOLTAGE_FRONT_LEFT	C0502	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Detection is handled by the Polaris ASIC	Polaris ASIC sets WSS Undervoltage disable bit = TRUE	• Wheel speed sensor supply is enabled	20 msec	Type A. MIL Illumination.
WSS_UNDER_VOLTAGE_FRONT_RIGHT	C0508	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Detection is handled by the Polaris ASIC	Polaris ASIC sets WSS Undervoltage disable bit = TRUE	• Wheel speed sensor supply is enabled	20 msec	Type A. MIL Illumination.
WSS_UNDER_VOLTAGE_REAR_LEFT	C050E	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Detection is handled by the Polaris ASIC	Polaris ASIC sets WSS Undervoltage disable bit = TRUE	• Wheel speed sensor supply is enabled	20 msec	Type A. MIL Illumination.
WSS_UNDER_VOLTAGE_REAR_RIGHT	C0514	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Detection is handled by the Polaris ASIC	Polaris ASIC sets WSS Undervoltage disable bit = TRUE	• Wheel speed sensor supply is enabled	20 msec	Type A. MIL Illumination.
ASIC_DECODE_THREE_LEVEL_FAULT_LF	C0555	This monitor checks if: • wrong vehicle config file used • misbuild using wrong WSS	Look for ASIC decoding a three level sensor when a two level sensor is configured: Check for the number of VDA bits received indicates that the ASIC is decoding for a three level sensor or Check for the tp out of range bit received indicates that the ASIC is decoding for a three level sensor	While a wheelspeed channel is expected to be configured for a 2-level sensor (i.e. decode modes 1 or 2), the MCU shall monitor the tp Out of Range and VDA Bit Counter SPI bits. If these bits are not zero, the MCU shall detect that the ASIC is incorrectly decoding in mode 3.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_THREE_LEVEL_DATA_READ_FAULT_LF	P0606	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the VDA Data, VDA Bit Counter, Standstill, and tp Out of Range SPI fields, the ASIC shall also set the Data Read SPI flag.	The MCU shall monitor each wheel's Data Read SPI flag, and verify that the bit is set at least every 195ms.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_TWO_LEVEL_DATA_READ_FAULT_LF	P0606	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the PWM Pulse Width and Standstill SPI register fields, the ASIC shall also set the Data Read SPI flag.	The MCU shall monitor each wheel's Data Read SPI flag, and verify that the bit is set after every sensor falling edge.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_DECODE_THREE_LEVEL_FAULT_RF	C0556	This monitor checks if: • wrong vehicle config file used • misbuild using wrong WSS	Look for ASIC decoding a three level sensor when a two level sensor is configured: Check for the number of VDA bits received indicates that the ASIC is decoding for a three level sensor or Check for the tp out of range bit received indicates that the ASIC is decoding for a three level sensor	While a wheelspeed channel is expected to be configured for a 2-level sensor (i.e. decode modes 1 or 2), the MCU shall monitor the tp Out of Range and VDA Bit Counter SPI bits. If these bits are not zero, the MCU shall detect that the ASIC is incorrectly decoding in mode 3.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_THREE_LEVEL_DATA_READ_FAULT_RF	P0606	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the VDA Data, VDA Bit Counter, Standstill, and tp Out of Range SPI fields, the ASIC shall also set the Data Read SPI flag.	The MCU shall monitor each wheel's Data Read SPI flag, and verify that the bit is set at least every 195ms.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_TWO_LEVEL_DATA_READ_FAULT_RF	P0606	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the PWM Pulse Width and Standstill SPI register fields, the ASIC shall also set the Data Read SPI flag.	The MCU shall monitor each wheel's Data Read SPI flag, and verify that the bit is set after every sensor falling edge.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_DECODE_THREE_LEVEL_FAULT_LR	C0557	This monitor checks if: • wrong vehicle config file used • misbuild using wrong WSS	Look for ASIC decoding a three level sensor when a two level sensor is configured: Check for the number of VDA bits received indicates that the ASIC is decoding for a three level sensor or Check for the tp out of range bit received indicates that the ASIC is decoding for a three level sensor	While a wheelspeed channel is expected to be configured for a 2-level sensor (i.e. decode modes 1 or 2), the MCU shall monitor the tp Out of Range and VDA Bit Counter SPI bits. If these bits are not zero, the MCU shall detect that the ASIC is incorrectly decoding in mode 3.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_THREE_LEVEL_DATA_READ_FAULT_LR	P0606	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the VDA Data, VDA Bit Counter, Standstill, and tp Out of Range SPI fields, the ASIC shall also set the Data Read SPI flag.	The MCU shall monitor each wheel's Data Read SPI flag, and verify that the bit is set at least every 195ms.	• Polaris is initialized	15 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
ASIC_TWO_LEVEL_DATA_READ_FAULT_LR	P0606	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the PWM Pulse Width and Standstill SPI register fields, the ASIC shall also set the Data Read SPI flag.	The MCU shall monitor each wheel's Data Read SPI flag, and verify that the bit is set after every sensor falling edge.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_DECODE_THREE_LEVEL_FAULT_RR	C0558	This monitor checks if: • wrong vehicle config file used • misbuild using wrong WSS	Look for ASIC decoding a three level sensor when a two level sensor is configured: Check for the number of VDA bits received indicates that the ASIC is decoding for a three level sensor or Check for the tp out of range bit received indicates that the ASIC is decoding for a three level sensor	While a wheelspeed channel is expected to be configured for a 2-level sensor (i.e. decode modes 1 or 2), the MCU shall monitor the tp Out of Range and VDA Bit Counter SPI bits. If these bits are not zero, the MCU shall detect that the ASIC is incorrectly decoding in mode 3.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_THREE_LEVEL_DATA_READ_FAULT_RR	P0606	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the VDA Data, VDA Bit Counter, Standstill, and tp Out of Range SPI fields, the ASIC shall also set the Data Read SPI flag.	The MCU shall monitor each wheel's Data Read SPI flag, and verify that the bit is set at least every 195ms.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_TWO_LEVEL_DATA_READ_FAULT_RR	P0606	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the PWM Pulse Width and Standstill SPI register fields, the ASIC shall also set the Data Read SPI flag.	The MCU shall monitor each wheel's Data Read SPI flag, and verify that the bit is set after every sensor falling edge.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
WSS_3L_INFO_MISSING_FRONT_LEFT	C0555	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long.	Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long. Furthermore it checks the number of received data bits in the transmission. If less than the minimum number of data bits (3) are received, a fault will be latched.	• Polaris is initialized. • Wheel Speed Sensor supply is enabled • No WSS electrical fault is present • SYSTEM_VOLTAGE_EXCESSIVE_LOW fault is not present	Fault is monitored only if sensor edges is received by Polaris. As at zero speed, standstill pulse is received every ~150ms, WSS_3L_INFO_MISSING_XX fault could take about ~7.5sec to mature. As the speed increments, sensor edges are received faster and eventually at higher speed WSS_3L_INFO_MISSING_XX fault would mature at about 250ms.	Type A. MIL Illumination.
WSS_3L_INFO_MISSING_FRONT_RIGHT	C0556	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long.	Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long. Furthermore it checks the number of received data bits in the transmission. If less than the minimum number of data bits (3) are received, a fault will be latched.	• Polaris is initialized. • Wheel Speed Sensor supply is enabled • No WSS electrical fault is present • SYSTEM_VOLTAGE_EXCESSIVE_LOW fault is not present	Fault is monitored only if sensor edges is received by Polaris. As at zero speed, standstill pulse is received every ~150ms, WSS_3L_INFO_MISSING_XX fault could take about ~7.5sec to mature. As the speed increments, sensor edges are received faster and eventually at higher speed WSS_3L_INFO_MISSING_XX fault would mature at about 250ms.	Type A. MIL Illumination.
WSS_3L_INFO_MISSING_REAR_LEFT	C0557	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long.	Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long. Furthermore it checks the number of received data bits in the transmission. If less than the minimum number of data bits (3) are received, a fault will be latched.	• Polaris is initialized. • Wheel Speed Sensor supply is enabled • No WSS electrical fault is present • SYSTEM_VOLTAGE_EXCESSIVE_LOW fault is not present	Fault is monitored only if sensor edges is received by Polaris. As at zero speed, standstill pulse is received every ~150ms, WSS_3L_INFO_MISSING_XX fault could take about ~7.5sec to mature. As the speed increments, sensor edges are received faster and eventually at higher speed WSS_3L_INFO_MISSING_XX fault would mature at about 250ms.	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
WSS_3L_INFO_MISSING_REAR_RIGHT	C0558	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long.	Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long. Furthermore it checks the number of received data bits in the transmission. If less than the minimum number of data bits (3) are received, a fault will be latched.	• Polaris is initialized. • Wheel Speed Sensor supply is enabled • No WSS electrical fault is present • SYSTEM_VOLTAGE_EXCESSIVE_LOW fault is not present	Fault is monitored only if sensor edges is received by Polaris. As at zero speed, standstill pulse is received every ~150ms, WSS_3L_INFO_MISSING_XX fault could take about ~7.5sec to mature. As the speed increments, sensor edges are received faster and eventually at higher speed WSS_3L_INFO_MISSING_XX fault would mature at about 250ms.	Type A. MIL Illumination.
WSS_PARITY_FRONT_LEFT	C0555	This monitor checks if: VDA data bits are corrupted	Decodes the additional information of a Philips KMI22/1 wheelspeed sensor which is a 3-level VDA compliant sensor.	It's a VDA compliant Philips KMI22/1 sensor so use the following mask for the data bits: 0 air gap (1=too large) 1 mode state (1=initial mode, 0=active mode) 2 digital input state (1=input voltage low) 3 validity direction recognition (1=direction bit is valid) 4 direction recognition (1=direction positive (forward driving)) 5-7 sensing distance bits (air gap) (Bit 5 is LSB, 7 MSB) (8) parity (1=even parity) The even parity flag should be the same as the calculated even parity. Else, it indicates that atleast one data bit is corrupted.	• Polaris is initialized. • Wheel Speed Sensor supply is enabled	This fault is monitored only if sensor edges are received by the Polaris. As at zero speed, standstill pulse is received every ~150ms, WSS_PARITY_XX fault could take about ~900ms to mature. As the speed increments, sensor edges are received faster and eventually at higher speed WSS_PARITY_XX fault would mature at 35ms.	Type A. MIL Illumination.
WSS_PARITY_FRONT_RIGHT	C0556	This monitor checks if: VDA data bits are corrupted	Decodes the additional information of a Philips KMI22/1 wheelspeed sensor which is a 3-level VDA compliant sensor.	It's a VDA compliant Philips KMI22/1 sensor so use the following mask for the data bits: 0 air gap (1=too large) 1 mode state (1=initial mode, 0=active mode) 2 digital input state (1=input voltage low) 3 validity direction recognition (1=direction bit is valid) 4 direction recognition (1=direction positive (forward driving)) 5-7 sensing distance bits (air gap) (Bit 5 is LSB, 7 MSB) (8) parity (1=even parity) The even parity flag should be the same as the calculated even parity. Else, it indicates that atleast one data bit is corrupted.	• Polaris is initialized. • Wheel Speed Sensor supply is enabled	This fault is monitored only if sensor edges are received by the Polaris. As at zero speed, standstill pulse is received every ~150ms, WSS_PARITY_XX fault could take about ~900ms to mature. As the speed increments, sensor edges are received faster and eventually at higher speed WSS_PARITY_XX fault would mature at 35ms.	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
WSS_PARITY_REAR_LEFT	C0557	This monitor checks if: VDA data bits are corrupted	Decodes the additional information of a Philips KMI22/1 wheelspeed sensor which is a 3-level VDA compliant sensor.	It's a VDA compliant Philips KMI22/1 sensor so use the following mask for the data bits: 0 air gap (1=too large) 1 mode state (1=initial mode, 0=active mode) 2 digital input state (1=input voltage low) 3 validity direction recognition (1=direction bit is valid) 4 direction recognition (1=direction positive (forward driving)) 5-7 sensing distance bits (air gap) (Bit 5 is LSB, 7 MSB) (8) parity (1=even parity) The even parity flag should be the same as the calculated even parity. Else, it indicates that atleast one data bit is corrupted.	• Polaris is initialized. • Wheel Speed Sensor supply is enabled	This fault is monitored only if sensor edges are received by the Polaris. As at zero speed, standstill pulse is received every ~150ms, WSS_PARITY_XX fault could take about ~900ms to mature. As the speed increments, sensor edges are received faster and eventually at higher speed WSS_PARITY_XX fault would mature at 35ms.	Type A. MIL Illumination.
WSS_PARITY_REAR_RIGHT	C0558	This monitor checks if: VDA data bits are corrupted	Decodes the additional information of a Philips KMI22/1 wheelspeed sensor which is a 3-level VDA compliant sensor.	It's a VDA compliant Philips KMI22/1 sensor so use the following mask for the data bits: 0 air gap (1=too large) 1 mode state (1=initial mode, 0=active mode) 2 digital input state (1=input voltage low) 3 validity direction recognition (1=direction bit is valid) 4 direction recognition (1=direction positive (forward driving)) 5-7 sensing distance bits (air gap) (Bit 5 is LSB, 7 MSB) (8) parity (1=even parity) The even parity flag should be the same as the calculated even parity. Else, it indicates that atleast one data bit is corrupted.	• Polaris is initialized. • Wheel Speed Sensor supply is enabled	This fault is monitored only if sensor edges are received by the Polaris. As at zero speed, standstill pulse is received every ~150ms, WSS_PARITY_XX fault could take about ~900ms to mature. As the speed increments, sensor edges are received faster and eventually at higher speed WSS_PARITY_XX fault would mature at 35ms.	Type A. MIL Illumination.
WSS_VDA_TP_OUT_OF_RANGE_FRONT_LEFT	C0501	This monitor checks if: • standstill pulse width out of range • Defective system ASIC	• The ASIC shall measure the width of each speed pulse or speed replacement pulse (tp). If tp is less than tp minimum threshold or greater than tp maximum threshold, the ASIC shall set the tp Out of Range SPI flag.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse width is out of range (error bit equals 1) (3 level WSS only)	• Polaris is initialized	15 msec -375ms	Type A. MIL Illumination.
WSS_VDA_TP_OUT_OF_RANGE_FRONT_RIGHT	C0507	This monitor checks if: • standstill pulse width out of range • Defective system ASIC	• The ASIC shall measure the width of each speed pulse or speed replacement pulse (tp). If tp is less than tp minimum threshold or greater than tp maximum threshold, the ASIC shall set the tp Out of Range SPI flag.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse width is out of range (error bit equals 1) (3 level WSS only)	• Polaris is initialized	15 msec -375ms	Type A. MIL Illumination.
WSS_VDA_TP_OUT_OF_RANGE_REAR_LEFT	C050D	This monitor checks if: • standstill pulse width out of range • Defective system ASIC	• The ASIC shall measure the width of each speed pulse or speed replacement pulse (tp). If tp is less than tp minimum threshold or greater than tp maximum threshold, the ASIC shall set the tp Out of Range SPI flag.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse width is out of range (error bit equals 1) (3 level WSS only)	• Polaris is initialized	15 msec -375ms	Type A. MIL Illumination.
WSS_VDA_TP_OUT_OF_RANGE_REAR_RIGHT	C0513	This monitor checks if: • standstill pulse width out of range • Defective system ASIC	• The ASIC shall measure the width of each speed pulse or speed replacement pulse (tp). If tp is less than tp minimum threshold or greater than tp maximum threshold, the ASIC shall set the tp Out of Range SPI flag.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse width is out of range (error bit equals 1) (3 level WSS only)	• Polaris is initialized	15 msec -375ms	Type A. MIL Illumination.
WSS_STANDSTILL_FAST_FRONT_LEFT	C0501	This monitor checks if: • Defective system ASIC Standstill VDA transmission too short	• The MCU shall detect if standstill pulses occur faster than every 95ms, for 5 consecutive standstill pulses.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too short - less than 105 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and detection rules. Range is from 25 - 475ms.	Type A. MIL Illumination.
WSS_STANDSTILL_SLOW_FRONT_LEFT	C0501	This monitor checks if: • Defective system ASIC • Standstill VDA transmission too long	• The MCU shall detect if standstill pulses occur slower than every 205ms, or no standstill pulse at all for 1025ms.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too long - more than 195 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and Detection Rules. Range is from 1025 - 5100ms.	Type A. MIL Illumination.
WSS_STANDSTILL_FAST_FRONT_RIGHT	C0507	This monitor checks if: • Defective system ASIC Standstill VDA transmission too short	• The MCU shall detect if standstill pulses occur faster than every 95ms, for 5 consecutive standstill pulses.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too short - less than 105 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and detection rules. Range is from 25 - 475ms.	Type A. MIL Illumination.
WSS_STANDSTILL_SLOW_FRONT_RIGHT	C0507	This monitor checks if: • Defective system ASIC • Standstill VDA transmission too long	• The MCU shall detect if standstill pulses occur slower than every 205ms, or no standstill pulse at all for 1025ms.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too long - more than 195 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and Detection Rules. Range is from 1025 - 5100ms.	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
WSS_STANDSTILL_FAST_REAR_LEFT	C050D	This monitor checks if: • Defective system ASIC Standstill VDA transmission too short	• The MCU shall detect if standstill pulses occur faster than every 95ms, for 5 consecutive standstill pulses.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too short - less than 105 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and detection rules. Range is from 25 - 475ms.	Type A. MIL Illumination.
WSS_STANDSTILL_SLOW_REAR_LEFT	C050D	This monitor checks if: • Defective system ASIC • Standstill VDA transmission too long	• The MCU shall detect if standstill pulses occur slower than every 205ms, or no standstill pulse at all for 1025ms.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too long - more than 195 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and Detection Rules. Range is from 1025 - 5100ms.	Type A. MIL Illumination.
WSS_STANDSTILL_FAST_REAR_RIGHT	C0513	This monitor checks if: • Defective system ASIC Standstill VDA transmission too short	• The MCU shall detect if standstill pulses occur faster than every 95ms, for 5 consecutive standstill pulses.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too short - less than 105 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and detection rules. Range is from 25 - 475ms.	Type A. MIL Illumination.
WSS_STANDSTILL_SLOW_REAR_RIGHT	C0513	This monitor checks if: • Defective system ASIC • Standstill VDA transmission too long	• The MCU shall detect if standstill pulses occur slower than every 205ms, or no standstill pulse at all for 1025ms.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too long - more than 195 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and Detection Rules. Range is from 1025 - 5100ms.	Type A. MIL Illumination.
SYS_ASIC_WSS_EDGE_MISMATCH_LF	P0606	This monitor checks if: • ASIC outputs shorted to neighbouring pins • Open trace on circuit board. • Defective system ASIC	The Wheel Speed signal generated by the ASIC and the one received by the main Micro should match to insure correct wheel speed calculation.	1) The micro monitors the number of edges received every loop for plausability (less than a max number). 2) The micro will compare the edges detected by the internal timer with the SPI flags sent by the ASIC to make sure they match.	• Polaris is initialized • No other ASIC faults detected	25 msec	Type A. MIL Illumination.
SYS_ASIC_WSS_EDGE_MISMATCH_RF	P0606	This monitor checks if: • ASIC outputs shorted to neighbouring pins • Open trace on circuit board. • Defective system ASIC	The Wheel Speed signal generated by the ASIC and the one received by the main Micro should match to insure correct wheel speed calculation.	1) The micro monitors the number of edges received every loop for plausability (less than a max number). 2) The micro will compare the edges detected by the internal timer with the SPI flags sent by the ASIC to make sure they match.	• Polaris is initialized • No other ASIC faults detected	25 msec	Type A. MIL Illumination.
SYS_ASIC_WSS_EDGE_MISMATCH_LR	P0606	This monitor checks if: • ASIC outputs shorted to neighbouring pins • Open trace on circuit board. • Defective system ASIC	The Wheel Speed signal generated by the ASIC and the one received by the main Micro should match to insure correct wheel speed calculation.	1) The micro monitors the number of edges received every loop for plausability (less than a max number). 2) The micro will compare the edges detected by the internal timer with the SPI flags sent by the ASIC to make sure they match.	• Polaris is initialized • No other ASIC faults detected	25 msec	Type A. MIL Illumination.
SYS_ASIC_WSS_EDGE_MISMATCH_RR	P0606	This monitor checks if: • ASIC outputs shorted to neighbouring pins • Open trace on circuit board. • Defective system ASIC	The Wheel Speed signal generated by the ASIC and the one received by the main Micro should match to insure correct wheel speed calculation.	1) The micro monitors the number of edges received every loop for plausability (less than a max number). 2) The micro will compare the edges detected by the internal timer with the SPI flags sent by the ASIC to make sure they match.	• Polaris is initialized • No other ASIC faults detected	25 msec	Type A. MIL Illumination.
MCU_WSS_EXCESSIVE_EDGES_DETECTED_FRONT_LEFT	C0504	This monitor checks if: • Defective system ASIC • Defective wheel speed sensor	This fault is latched when the edge counts exceeds the threshold.	Excessive Edge counts > 55	• Wheel speed sensor supply is enabled	25 msec	Type A. MIL Illumination.
MCU_WSS_EXCESSIVE_EDGES_DETECTED_FRONT_RIGHT	C050A	This monitor checks if: • Defective system ASIC • Defective wheel speed sensor	This fault is latched when the edge counts exceeds the threshold.	Excessive Edge counts > 55	• Wheel speed sensor supply is enabled	25 msec	Type A. MIL Illumination.
MCU_WSS_EXCESSIVE_EDGES_DETECTED_REAR_LEFT	C0510	This monitor checks if: • Defective system ASIC • Defective wheel speed sensor	This fault is latched when the edge counts exceeds the threshold.	Excessive Edge counts > 55	• Wheel speed sensor supply is enabled	25 msec	Type A. MIL Illumination.
MCU_WSS_EXCESSIVE_EDGES_DETECTED_REAR_RIGHT	C0516	This monitor checks if: • Defective system ASIC • Defective wheel speed sensor	This fault is latched when the edge counts exceeds the threshold.	Excessive Edge counts > 55	• Wheel speed sensor supply is enabled	25 msec	Type A. MIL Illumination.
WSS_TYPE_MISMATCH_FRONT_LEFT	C0555	This monitor checks if: • Incorrect WSS installed (Non-Directional or Infineon sensor)	• Probability counters are used to determine the likelihood of possible DWSS sensors. Therefore, no speed or time filtering is needed. Detection time depends on wheel speed. When the vehicle is at a stop, detection time is longest since no direction is transmitted (both sensor types look the same) and standstill pulses are used instead. At high-speeds, detection is shortest since missing or extra direction information will indicate the sensor installed.	Algorithm has detected that a directional WSS has incorrectly been installed	• WSS must be valid (supply enabled and no electrical problems)	5 msec	Type A. MIL Illumination.
WSS_TYPE_MISMATCH_FRONT_RIGHT	C0556	This monitor checks if: • Incorrect WSS installed (Non-Directional or Infineon sensor)	• Probability counters are used to determine the likelihood of possible DWSS sensors. Therefore, no speed or time filtering is needed. Detection time depends on wheel speed. When the vehicle is at a stop, detection time is longest since no direction is transmitted (both sensor types look the same) and standstill pulses are used instead. At high-speeds, detection is shortest since missing or extra direction information will indicate the sensor installed.	Algorithm has detected that a directional WSS has incorrectly been installed	• WSS must be valid (supply enabled and no electrical problems)	5 msec	Type A. MIL Illumination.
WSS_TYPE_MISMATCH_REAR_LEFT	C0557	This monitor checks if: • Incorrect WSS installed (Non-Directional or Infineon sensor)	• Probability counters are used to determine the likelihood of possible DWSS sensors. Therefore, no speed or time filtering is needed. Detection time depends on wheel speed. When the vehicle is at a stop, detection time is longest since no direction is transmitted (both sensor types look the same) and standstill pulses are used instead. At high-speeds, detection is shortest since missing or extra direction information will indicate the sensor installed.	Algorithm has detected that a directional WSS has incorrectly been installed	• WSS must be valid (supply enabled and no electrical problems)	5 msec	Type A. MIL Illumination.
WSS_TYPE_MISMATCH_REAR_RIGHT	C0558	This monitor checks if: • Incorrect WSS installed (Non-Directional or Infineon sensor)	• Probability counters are used to determine the likelihood of possible DWSS sensors. Therefore, no speed or time filtering is needed. Detection time depends on wheel speed. When the vehicle is at a stop, detection time is longest since no direction is transmitted (both sensor types look the same) and standstill pulses are used instead. At high-speeds, detection is shortest since missing or extra direction information will indicate the sensor installed.	Algorithm has detected that a directional WSS has incorrectly been installed	• WSS must be valid (supply enabled and no electrical problems)	5 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
SYS_ASIC_U_WS_OVER_VOLT	C05A3	This monitor checks if: • Defective system ASIC	If VU_WS exceeds the rising U_WS over-voltage detection threshold for the detection debounce time, the ASIC sets the U_WS Overvoltage Warning SPI flag and disable the four high-side switches.	The MCU shall configure the wheelspeed sensor overvoltage bypass configuration to LOW. If the WSS overvoltage warning bit is set, fault is set.	• Polaris is initialized	5 msec	Type A. MIL Illumination.
SYS_ASIC_WSS_SUPPLY_LOW	C05A4	This monitor checks if: • Defective system ASIC	• Within the ASIC, the U_WS and U12 voltages shall be internally divided down and shall feed dedicated ADC channels.	The MCU shall read the ASIC's U_WS Voltage Result SPI field and verify that "sufficient voltage" is present for wheelspeed operation. For ECUs with no U_WS voltage regulation: the MCU shall also read the ASIC's U12 Voltage Result SPI field and perform a plausibility check between U_WS and U12.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
WSS_OVER_TEMP_WARNING	P0606	This monitor checks if: • Defective system ASIC • internal overheating	• MCU shall monitor the U_WS OverTemp Warning SPI flag received from the ASIC	MCU detects that the U_WS OverTemp Warning SPI flag received from the ASIC is TRUE	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_WSS_HS_STUCK_ON	C05A3	This monitor checks if: • Defective system ASIC	• The ASIC's open circuit detection (SM42) shall remain operational even if the channel's high-side supply is turned off or disabled. • Periodically (e.g. once per ignition cycle), the MCU shall enable the low-side wheelspeed supplies but shall leave the high-side supplies off. The MCU shall detect if an open-circuit is not detected on any channel. • Periodically (e.g. once per ignition cycle), the MCU shall command the wheelspeed high-side supplies off, low-side supplies on, and verify that each channel's Open Circuit SPI bit is set.	Any one wheel fails to detect an open-circuit during either the high-side or low-side supply ON check.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
MISMATCH_TIRE	C10EE	This monitor checks if: • Significantly different size tires installed on the vehicle. • Missing target ring (sensor picking up lug nuts) • Anything that generates consistent differences in apparent wheel rotational speed. • Different number of teeth on the exciter rings.	• Wheel Velocity Differences between one and the others > 15 %. • The mismatch tire ratio adjustment is disabled if: • Vehicle Velocity < 8.9 mph, • Cornering is detected, • Spinning wheels are detected, • Braking is detected, • Wheel speed sensor faults exist. • Counter: Count 1-up • Monitor Rate: 10ms	Wheel Velocity difference between one and the others > 15 %	• The mismatch tire ratio adjustment is disabled if: • Vehicle Velocity < 8.9 mph, • Cornering is detected, • Spinning wheels are detected, • Braking is detected, • Wheel speed sensor faults exist, • Emissions Rolls Test is active	1 Count	Type A. MIL Illumination.
Group 3 - Solenoid and Valve							
SOL_OPEN_ISO_FRONT_LEFT	C0010	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_ISO_FRONT_RIGHT	C0014	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On and not faulted 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_ISO_REAR_LEFT	C0018	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_ISO_REAR_RIGHT	C001C	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_DUMP_FRONT_LEFT	C0011	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
SOL_OPEN_DUMP_FRONT_RIGHT	C0015	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_DUMP_REAR_LEFT	C0019	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_DUMP_REAR_RIGHT	C001D	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_3WAY_PRIMARY	C0001	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_3WAY_SECONDARY	C0003	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_FDBK_UNEQUAL_TO_CMD_3WAY_PRIMARY	C0001	This monitor checks if: • Deviation in PWM output status • Defective microprocessor. • Defective printed circuit board. • Defective solenoid. • Defective solenoid driver FET.	Whenever the power switch is closed and the driver FET is not turned on (solenoid commanded off) then the feedback voltage should be high. If the solenoid feedback voltage is measured to be > 43.49% and < 65.23% of the coil supply voltage for 30 msec, an open solenoid fault is indicated	For too short on time = Ontime - 7.5% period For too long on time = Ontime + 7.5% period	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	60 ms	Type A. MIL Illumination.
SOL_FDBK_UNEQUAL_TO_CMD_3WAY_SECONDARY	C0003	This monitor checks if: • Deviation in PWM output status • Defective microprocessor. • Defective printed circuit board. • Defective solenoid. • Defective solenoid driver FET.	Whenever the power switch is closed and the driver FET is not turned on (solenoid commanded off) then the feedback voltage should be high. If the solenoid feedback voltage is measured to be > 43.49% and < 65.23% of the coil supply voltage for 30 msec, an open solenoid fault is indicated.	For too short on time = Ontime - 7.5% period For too long on time = Ontime + 7.5% period	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	60 ms	Type A. MIL Illumination.
SOL_OPEN_NORMAL_CLOSE_DAP	C0004	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_PEDAL_SIM_ISO	C0024	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
SOL_OPEN_NORMAL_OPEN_DAP	C0002	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_SIM_TEST	C05D5	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_ISO_FRONT_LEFT	C0010	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver • Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_ISO_FRONT_RIGHT	C0014	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver • Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_ISO_REAR_LEFT	C0018	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver • Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_ISO_REAR_RIGHT	C001C	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver • Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_DUMP_FRONT_LEFT	C0011	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver • Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_DUMP_FRONT_RIGHT	C0015	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver • Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_DUMP_REAR_LEFT	C0019	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver • Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
DRIVER_SHORT_DUMP_REAR_RIGHT	C001D	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver • Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_3WAY_PRIMARY	C0001	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_3WAY_SECONDARY	C0003	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_NORMAL_CLOSE_DAP	C0004	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_PEDAL_SIM_ISO	C0024	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_NORMAL_OPEN_DAP	C0002	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_SIM_TEST	C05D5	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_SHORT_ISO_FRONT_LEFT	C0010	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_ISO_FRONT_RIGHT	C0014	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
SOL_SHORT_ISO_REAR_LEFT	C0018	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_ISO_REAR_RIGHT	C001C	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_DUMP_FRONT_LEFT	C0011	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_DUMP_FRONT_RIGHT	C0015	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_DUMP_REAR_LEFT	C0019	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_DUMP_REAR_RIGHT	C001D	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_3WAY_PRIMARY	C0001	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_3WAY_SECONDARY	C0003	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
SOL_SHORT_NORMAL_CLOSE_DAP	C0004	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_PEDAL_SIM_ISO	C0024	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_NORMAL_OPEN_DAP	C0002	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_SIM_TEST	C05D5	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_OVERTEMP_ISO_FRONT_LEFT	C0010	This monitor checks if: • Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type C, No MIL, "Emissions Neutral Diagnostic "
SOL_OVERTEMP_ISO_FRONT_RIGHT	C0014	This monitor checks if: • Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type C, No MIL, "Emissions Neutral Diagnostic "
SOL_OVERTEMP_ISO_REAR_LEFT	C0018	This monitor checks if: • Anything that causes the solenoid to be active for excessive (usually unintended) period of time		Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type C, No MIL, "Emissions Neutral Diagnostic "
SOL_OVERTEMP_ISO_REAR_RIGHT	C001C	This monitor checks if: • Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
SOL_OVERTEMP_DUMP_FRONT_LEFT	C0011	This monitor checks if: • Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type C, No MIL, "Emissions Neutral Diagnostic "
SOL_OVERTEMP_DUMP_FRONT_RIGHT	C0015	This monitor checks if: • Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type C, No MIL, "Emissions Neutral Diagnostic "
SOL_OVERTEMP_DUMP_REAR_LEFT	C0019	This monitor checks if: • Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type C, No MIL, "Emissions Neutral Diagnostic "
SOL_OVERTEMP_DUMP_REAR_RIGHT	C001D	This monitor checks if: • Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type C, No MIL, "Emissions Neutral Diagnostic "
SOL_OVERTEMP_3WAY_PRIMARY	C0001	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOL_OVERTEMP_3WAY_SECONDARY	C0003	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOL_OVERTEMP_NORMAL_CLOSE_DAP	C0004	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOL_OVERTEMP_PEDAL_SIM_ISO	C0024	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOL_OVERTEMP_NORMAL_OPEN_DAP	C0002	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
SOL_OVERTEMP_SIM_TEST	C05D5	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type C, No MIL, "Emissions Neutral Diagnostic "
SOL_DRIVER_OVERTEMP_ISO_FRONT_LEFT	C0010	This monitor checks if: • Anything that causes the solenoid driver to be active for excessive (usually unintended) period of time	• Driver Overtemp info transmitted via SPI from Polaris ASIC	Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature. Microprocessor recieves the information via SPI from the ASIC	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	5 msec	Type A. MIL Illumination.
SOL_DRIVER_OVERTEMP_ISO_FRONT_RIGHT	C0014	This monitor checks if: • Anything that causes the solenoid driver to be active for excessive (usually unintended) period of time	• Driver Overtemp info transmitted via SPI from Polaris ASIC	Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature. Microprocessor recieves the information via SPI from the ASIC	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	5 msec	Type A. MIL Illumination.
SOL_DRIVER_OVERTEMP_ISO_REAR_LEFT	C0018	This monitor checks if: • Anything that causes the solenoid driver to be active for excessive (usually unintended) period of time	• Driver Overtemp info transmitted via SPI from Polaris ASIC	Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature. Microprocessor recieves the information via SPI from the ASIC	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	5 msec	Type A. MIL Illumination.
SOL_DRIVER_OVERTEMP_ISO_REAR_RIGHT	C001C	This monitor checks if: • Anything that causes the solenoid driver to be active for excessive (usually unintended) period of time	• Driver Overtemp info transmitted via SPI from Polaris ASIC	Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature. Microprocessor recieves the information via SPI from the ASIC	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	5 msec	Type A. MIL Illumination.
SOL_DRIVER_OVERTEMP_PEDAL_SIM_ISO	C0024	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Driver Overtemp info transmitted via SPI from Polaris ASIC	Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature. Microprocessor recieves the information via SPI from the ASIC	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	5 msec	Type A. MIL Illumination.
SOL_DRIVER_OVERTEMP_NORMAL_OPEN_DAP	C0002	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Driver Overtemp info transmitted via SPI from Polaris ASIC	Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature. Microprocessor recieves the information via SPI from the ASIC	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	5 msec	Type A. MIL Illumination.
CLAMP_ACTIVATION_FAILURE_ISO_FRONT_LEFT	C0010	This monitor checks if: • Defective / Missing Flyback Diode • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured.	1. Coil Overcurrent DTC is not set 2. No CLAMP_ACTIVATION_FAILURE DTC is set 3. execute as part of Power-Up System Test, Periodic Coil Test or anytime ABS Iso is activated during performance	45 counts (minimum 3 failures in 10 attempts)	Type A. MIL Illumination.
CLAMP_ACTIVATION_FAILURE_ISO_FRONT_RIGHT	C0014	This monitor checks if: • Defective / Missing Flyback Diode • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured.	1. Coil Overcurrent DTC is not set 2. No CLAMP_ACTIVATION_FAILURE DTC is set 3. execute as part of Power-Up System Test, Periodic Coil Test or anytime ABS Iso is activated during performance	45 counts (minimum 3 failures in 10 attempts)	Type A. MIL Illumination.
CLAMP_ACTIVATION_FAILURE_ISO_REAR_LEFT	C0018	This monitor checks if: • Defective / Missing Flyback Diode • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured.	1. Coil Overcurrent DTC is not set 2. No CLAMP_ACTIVATION_FAILURE DTC is set 3. execute as part of Power-Up System Test, Periodic Coil Test or anytime ABS Iso is activated during performance	45 counts (minimum 3 failures in 10 attempts)	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
CLAMP_ACTIVATION_FAILURE_ISO_REAR_RIGHT	C001C	This monitor checks if: • Defective / Missing Flyback Diode • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured.	1. Coil Overcurrent DTC is not set 2. No CLAMP_ACTIVATION_FAILURE DTC is set 3. execute as part of Power-Up System Test, Periodic Coil Test or anytime ABS Iso is activated during performance	45 counts (minimum 3 failures in 10 attempts)	Type A. MIL Illumination.
CLAMP_ACTIVATION_FAILURE_NORMAL_OPEN_DAP	C0002	This monitor checks if: • Defective / Missing Flyback Diode • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured.	1. Coil Overcurrent DTC is not set 2. No CLAMP_ACTIVATION_FAILURE DTC is set 3. execute as part of Power-Up System Test, Periodic Coil Test or anytime ABS Iso is activated during performance	45 counts (minimum 3 failures in 10 attempts)	Type A. MIL Illumination.
CLAMP_ACTIVATION_FAILURE_PEDAL_SIM_ISO	C0024	This monitor checks if: • Defective / Missing Flyback Diode • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured.	1. Coil Overcurrent DTC is not set 2. No CLAMP_ACTIVATION_FAILURE DTC is set 3. execute as part of Power-Up System Test, Periodic Coil Test or anytime ABS Iso is activated during performance	45 counts (minimum 3 failures in 10 attempts)	Type A. MIL Illumination.
LEAKY_DRIVER_UNKNOWN_ABS_CIRCUITS	C0024	This monitor checks if: • Defective FET • Defective printed circuit board	• Slip Control Power Switch must be commanded ON than subsequently commanded OFF	If the Slip Control Power decreases at a rate that is faster than expected, fault will be set. If the power decreases from 100% to 30% in 1 msec, fault is set.	• Power Switch is ON, then OFF • will only be retested after a power cycle	1 Count	Type A. MIL Illumination.
LEAKY_DRIVER_UNKNOWN_BOOST_CIRCUITS	C0024	This monitor checks if: • Defective FET • Defective printed circuit board	• Slip Control Power Switch must be commanded ON than subsequently commanded OFF	If the Slip Control Power decreases at a rate that is faster than expected, fault will be set. If the power decreases from 100% to 30% in 1 msec, fault is set.	• Power Switch is ON, then OFF • will only be retested after a power cycle	1 Count	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_HIGH_ISO_FRONT_RIGHT	C0014	This monitor checks if: Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_LOW_ISO_FRONT_RIGHT	C0014	This monitor checks if: Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_HIGH_ISO_FRONT_LEFT	C0010	This monitor checks if: Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_LOW_ISO_FRONT_LEFT	C0010	This monitor checks if: Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_HIGH_ISO_REAR_RIGHT	C001C	This monitor checks if: Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
SOL_CC_DC_SATURATED_LOW_ISO_REAR_RIGHT	C001C	This monitor checks if: Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_HIGH_ISO_REAR_LEFT	C0018	This monitor checks if: Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_LOW_ISO_REAR_LEFT	C0018	This monitor checks if: Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_HIGH_NORMAL_OPEN_DAP	C0002	This monitor checks if: Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_LOW_NORMAL_OPEN_DAP	C0002	This monitor checks if: Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_HIGH_PEDAL_SIM_ISO	C0024	This monitor checks if: Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_LOW_PEDAL_SIM_ISO	C0024	This monitor checks if: Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100ms	Type A. MIL Illumination.
SOL_OVER_VOLTAGE_NORMAL_CLOSE_DAP	C0004	This monitor checks if: Defective/Missing Suppression diode Defective PCB	If the suppression diode is missing or failed the ASIC detects it by monitoring the solenoid back EMF. Reading above +40V sets the Overvoltage Warning SPI flag. The coils output is not shut-off by the ASIC. Software matures the fault by monitoring the SPI flag. NOTE: There are no suppression diodes on any of the Dump coils because they are not PWM'd.	Duty cycle is out of range	Polaris is initialized	100ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
SOL_OVER_VOLTAGE_SIM_TEST	C05D5	This monitor checks if: Defective/Missing Suppression diode Defective PCB	If the suppression diode is missing or failed the ASIC detects it by monitoring the solenoid back EMF. Reading above +40V sets the Overvoltage Warning SPI flag. The coils output is not shut-off by the ASIC. Software matures the fault by monitoring the SPI flag. NOTE: There are no suppression diodes on any of the Dump coils because they are not PWM'd.	Duty cycle is out of range	Polaris is initialized	100ms	Type A. MIL Illumination.
DC_SOL_REGULATION_FAILURE	P0606	This monitor checks if: • Defective system ASIC	• The ASIC shall monitor the state of each DROx output and report if it does not match the commanded state.	The MCU shall monitor ASIC's "DROx Gate Monitor Fault" SPI bits.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SOL_DUTY_CYCLE_FDBK_PLAUS_FAULT	P0606	This monitor checks if: • Defective system ASIC Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	The MCU shall monitor battery voltage and maintain an estimated coil temperature/resistance model. For a given current command, the MCU shall estimate the required duty cycle. The MCU shall verify that the estimated duty cycle against the ASIC's reported "CC_DRx Duty Cycle Command Feedback" match within a TBD tolerance. Current threshold is 20%	The MCU shall monitor battery voltage and maintain an estimated coil temperature/resistance model. For a given current command, the MCU shall estimate the required duty cycle. The MCU shall verify that the estimated duty cycle against the ASIC's reported "CC_DRx Duty Cycle Command Feedback" match within a TBD tolerance. Current threshold is 10%	• Polaris is initialized	15 msec	Type A. MIL Illumination.
COIL_CURRENT_FDBK_PLAUS_FAULT	P0606	This monitor checks if: • Defective system ASIC ASIC cannot control sol current properly	For CC_DRx channels in duty-cycle control mode: While a CC_DRx coil drive is commanded to greater than 0% duty cycle, the MCU shall monitor the ASIC's CC_DRx Current Result SPI field and verity the result matches the expected current. When a duty cycle command results in an CC_DRx on-time less than the minimum on time, no coil current measurement is possible. The reported CC_DRx Current Result will retain its prior value, and the corresponding Data Read bit will be 0. SW shall suspend SM102 while Data Read is 0.	For CC_DRx channels in duty-cycle control mode: While a CC_DRx coil drive is commanded to greater than 0% duty cycle, the MCU shall monitor the ASIC's CC_DRx Current Result SPI field and verity the result matches the expected current. When a duty cycle command results in an CC_DRx on-time less than the minimum on time, no coil current measurement is possible. The reported CC_DRx Current Result will retain its prior value, and the corresponding Data Read bit will be 0. SW shall suspend SM102 while Data Read is 0.	• Polaris is initialized • Coil Commanded in Duty Cycle mode	50 msec	Type A. MIL Illumination.
Group 4 - Electronic Control Unit (ECU)							
SPI_FAILURE_ASIC	P0606	This monitor checks if: • Defective printed circuit board. • Defective Polaris ASIC. • Defective microprocessor. • Noisy Power	• This fault can be set by problems communicating over SPI between the MICRO and the Polaris ASIC. It is checked ONCE at power up. • The SPI initialization will fail if the driver has not finished a previous transmission when a new transmission is required (not enough SPI throughput). • The SPI initialization will also fail if the driver detects an error (bad parity, control register data echo over the SPI or control register data read does not match). • If the Polaris ASIC fails to initialize SPI communication after 2 retries (3 attempts total) then this fault is set • Counter: Count 1-up • Monitor Rate: 1ms	Polaris Error Flag = TRUE Polaris.Error_Flags != 0 Polaris.Error_Flags_Observed |= Polaris.Error_Flags	• Power Switch is ON	3 ms	Type A. MIL Illumination.
FSC_SPI_TRANSMIT_FAILURE	P0606	This monitor checks if: • Defective printed circuit board. • Defective Polaris ASIC. • Defective microprocessor. • Noisy Power	• This fault can be set by problems communicating over SPI with the Polaris ASIC. The fault will set if the driver has not finished a previous transmission when a new transmission is required (not enough SPI throughout). The fault will also set if the driver detects an error (bad parity, control register data echo over the spi or control register data read does not match) in a single transmission and is unable to complete this transmission after 2 retries (3 attempts total). • Counter: Count 1-up • Monitor Rate: 1ms	Polaris Error Flag = TRUE Polaris.Error_Flags != 0 Polaris.Error_Flags_Observed |= Polaris.Error_Flags	• Power Switch is ON	3 ms	Type A. MIL Illumination.
NVRAM_DEVICE_INOPERATIVE	P062F	This monitor checks if: • Problem in chip select line • fault in SPI driver related code/circuit.	• This fault is set 1. When SPI driver is unable to do message transfer 2. If unable to write or time out before write operation could complete. 3. If requested message transfer not in time (including wait time)	device operational flag = FALSE (error during read write request occured)	• Power Switch is ON	5ms	Type A. MIL Illumination.
NVRAM_WRITE_FAILURE	P062F	This monitor checks if: • Communication problem with NVRAM chip • NVRAM hardware problem • PCB problem	• This fault is detected by the NVRAM handler. The NVRAM handler verifies a successful write event by reading back the information that is expected to be stored in NVRAM and also verifying the checksum.	If the NVRAM handler detects an unsuccessful write event three times, the fault is set.	• Power Switch in ON	60 msec	Type A. MIL Illumination.
COIL_DRIVER_SPI_FAILURE	P0606	This monitor checks if: • Defective system ASIC	• After a rising SYNC pin edge has occurred, the SW shall read the ASIC's "SYNC Armed Status" flag and detects if the bit is still high (indicating the rising SYNC pin edge was not detected).	The ASIC clears the "SYNC Armed" bit after a rising edge has occurred on the SYNC pin. The ASIC provides the "SYNC Armed Status" SPI flag, which reflects the state of the "SYNC Armed" SPI bit. After a rising SYNC pin edge has occurred, the SW reads the ASIC's "SYNC Armed Status" SPI bit and detects if the bit is still high (indicating the rising SYNC pin edge was not detected).	• Polaris is initialized	15 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
EXT_WATCHDOG_FAIL	P0606	This monitor checks if: • Defective system ASIC	• None.	Periodically (e.g. once per ignition cycle), the MCU shall perform the following watchdog test (or equivalent): (1) Start with the Watchdog Counter Value SPI field = 0, the WDEN pin high, and all other "watchdog-enabled functions" otherwise enabled. (2) Verify Watchdog Status SPI bit is 0 and all "watchdog-enabled functions" are disabled. (3) Service watchdog until the Watchdog Counter Value = 6. Verify the conditions from (2) remain. (4) Set the WDEN pin low, then service the watchdog. (5) Confirm the Watchdog Counter Value = 7 and all "watchdog-enabled functions" are disabled. (6) Allow the watchdog to timeout, then set the WDEN pin high. (7) Confirm the Watchdog Counter Value = 0, Watchdog Status bit is 0, and all "watchdog-enabled functions" are disabled. Watchdog-enable functions are: (1) solid state relay driver pin (VDG), (2) the motor ½ bridge pre-driver pins (PDG and PRG), (3) the ENQ digital output pin, and (4) the low-side coil drivers (CC_DRx) and pre-drivers (DROx).	• Polaris is initialized	10 msec	Type A. MIL Illumination.
AD_PERIPHERAL_TIMEOUT_FAILURE	P060B	This monitor checks if: • Defective printed circuit board. • Defective Polaris ASIC. • Defective microprocessor.	• A/D Peripheral Timeout Failure • When reading an A/D channel, the software enters a "wait" loop where it looks for a bit in an A/D register to be set, indicating that the conversion is complete. A "timeout" mechanism exists that breaks out of the wait loop after 100 usec (well longer than it is ever expected to complete an A/D conversion) has elapsed. If this timeout mechanism is executed, a fault code is set. • Counter: Count 1-up • Monitor Rate: 10ms	Adc Port Lockup Detected = TRUE	• Power Switch is ON	5ms	Type A. MIL Illumination.
AD_EVENT_LOCKUP	P060B	This monitor checks if: • Defective printed circuit board. • Defective Polaris ASIC. • Defective microprocessor.	A/D Event Lockup Failure Two detection methods: No A/D conversions in the last 5 msec: A counter is incremented when A/D conversion results are retrieved. Every 5 msec this counter is checked. If it is 0, then the AD_EVENT_LOCKUP fault will begin to mature. If greater than 0, then it is cleared. 2 consecutive failures are needed to set the fault. Adc_Synchronization_Failed flag is TRUE: The ASIC will set this flag TRUE when the conversion count (number of channels converted) is larger than what is expected (9). 2 consecutive failures are needed to set the fault.	Adc Lockup Count = 0 or Adc Synchronization Failed = TRUE	• Power Switch is ON	5ms	Type A. MIL Illumination.
SOLENOID_TIMEOUT_FAILURE	P0606	This monitor checks if: • Defective microprocessor. • Incorrect microprocessor application code.	• Solenoid Timeout Failure Each solenoid in the system is expected to generate a HET interrupt command to indicate the end of a solenoid pulse duration.. Each solenoid timeout interrupt results in logic that sums the total number of HET interrupts. This is done independently for each channel. At the completion of the System Self-Test, the number of valid HET interrupts, are compared. The total number of HET interrupts is expected to be equal to the number of solenoids in the system. If the number of interrupts that occurred does not equal the expected number, a failure is indicated and this fault is set. • After the system self test is complete, each solenoid is test again once per every 5 sec, as described above. • The fault is cleared when above condition does not exist. • Counter: Count 1-up • Monitor Rate: 10MS	At least one solenoid fails to get all timeout interrupts for all 0.5 ms pulses	• Mode manager is normal mode • Power switch is not faulted • System is not initializing • System is not re-initializing • Engine is not being cranked • Diagnostic commands are not requested • System is not shutting down	5ms	Type A. MIL Illumination.
SOLENOID_PERIODIC_INTERRUPT_FAILURE	P0606	This monitor checks if: • Defective microprocessor. Incorrect microprocessor application code, ex. Bad scheduler	HET Periodic Interrupt Failure Verifies that one particular High End Timer interrupt (HET) feedback; occurs every pass through the schedule loop time (10MS). This fault is set if no HET interrupt feedback has occurred for 3 consequentive schedule loop time (10MS). The HET interrupt feedback that is checked is the solenoid feedback interrupts, This Solenoid feedback interrupt is scheduled every interval of the operating system. The fault is cleared when above condition does not exist. Counter: Count 1-up-Reset Monitor Rate: 10MS	periodic het interrupt flag = FALSE (periodic interrupt did not occur)	Power Switch is ON	5ms	Type A. MIL Illumination.
SYS_ASIC_U3_SELECT_FAILURE	P0606	This monitor checks if: • Defective system ASIC	• If the external U3 FET is present, the ASIC shall set the U3 External FET SPI bit. • Provide a SPI bit which reports whether the internal or external U3 FET has been selected.	The MCU shall read the ASIC's U3 External FET status bit and compares against the expected value.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_WDEN_STATUS_CORR	P0606	This monitor checks if: • Defective system ASIC	• The ASIC shall provide the WDEN Status SPI bit which reflects the filtered state of the WDEN pin. The MCU shall monitor the ASIC's WDEN Status SPI flag and verify it is the expected value.	WDEN Status SPI flag <> WDEN PIN status	• Polaris is initialized	15 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
SYS_ASIC_EXCESS_STARTUP	P0606	This monitor checks if: • Defective system ASIC	• During the power-on sequence, the ASIC shall monitor the U5, U3, and U1 voltages, with respect to the discharge voltage threshold. • If the power-on sequence is delayed (e.g. due to a slow U5, U3, U1, discharge), the ASIC shall report the Excessive Startup Time SPI flag.	The MCU shall monitor the ASIC's Excessive Startup Time SPI flag.	• Polaris is initialized	5 msec	Type A. MIL Illumination.
SYS_ASIC_EXCESS_STARTUP_AT_SPEED	P0606	This monitor checks if: • Defective system ASIC	• During the power-on sequence, the ASIC shall monitor the U5, U3, and U1 voltages, with respect to the discharge voltage threshold. • If the power-on sequence is delayed (e.g. due to a slow U5, U3, U1, discharge), the ASIC shall report the Excessive Startup Time SPI flag. • The fault linked to heading of this section is set at speed and cleared below a speed. Although there is no hardware failure once electronics power up, IBC projects currently are sensitive to drivers going from push through to boosted brakes. Therefore, system will set fault if above a defined vehicle speed when bit is set. Note: Since bit is set first thing at power up, care shall be taken to ensure the bit is saved until the ability to check vehicle speed.	The MCU shall monitor the ASIC's Excessive Startup Time SPI flag. AND ((vehicle speed > 3 kph) OR (any nonfailed wheel speed sensor > 3 kph) OR all wheel speeds are failed)	• Polaris is initialized	5 msec	Type A. MIL Illumination.
SYS_ASIC_ADC_REF_HIGH	P060B	This monitor checks if: • Defective system ASIC	• The ASIC shall provide three ADC test voltage channels fixed to internal voltage references: Vhigh (ADREFHI),Vlow (GND_Q1), and Vmid (ADREFHI/2).	Each software loop, the MCU shall read the ADC conversion results for the Vhigh, Vlow and Vmid ASIC ADC channels over SPI, and compare them against fixed detection thresholds. Note: This MCU requirement is the same as in SM137.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_ADC_REF_MID	P060B	This monitor checks if: • Defective system ASIC	• The ASIC shall provide three ADC test voltage channels fixed to internal voltage references: Vhigh (ADREFHI),Vlow (GND_Q1), and Vmid (ADREFHI/2).	Each software loop, the MCU shall read the ADC conversion results for the Vhigh, Vlow and Vmid ASIC ADC channels over SPI, and compare them against fixed detection thresholds. Note: This MCU requirement is the same as in SM137.	• Polaris is initialized	25 msec	Type A. MIL Illumination.
SYS_ASIC_ADC_REF_LOW	P060B	This monitor checks if: • Defective system ASIC	• The ASIC shall provide three ADC test voltage channels fixed to internal voltage references: Vhigh (ADREFHI),Vlow (GND_Q1), and Vmid (ADREFHI/2).	Each software loop, the MCU shall read the ADC conversion results for the Vhigh, Vlow and Vmid ASIC ADC channels over SPI, and compare them against fixed detection thresholds. Note: This MCU requirement is the same as in SM137.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_ADC_ATTN_BIT_STUCK	P060B	This monitor checks if: • Defective system ASIC	• The MCU shall periodically (e.g. once per ignition cycle) command each active (i.e. used) ASIC external ADC channel with the attenuation mode opposite of normal operation and verify that its attenuation enable feedback SPI bit is not stuck.	Any one of the 10 ASIC external ADC channel's attenuation enable feedback SPI bits is stuck	• Polaris is initialized	10 msec	Type A. MIL Illumination.
SYS_ASIC_ADC_ATTN_FACTOR	P060B	This monitor checks if: • Defective system ASIC	• Each background conversion loop, the ASIC shall perform the conversion of the internal Vmid voltage both with and without the selectable attenuation switched in. The conversion results shall be stored respectively in the separate ADC Vmid with Attenuation Test Result and ADC Vmid Test Result SPI fields. • Each software loop, the MCU shall calculate the ASIC's ADC attenuation factor by reading the ADC Vmid with Attenuation Test Result and ADC Vmid Test Result SPI fields, calculate the ASIC's ADC attenuation factor by dividing the attenuated result by the non-attenuated result, and verify the resulting attenuation factor is within limits.	Calculated ADC attenuation factor < 0.6176 OR Calculated ADC attenuation factor > 0.6320	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_EXT_ADC_FAILURE	P060B	This monitor checks if: • Defective Polaris ASIC.	The ASIC reports the state of the attenuation (selected or not selected) for each external ADC channel via the "ADx Attenuation Feedback" SPI bits within the ADC result registers. For fault detection purposes, the feedback bits directly monitor the control signal state within the SAR Logic, as opposed to only echoing the "ADx Attenuation Select" command. Each time an ASIC external ADC channel is read over SPI, the SW also reads the "ADx Attenuation Feedback" bit and compare the result against the expected (i.e. commanded) attenuation setting.	Compare the ASIC external ADC channel read of SPI and the ADx Attenuation feedback bit against expected attenuation setting	• Polaris is initialized	50 msec	Type A. MIL Illumination.
SYS_ASIC_SYNC_PULSE_DETECT	P0606	This monitor checks if: • Defective system ASIC	• ASIC provides SYNC ARMED SPI mapped bit that can be set and cleared through SPI, or cleared by detected valid SYNC rising edge event. • Provide un-armed SYNC edge detected SPI mapped bit.	Periodically (e.g. once per ignition cycle) the MCU shall send a rising edge on the SYNC pin, while the SYNC Armed SPI bit is low. The MCU shall verify that the Unarmed SYNC Edge Detected SPI flag is set.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_SPI_DETECT	P0606	This monitor checks if: • Defective system ASIC	• None.	Periodically, and within the fault response time, the MCU shall send separate SPI frames with: (1) an incorrect CRC (2) an incorrect number of SPI bits (3) an invalid command (invalid address) (4) invalid data The MCU shall then verify that the CRC is corrupted in the ASIC's response frame to each of the above errors.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_REGISTER	P0606	This monitor checks if: • Defective system ASIC	• The ASIC shall provide the Storage SPI register. The register contents shall have no effect on the ASIC operation. Register contents shall only be modified by a SPI write and not by any internal ASIC action.	Every major software loop (e.g. 5 - 10ms), the MCU shall perform a write to, normal mode read from and dump mode read from the Storage SPI register. Each loop, the value written shall change, and shall include checkerboard (0xAA, 0x55), walking 1s and walking 0s). The MCU shall verify the written and read values match. After performing a write to a safety critical SPI register, the MCU shall perform a read back of the same register, and verify that the contents were written. The read shall occur within the same software loop, in order to allow the MCU to correct any mis-write within the fault response time. Note: The read back refers to a separate read request, and is not the same as verifying the write echo.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_DUPL_SEED	P0606	This monitor checks if: • Defective system ASIC	• None.	The MCU shall detect if ASIC provides the same seed value 3 times in a row.	• Polaris is initialized	15 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
SYS_ASIC_AD_REFRESH_FAILURE	P060B	This monitor checks if: • Defective system ASIC	• The ASIC shall set the Data Read bit to indicate that an individual ADC result has been updated since the register was last read.	Each time an ASIC ADC channel is read over SPI, the MCU shall also read the Data Read bit. If the Data Read bit is not set, the MCU treats the result as old data. If the Data Read bit is not set and the time since the prior ADC read is longer than the ASIC ADCs background loop time, the MCU shall detect a fault Periodically (e.g. once per ignition cycle), the MCU shall read each ADC result register immediately 3 times in a row. If the Data Read bit is never low during the 3 reads, flag a fault that the Data Read bit is stuck high. Repeat for all ASIC ADC channels. Note: Because the ASIC could update the result register between two register reads (resulting in two high Data Read bits), 3 successive reads are required.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_AD_DATA_READ_STUCK	P060B	This monitor checks if: • Defective system ASIC	• The ASIC shall set the Data Read bit to indicate that an individual ADC result has been updated since the register was last read.	Periodically (e.g. once per ignition cycle), the MCU shall read each ADC result register immediately 3 times in a row. If the Data Read bit is never low during the 3 reads, flag a fault that the Data Read bit is stuck high. Repeat for all ASIC ADC channels. Note: Because the ASIC could update the result register between two register reads (resulting in two high Data Read bits), 3 successive reads are required.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_MISSING_SYNC_EDGE	P0606	This monitor checks if: • Defective system ASIC	• After a rising SYNC pin edge has occurred, the SW shall read the ASIC's "SYNC Armed Status" flag and detects if the bit is still high (indicating the rising SYNC pin edge was not detected).	The ASIC clears the "SYNC Armed" bit after a rising edge has occurred on the SYNC pin. The ASIC provides the "SYNC Armed Status" SPI flag, which reflects the state of the "SYNC Armed" SPI bit. After a rising SYNC pin edge has occurred, the SW reads the ASIC's "SYNC Armed Status" SPI bit and detects if the bit is still high (indicating the rising SYNC pin edge was not detected).	• Polaris is initialized	15 msec	Type A. MIL Illumination.
DC_SOL_ON_TIME_MON_FAILED	P0606	This monitor checks if: • Defective system ASIC ASIC is not controlling PWM properly	The ASIC shall monitor the filtered DRDx feedback voltage and shall provide an on-time counter (for each channel) which shall accumulate the QDRx on-time. At each valid SYNC edge, the ASIC shall latch the current accumulated value into the DRDx On-Time Feedback Register and clear the on-time counter. The MCU shall integrate the commanded on-time between valid SYNC pulses and verify it matches the ASIC's reported result. Current threshold is 250 * MICROSECOND	Compare the solenoid commanded on time to the measured on time. If the difference in the two times is >250 microsec for 10 consecutive checks then the fault is immediately matured	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_UNEXPECTED_SYNC_PULSE	P0606	This monitor checks if: • Defective Polaris ASIC.	• The MCU shall monitor the ASIC's Unarmed SYNC Edge Detected SPI bit and verify no expected SYNC pin edges have occurs. • After a rising SYNC pin edge has occurred (e.g. at the start of the next software loop), the MCU shall read the ASIC's SYNC Armed Status SPI bit and confirm that the rising SYNC pin edge occurred (in which case the bit will be low).	Fault will set if the MCU detects an unexpected sync pulse from the ASIC by monitoring the Unarmed SYNC Edge Detected SPI bit	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_SYNC_TIMEOUT	P0606	This monitor checks if: • Defective Polaris ASIC. • Defective microprocessor. • Operating system failure	The ASIC detects if the time since the prior valid rising SYNC edge exceeds the SYNC timeout time. Then the ASIC turns off the coil drivers and sets the "SYNC Timeout" SPI bit. The SW monitors the ASIC's "SYNC Timeout" SPI bit to detect if a SYNC Timeout has occurred.	This fault would be set if the SPI bit SYNC Timeout is set for 25msec	• Polaris is initialized	max 17ms	Type A. MIL Illumination.
SYS_ASIC_CONFIG_REG_FAILURE	P0606	This monitor checks if: • register error • register rewrite error	• Configuration Registers: (These are written once at startup.) After writing once, read back and verify their contents during every subsequent 5ms SPI loop.	Rewrite registers with an incorrect value Verify if the write was successful during the following 5ms SPI loop's read & verify. If the rewrite is not successful after 3 attempts in a row, set a fault.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_CONTROL_REG_FAILURE	P0606	This monitor checks if: • register error • register rewrite error	• Control Registers: (These are written every 5ms loop for control or failsafing purposes.) For those registers not covered by other SMs, read and verify every 5ms loop, prior to performing the write.	Rewrite registers with an incorrect value Verify if the write was successful during the following 5ms SPI loop's read & verify. If the rewrite is not successful after 3 attempts in a row, set a fault.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ENQ_PIN_FAILED	P0606	This monitor checks if: • Defective ASIC.	• The Polaris ASIC provides a digital push-pull output, ENQ. ENQ is high when the ENQ Enable SPI bit is set, the Watchdog Status is "in range", WDEN Status is high, and nRST Status is high. Otherwise ENQ is low. ENQ is used as a pre-driver to enable ECU circuitry.	The MCU shall continuously monitor the ASIC ENQ feedback signal state and verify that it has the expected state. The HW shall provide a digital feedback signal of ASIC ENQ signal to MCU digital input.	• Polaris is initialized	10 msec	Type A. MIL Illumination.
BROKEN_WIRE_BPWM_SWITCH_1	P060B	This monitor checks if: • Improper (broken wire) connection between the external analog sensor and the input pin. • Defective microprocessor.	• Conversion results for VHigh and VLow ADC channels are out of range, then Broken Wire fault is set.	• Each software loop, ADC conversion results for VHigh and VLow MMC ADC Channels are read. • If conversion results for VHigh and VLow are out of range, then Broken Wire fault is set.	• Power Switch is ON	5 msec	Type A. MIL Illumination.
BROKEN_WIRE_BPWM_SWITCH_5	P060B	This monitor checks if: • Improper (broken wire) connection between the external analog sensor and the input pin. • Defective microprocessor.	• Conversion results for VHigh and VLow ADC channels are out of range, then Broken Wire fault is set.	• Each software loop, ADC conversion results for VHigh and VLow MMC ADC Channels are read. • If conversion results for VHigh and VLow are out of range, then Broken Wire fault is set.	• Power Switch is ON	5 msec	Type A. MIL Illumination.
BROKEN_WIRE_BFL_SWITCH_2	P060B	This monitor checks if: • Improper (broken wire) connection between the external analog sensor and the input pin. • Defective microprocessor.	• Conversion results for VHigh and VLow ADC channels are out of range, then Broken Wire fault is set.	• Each software loop, ADC conversion results for VHigh and VLow MMC ADC Channels are read. • If conversion results for VHigh and VLow are out of range, then Broken Wire fault is set.	• Power Switch is ON	5 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
BROKEN_WIRE_TEMP_FDBK_A	P060B	This monitor checks if: • Improper (broken wire) connection between the external analog sensor and the input pin. • Defective microprocessor.	• Conversion results for VHigh and VLow ADC channels are out of range, then Broken Wire fault is set.	• Each software loop, ADC conversion results for VHigh and VLow MMC ADC Channels are read. • If conversion results for VHigh and VLow are out of range, then Broken Wire fault is set.	• Power Switch is ON	5 msec	Type A. MIL Illumination.
BROKEN_WIRE_COIL_THREE_WAY_PRIMARY_FDBK_A	P060B	This monitor checks if: • Open coil detection • Defective microprocessor.	• Broken wire faults is set when the low side driver drain feedback is not at expected value when coil and Base Brake Safety switch is commanded ON.	• The MCU monitors the low side driver drain feedback to determine an open coil failure while coil is commanded OFF and Base Brake Safety switch is commanded ON every 5msec. • Broken wire faults is set when the low side driver drain feedback is not at expected value when coil and Base Brake Safety switch is commanded ON.	• Power Switch is ON	30 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
BROKEN_WIRE_COIL_THREE_WAY_SECONDARY_FDBK_A	P060B	This monitor checks if: • Open coil detection • Defective microprocessor.	• Broken wire faults is set when the low side driver drain feedback is not at expected value when coil and Base Brake Safety switch is commanded ON.	• The MCU monitors the low side driver drain feedback to determine an open coil failure while coil is commanded OFF and Base Brake Safety switch is commanded ON every 5msec. • Broken wire faults is set when the low side driver drain feedback is not at expected value when coil and Base Brake Safety switch is commanded ON.	• Power Switch is ON	30 msec	Type A. MIL Illumination.
SYS_ASIC_U1_SELECT_FAILURE	P0606	This monitor checks if: • Defective printed circuit board. • Defective ASIC. • Defective microprocessor.	• The U1 operating mode and voltage level selections are viewable via the U1 Mode Select Status and U1 Voltage Select Status SPI fields. The SPI feedback signals are internally routed so that they monitor the true state of the mode and voltage control circuits.	The MCU verifies that the U1 Mode Select Status and U1 Voltage Select Status SPI fields in register 0x45 match the values which are hard-coded into SW corresponding the application's intended HW population. If a mismatch is detected, fault is set.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_NVM_FAIL	P062F	This monitor checks if: • Defective printed circuit board. • Defective ASIC. • Defective microprocessor.	• During the ASIC's full active logic reset sequence (within the active mode), the ASIC shall read and compare the primary and inverted U1 mode and voltage SPI fields. • If primary and inverted SPI fields do not match, the ASIC shall configure the U1 regulator in the 1.1V, supervisor mode configuration and shall set the TRW NVM Fail SPI bit in registers 0x45 and 0x61.	The MCU shall periodically verify that the TRW NVM Fail SPI bit (reg 0x45) is low. If the bit is read as high, fault is set.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_SM_DISABLED	P0606	This monitor checks if: • Defective printed circuit board. • Defective ASIC. • Defective microprocessor.	• The ASIC shall set the Safety Mechanisms Disabled SPI bit when a test mode is active which prevents the ASIC from resetting the MCU or disabling power supplies in reaction to a fault.	The MCU shall periodically verify that the Safety Mechanisms Disabled SPI bit is low. If the bit is read as high, fault is set.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_SPI_TRANSFER_ERROR	P0606	This monitor checks if: • SPI transfer error • ASIC problem • PCB problem	• The micro monitors the SPI data transmissions and checks for SPI transfer errors	If any of the below errors are observed in Spi Data transmission this fault will set. POLARIS_SPI_NOT_INITIALIZED POLARIS_SPI_TRANSFER_REJECTED POLARIS_SPI_TX_MSG_LENGTH_ERROR	• Continuous failsafing	15 msec	Type A. MIL Illumination.
Group 5 - Microcontroller							
ROM_CRC_FAILURE	P0606	This monitor checks if: • Defective microprocessor • Incorrect fault detection algorithm	• CRC ROM Failure R4 • The ROM self-test is a dynamic test that is called from the scheduler at a rate of 5 msec. Each ROM section is checksummed byte by byte. Each byte will be added to the current checksum for a section. If the byte being checked is the last byte of a section, then the setion is verified for a correct checksum stored at the end of the section.	calculated CRC != stored CRC	• Power Switch is ON	5 msec	Type A. MIL Illumination.
LMU_DATA_PATH_TEST_FAILURE	P0606	This monitor checks if: Permanent failure of the LMU (Local Memory Unit) SRAM data path	The fault will be set if the data written to the LMU SRAM does not match the data read back from the same location of the LMU SRAM	The test consists of the following sequence: 1. Write 8 different 8-bit values to sequential addresses in LMU SRAM. Data pattern: 0x1122334455667788 2. Perform a 64-bit read and compare against expected values 3. Write 4 different 16-bit values to sequential addresses in LMU SRAM. Data pattern: 0xEEDDCCBBAA998877 4. Perform a 64-bit read and compare against expected values 5. Write 2 different 32-bit values to sequential addresses in LMU SRAM. Data pattern: 0xA5A5A5A5A5A5A5A5 6. Perform a 64-bit read and compare against expected values	Always runs during initialization	1 Count	Type A. MIL Illumination.
SPINLOCK_FAULT_BUFFER_ERROR	P0606	This monitor checks if: Software Error CPU Failure	Spinlock variable fails to go to available value before timeout expires.	None	Always Enabled	10 msec	Type A. MIL Illumination.
SPINLOCK_ONSTAR_FAULT_LATCHED_ERROR	P0606	This monitor checks if: Software Error CPU Failure	Spinlock variable fails to go to available value before timeout expires.	None	Always Enabled	10 msec	Type A. MIL Illumination.
SPINLOCK_ONSTAR_FAULT_CLEARED_ERROR	P0606	This monitor checks if: Software Error CPU Failure	Spinlock variable fails to go to available value before timeout expires.	None	Always Enabled	10 msec	Type A. MIL Illumination.
SPINLOCK_FMM_BLOCK_ERROR	P0606	This monitor checks if: Software Error CPU Failure	Spinlock variable fails to go to available value before timeout expires.	None	Always Enabled	10 msec	Type A. MIL Illumination.
SPINLOCK_NVRAM_FAULT_BIT_ERROR	P062F	This monitor checks if: Software Error CPU Failure	Spinlock variable fails to go to available value before timeout expires.	None	Always Enabled	10 msec	Type A. MIL Illumination.
OS_TASK_MONITOR_FAULT_CORE0	P0606	This monitor checks if: Software Error Partial Microcontroller Failure	Checks to be sure that all tasks on CPU0 are running	None	Always Enabled	1 count	Type A. MIL Illumination.
OS_TASK_MONITOR_FAULT_CORE1	P0606	This monitor checks if: Software Error Partial Microcontroller Failure	Checks to be sure that all tasks on CPU1 are running	None	Always Enabled	1 count	Type A. MIL Illumination.
OS_TASK_MONITOR_FAULT_CORE2	P0606	This monitor checks if: Software Error Partial Microcontroller Failure	Checks to be sure that all tasks on CPU2 are running	None	Always Enabled	1 count	Type A. MIL Illumination.
OS_INTERNAL_FAILURE_CORE0	P0606	This monitor checks if: Failure in a hardware system that the OS depends on.	The OS has detected a serious failure such that, as determined by the OS vendor, it cannot continue safe operation on at least 1 CPU. This is most likely because of a failure in a hardware system that the OS depends on.	None	Always Enabled	10 msec	Type A. MIL Illumination.
OS_INTERNAL_FAILURE_CORE1	P0606	This monitor checks if: Failure in a hardware system that the OS depends on.	The OS has detected a serious failure such that, as determined by the OS vendor, it cannot continue safe operation on at least 1 CPU. This is most likely because of a failure in a hardware system that the OS depends on.	None	Always Enabled	10 msec	Type A. MIL Illumination.
OS_INTERNAL_FAILURE_CORE2	P0606	This monitor checks if: Failure in a hardware system that the OS depends on.	The OS has detected a serious failure such that, as determined by the OS vendor, it cannot continue safe operation on at least 1 CPU. This is most likely because of a failure in a hardware system that the OS depends on.	None	Always Enabled	10 msec	Type A. MIL Illumination.
RTOS_FAILURE_CORE0	P0606	This monitor checks if: Software Error	EB OS detects an error situation and calls ErrorHook with a status code for which there is no other fault code.	None	Always Enabled	5*Number of errors in 10ms update Cycle	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
RTOS_FAILURE_CORE1	P0606	This monitor checks if: Software Error	EB OS detects an error situation and calls ErrorHook with a status code for which there is no other fault code.	None	Always Enabled	5*Number of errors in 10ms update Cycle	Type A. MIL Illumination.
RTOS_FAILURE_CORE2	P0606	This monitor checks if: Software Error	EB OS detects an error situation and calls ErrorHook with a status code for which there is no other fault code.	None	Always Enabled	5*Number of errors in 10ms update Cycle	Type A. MIL Illumination.
UNEXPECTED_EXCEPTION_CORE0	P0606	This monitor checks if: Software Error Partial Microcontroller Failure	The CPU detects a situation where it cannot successfully complete an instruction, such no memory exists at the read/write address or instruction code is invalid. The CPU branches to a predefined Trap address and control is transferred to the Elektrobit OS. The EB OS will call ProtectionHook with status code E_OS_PROTECTION_EXCEPTION provided the following two aspects are true. 1 – The trap was not a normal function of the OS. 2 – The OS does not have another more specific error code to use, such as E_OS_PROTECTION_MEMORY for a MPU violation.	None	Always Enabled	10 msec	Type A. MIL Illumination.
UNEXPECTED_EXCEPTION_CORE1	P0606	This monitor checks if: Software Error Partial Microcontroller Failure	The CPU detects a situation where it cannot successfully complete an instruction, such no memory exists at the read/write address or instruction code is invalid. The CPU branches to a predefined Trap address and control is transferred to the Elektrobit OS. The EB OS will call ProtectionHook with status code E_OS_PROTECTION_EXCEPTION provided the following two aspects are true. 1 – The trap was not a normal function of the OS. 2 – The OS does not have another more specific error code to use, such as E_OS_PROTECTION_MEMORY for a MPU violation.	None	Always Enabled	10 msec	Type A. MIL Illumination.
UNEXPECTED_EXCEPTION_CORE2	P0606	This monitor checks if: Software Error Partial Microcontroller Failure	The CPU detects a situation where it cannot successfully complete an instruction, such no memory exists at the read/write address or instruction code is invalid. The CPU branches to a predefined Trap address and control is transferred to the Elektrobit OS. The EB OS will call ProtectionHook with status code E_OS_PROTECTION_EXCEPTION provided the following two aspects are true. 1 – The trap was not a normal function of the OS. 2 – The OS does not have another more specific error code to use, such as E_OS_PROTECTION_MEMORY for a MPU violation.	None	Always Enabled	10 msec	Type A. MIL Illumination.
FSMC_MISMATCH_VELOCITY	P0606	This monitor checks if: • Defective • Microprocessor • At least one • wheel velocity • calculation • between • Micro 1 and • Micro 2 does not agree	• Mismatched Wheel Velocity Failure • Both micro 1 and micro 2 are calculating the velocity for each wheel. All wheel speeds computed by the micro 1 are transmitted to the micro 2 every loop time. The micro 2 compares them to the appropriate velocities received from the micro 1.	Tolerance of any wheel velocity calculations is > +/- 10 km/h	• High wheel acceleration inhibits this routine	35 ms	Type A. MIL Illumination.
LOGICAL_SEQUENCE_FAULT_CORE0	P0606	This monitor checks if: Improper sequencing of runnables	If the software finds mismatch in current sequence compared to predefined sequence of the runnables then LSM flag in Core 0 is set.	Fault is set if LSM flag in Core 0 is set.	Continuous Failsafing	1 count	Type A. MIL Illumination.
LOGICAL_SEQUENCE_FAULT_CORE1	P0606	This monitor checks if: Improper sequencing of runnables	If the software finds mismatch in current sequence compared to predefined sequence of the runnables then LSM flag in Core 1 is set.	Fault is set if LSM flag in Core 1 is set.	Continuous Failsafing	1 count	Type A. MIL Illumination.
LOGICAL_SEQUENCE_FAULT_CORE2	P0606	This monitor checks if: Improper sequencing of runnables	If the software finds mismatch in current sequence compared to predefined sequence of the runnables then LSM flag in Core 2 is set.	Fault is set if LSM flag in Core 2 is set.	Continuous Failsafing	1 count	Type A. MIL Illumination.
CPU_FAILURE_SEVERITY_X	P0606	This monitor checks if: • Defective microprocessor • Improper Application Code	The SW shall configure the MCU's fault manager to signal MCU faults via alarm but don't require the MCU to be held in reset.	See Aurix_Alarms_Update.xlxs for which alarm indicates what MCU faults and set the CPU_FAILURE_SEVERITY_X fault.	• Power Switch in ON	Checked continuously set on first occurrence.	Type A. MIL Illumination.
CPU_FAILURE_SEVERITY_Y	P0606	This monitor checks if: • Defective microprocessor • Improper Application Code	Activates the FSP then checks to see if it truly got activated. Also, checks to see if the ASIC saw the FSP pin activate.	If Polaris feedback does not match FSP command OR If Aurix feedback does not match FSP command	• Power Switch in ON	Checked once at power up, sets for signal occurrence of feedback not matching expectation.	Type A. MIL Illumination.
CPU_FAILURE_SEVERITY_TRANSIENT	P0606	This monitor checks if: • Defective microprocessor • Improper Application Code	The SW shall configure the MCU's fault manager to signal MCU faults via alarm and configures hardware intervention to hold MCU in reset. When the alarm occurs, SW stores information in NVRAM. On the next Ignition cycle if SW sees indication stored in NVRAM that indicates we had an FSP occur, we set the fault. Note: There is no gaurantee that SW is able to write to NVRAM depending on what has failed.	See Aurix_Alarms_Update.xlxs for which alarm indicates what MCU faults and set the CPU_FAILURE_SEVERITY_TRANSIENT fault.	• Power Switch in ON	Checked once at power up.	Type A. MIL Illumination.
SYS_ASIC_SYNC_TIME_MISMATCH_FAULT	P0606	This monitor checks if: • Defective system ASIC	• At each valid SYNC edge, the ASIC shall store the time between that edge and the prior valid SYNC edge in the Prior SYNC Interval Time SPI register field.	The MCU shall measure time between SYNC edges (based upon the MCU clock) and verify the time matches the ASIC's Prior SYNC Interval Time SPI field.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_TARGET_CURRENT_DETECT	P0606	This monitor checks if: When any ABS ISOs, NO DAP or PEDAL_SIM solenoids are: • Shorted Solenoid OR • Open Solenoid Driver OR • Open Flyback diode	• None.	Periodically (e.g. once per ignition cycle), the MCU shall command the maximum coil current with the solid state relay off and verify that the ASIC sets the "CC_DRx High Target Unreachable" SPI flag. The MCU shall also command the minimum non-zero coil current with the solid state relay on and verify that the ASIC sets the "CC_DRx Low Target Unreachable" SPI flag. This test shall be performed on all CC_DRx channels.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_DRIVER_SHORT_DETECT	P0606	This monitor checks if: • Defective system ASIC	• The ASIC shall not automatically inhibit the Shorted Driver Detection (SM37) when the SSR is off.	Periodically (e.g. once per ignition cycle), the MCU shall disable the SSR, enable the CC_DRx and DROx drivers, command 0A or 0% duty cycle, and verify that the Open Coil / Shorted Driver Warning Valid bits are set, and verify that a Shorted Driver Warning is reported on each driver channel.	• Polaris is initialized	15 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
SYS_ASIC_SSR_SELF_TEST_FAILED	P0604	This monitor checks if: • Solid State Relay problem • Defective ASIC • PCB problem	• The MCU performs various tests on the Solid State Relay during System Self Test.	(1a) Se/Command: Watchdog Counter Value SPI field = 0, WDEN pin low, the Enable Failsafe SSR SPI bit = 0, and the SSR Shut Off Pin low (= off). (1b) Verify the Coil Supply Voltage is low. (2a) Set the WDEN pin high, the Enable Failsafe SSR SPI bit = 1, and the SSR Shut Off Pin high (= on). Do not service the Watchdog. (2b) Verify the Coil Supply Voltage is low. (3a) Service Watchdog until the Watchdog Counter Value SPI field = 6. (3b) Verify the Coil Supply Voltage is low. (4a) Set the WDEN pin low, then service the Watchdog once, such that the Watchdog Counter Value SPI field = 7. (4b) Verify the Coil Supply Voltage is low. (5a) Set the Enable Failsafe SSR SPI bit = 0, then set the WDEN pin high. (5b) Verify the Coil Supply Voltage is low. (6a) Set the SSR Shut Off Pin low (= off), then set the Enable Failsafe SSR SPI bit = 1. (6b) Verify the Coil Supply Voltage is low. (7a) Allow the Watchdog to timeout, then set the SSR Shut Off Pin high (= on). The time between (4a) and (7a) should be counted toward the required timeout time. If the time between (4a) and (7a) is more than 34ms, a watchdog service event must be added in-between to prevent the Watchdog from timing out before (7a).	• Runs during initialization	30 msec	Type A. MIL Illumination.
				(7b) Verify the Coil Supply Voltage is low and verify the Watchdog Counter Value SPI field = 0. If any of the above tests failed , retry the re enable all the inputs that are being disabled for this test, and re run this test two more times. If it is still failed then set the fault. If any of the above tests failed , retry the re enable all the inputs that are being disabled for this test, and re run this test two more times. If it is still failed then set the fault.			
SYS_ASIC_WDOG_COUNT_TEST_FAILED	P0606	This monitor checks if: • Watchdog problem • Defective ASIC • PCB problem	• This fault tests the watchdog by purposefully allowing the watchdog to time out and checking to see how the watchdog reacts	Allow the Watchdog to timeout. Timeout shall occur 34ms to 42ms after the last watchdog service occurred, The time taken to timeout the watchdog counter should be counted toward the required timeout time. If the time is not in a range of 34 to 42 msec this fault should set	• Runs during initialization	34 msec	Type A. MIL Illumination.
WDOG_DYNAMIC_TEST_FAILURE	P0606	This monitor checks if: • Defective printed circuit board. • Defective ASIC. • Defective microprocessor.	• Watchdog Dynamic Test Failure • The micro sends a bad watchdog response value back to the ASIC periodically to verify that the ASIC does move towards disabling the system when the watchdog is not correctly being updated. Each loop, the watchdog status counter is checked. After the bad value is sent, the logic tests the status counter to verify that it moved towards disabling the system. If the ASIC operation did not move towards disabling the system, the logic assumes that the watchdog is not able to function properly. As a result, the logic disables the system because the watchdog operation cannot be assumed to be correct. 2 occurrences of this failure is needed to set the fault.	If the ASIC operation has not moved towards disabling the system, the logic assumes that the watchdog is not able to function properly. As a result, the logic disables the system because the watchdog operation cannot be assumed to be correct. 2 occurrences of this failure is needed to set the fault.	• Power Switch is ON	10 msec	Type A. MIL Illumination.
SYS_ASIC_U1_UV_RESET_FAULT	P0606	This monitor checks if: • ASIC power supply block problem • Defective ASIC • PCB problem	When the U5 or U3 Undervoltage Diagnostic SPI bit is set, the ASIC raises the effective U5 out of range lower warning level, or the U3 undervoltage fault threshold above the maximum U5 or U3 regulation voltage, thus forcing a U5 out of range warning or U3 undervoltage fault. Periodically, the MCU shall store a flag in NVM indicating that it will perform a U5, U3 or U1 undervoltage diagnostic. The MCU shall then force one of the three test modes and start a timer.	The MCU shall detect a fault if it does not receive a reset within the expected time. If a reset occurs, the MCU shall check NVM and the ASIC's Reset Source SPI Register, and verify that the reset was due to a planned test.	• Runs during initialization	10 msec	Type A. MIL Illumination.
SYS_ASIC_OSCI_RESET_TEST_FAULT	P0606	This monitor checks if: • Oscillator problem • Defective ASIC • PCB problem	• The ASIC shall provide a means to periodically verify that the ASIC is capable of detecting an Oscillator Fault condition and entering the Oscillator Fault Power-down Mode. • From within TRW Test Mode, the ASIC shall provide Main and Supervisor Oscillator Diagnostic bits, which are capable of diving the main oscillator frequency by 2, stopping the main oscillator, dividing the supervisor oscillator frequency by 2, and stopping the supervisor oscillator. • Periodically (e.g. once per ignition cycle) the MCU shall store a flag in NVM indicating that it will perform a oscillator diagnostic. The MCU shall then force one of the four oscillator test modes and start a timer.	The MCU shall detect a fault if it does not receive a reset within the expected time. If a reset occurs, the MCU shall check NVM and the ASIC's Reset Source SPI Register, and verify that the reset was due to a planned test.	• Runs during initialization	10 msec	Type A. MIL Illumination.
SYS_ASIC_DBO1_OVERCURRENT	P0606	This monitor checks if: • Digital buffered output is overcurrent • ASIC problem • PCB problem	• The ASIC shall limit the DBOx current and, after the over-current warning debounce time, set the DBOx Overcurrent Warning SPI flag specific to the faulted output. If the ASIC's Central Overtemperature Warning and the debounced DBOx Overcurrent Warning are both active, the ASIC shall also disable the shorted switch.	The MCU shall read the ASIC's DBOx Overcurrent Warning SPI field. If the SPI bit is high, fault is set.	• Continuous failsafing	30 msec	Type A. MIL Illumination.
SYS_ASIC_DBO2_OVERCURRENT	P0606	This monitor checks if: • Digital buffered output is overcurrent • ASIC problem • PCB problem	• The ASIC shall limit the DBOx current and, after the over-current warning debounce time, set the DBOx Overcurrent Warning SPI flag specific to the faulted output. If the ASIC's Central Overtemperature Warning and the debounced DBOx Overcurrent Warning are both active, the ASIC shall also disable the shorted switch.	The MCU shall read the ASIC's DBOx Overcurrent Warning SPI field. If the SPI bit is high, fault is set.	• Continuous failsafing	30 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
SYS_ASIC_LOGIC_RST_STUCK_DETECT	P0606	This monitor checks if: • Reset source register problem • ASIC problem • PCB problem	• The MCU continuously monitors the External LOGIC_RST Reset SPI bit within the Reset Source Register.	The MCU shall read the ASIC's External LOGIC_RST Reset SPI field. If the SPI bit is high, fault is set.	• Continuous failsafing	15 msec	Type A. MIL Illumination.
MULTIPLE_STARTUP_FAILURE	P0606	This monitor checks if: • Defective CPU	The library of micro safety tests are run at every power-up. If any test fails the results are stored and the system is soft reset. If after the reset, any different test or procedure fails then a MULTIPLE_STARTUP_FAILURE is latched	Any two different Safety Test flags are reported as FAILED in two consecutive tests	Enabled at power up	1 count	Type A. MIL Illumination.
SBST_CORE2_FAILURE	P0606	This monitor checks if: Failure of the CPU core	Fault is set if SafeTlib test "CpuTst_CpuSbstPTst()" fails	Every 1 second the SafeTlib test "CpuTst_CpuSbstPTst()" is run. The fault is set if it returns a failure.	Continous - Always enabled	1 Count	Type A. MIL Illumination.
UNIMPLEMENTED_INTERRUPT_CORE0	P0606	This monitor checks if: Defective CPU	When the failsafe is called during runtime, it will loop through all the SRC registers to find if there is any pending interrupt from disabled interrupt source	If SRPN bits in SRC register of Interrupt router is zero then the fault will set if SRR bit of SRC register is set	Continuous Failsafing	300 counts	Type A. MIL Illumination.
ADC_FAILURE	P060B	This monitor checks if: • Defective CPU	Fault sets under the following circumstances: An AD pin is read. Using the Conversion Diagnostics, a pull down is tied to the pin and read again. Then, a pull up is tied to the pin, and read again. Then, the pull devices are removed, and the pin is read a 4th time. The fault will be set if the pull down did not pull the value down by at least 20%, or, the pull up did not pull the value up by at least 20%, or the reread value changed from the initial value by more than 3%. Repeat on another AD pin.	If (pulled down value read > initial value read * 0.8) OR If (pulled up value read < initial value read * 1.2) OR If (reread value > initial value read*1.03) OR If (reread value < initial value read *0.97) THEN Set ADC_FAILURE	performed at power up	1 count	Type A. MIL Illumination.
RESET_SSCHECK_FAILURE	P0606	This monitor checks if: • Defective CPU	After a warm reset the RSTCON2.CSS bits are checked. If any are 0, then the fault will be set	If (warm reset == TRUE) AND (RSTCON2.CSS == 0)	performed at power up	1 count	Type A. MIL Illumination.
SPB_FAILURE	P0606	This monitor checks if: failed System Peripheral Bus	The correct value of different registers shall be tested to ensure the proper functioning of the SPB address lines. Fault set if any of the registers have an unexpected value after 5 consecutive checks in the 20 ms task .	Each of the required registers will be read during runtime to see if they provide the expected value that was loaded during initialization.	Power Switch is ON	100msec	Type A. MIL Illumination.
SMU_CONFIG_REGISTER_READBACK_FAILURE	P0606	This monitor checks if: • Defective CPU	after the SMU has been initialized it will loop through a table of SMU registers and compare each register value to the value that the MCAL has previously written to it. If there is a difference, then the SMU will be unlocked, the register updated, and then the SMU will be put back to it's previous state. The register will then be checked again. If it fails 3 times, then the SMU_CONFIG_REGISTER_READBACK_FAILURE will be set.	register value is not equal to test value written to it	performed at power up	1 count	Type A. MIL Illumination.
SBCU_CONFIG_REGISTER_READBACK_FAILURE	P0606	This monitor checks if: • Defective CPU	after the SMU has been initialized it will loop through a table of SMU registers and compare each register value to the value that the MCAL has previously written to it. If there is a difference, then the SMU will be unlocked, the register updated, and then the SMU will be put back to it's previous state. The register will then be checked again. If it fails 3 times, then the SMU_CONFIG_REGISTER_READBACK_FAILURE will be set.	register value is not equal to test value written to it	performed at power up	1 count	Type A. MIL Illumination.
WDT_CONFIG_REGISTER_READBACK_FAILURE	P0606	This monitor checks if: • Defective CPU	On initialization: One or more of these Safety Watchdog registers has an incorrect value: WDTSCON0.REL WDTSCON1.IR0 WDTSCON1.IR1 WDTSCON1.DR WDTSCON1.UR WDTSCON1.TCTR During runtime: One or more of these CPU0 Watchdog registers has an incorrect value for 4 consecutive checks: WDTCPU0CON0.REL WDTCPU0CON1.IR0 WDTCPU0CON1.IR1 WDTCPU0CON1.DR WDTCPU0CON1.UR WDTCPU0CON1.TCTR	any register has an incorrect value for four consecutive checks	Enabled at power up	4 count	Type A. MIL Illumination.
CPU_BUS_MPU_CONFIG_REGISTER_READBACK_FAILURE	P0606	This monitor checks if: • Defective CPU	after the MPU has been initialized it will loop through a table of MPU registers and compare each register value to the value that the MCAL has previously written to it. If there is a difference, then the MPU will be unlocked, the register updated, and then the SMU will be put back to it's previous state. The register will then be checked again. If it fails 3 times, then the CPU_MPU_CONFIG_REGISTER_READBACK_FAILURE will be set.	register value is not equal to test value written to it	performed at power up	1 count	Type A. MIL Illumination.
LMU_MPU_CONFIG_REGISTER_READBACK_FAILURE	P0606	This monitor checks if: • Defective CPU	after the MPU has been initialized it will loop through a table of MPU registers and compare each register value to the value that the MCAL has previously written to it. If there is a difference, then the MPU will be unlocked, the register updated, and then the SMU will be put back to it's previous state. The register will then be checked again. If it fails 3 times, then the CPU_MPU_CONFIG_REGISTER_READBACK_FAILURE will be set.	register value is not equal to test value written to it	performed at power up	1 count	Type A. MIL Illumination.
PB_MICRO_REGISTER_READBACK_FAILURE	P0606	This monitor checks if: • Defective CPU	The ECU provides the capability to ensure the data integrity of register configuration. The software shall ensure the data integrity of the register configuration and compare the calculated checksum against an expected value.	register value is not equal to test value written to it	performed at power up	1 count	Type A. MIL Illumination.
SAFETY_LIB_DETECTED_FAILURE	P0606	This monitor checks if: • Defective CPU	The library of micro safety tests are run at every power-up. If any test fails the results are stored and the system is soft reset. If after the reset, the same test or procedure fails then a SAFETY_LIB_DETECTED_FAILURE is latched	Any one Safety Test flag is reported as FAILED in two consecutive tests	Enabled at power up	1 count	Type A. MIL Illumination.
STM_PLAUSIBILITY_FAILURE	P0606	This monitor checks if: • Defective CPU	STM and TBU timers are read without interrupt between, then after 20 ms, STM and TBU elaspsed times are read without interrupt between the readings, the 2.5% error is checked and Up/down failsafe monitor function is called. The fault is continiously checked every 20 ms.	The difference between the System Timer and Time Base Unit channel 1 >= 2.5%	Enabled at power up	105 msec	Type A. MIL Illumination.
EVR_CFGMON_FAILURE	P0606	This monitor checks if: • Defective CPU	The Power Management Status Register is checked at power-up. Two configuration bits are checked. Also the EVR Active flag is checked.	If any of the checked flags are FALSE then the fault is set immediately	performed at power up	1 count	Type A. MIL Illumination.
RAM_STARTUP_MBIST_FAILURE	P0604	This monitor checks if: • Defective CPU	The micro runs a RAM self test at power-up. If a failure is detected the the BIST is rerun after a warm reset. If a failure still exists then the failed bit will be set	If the failed bit is TRUE then set the fault	performed at power up	1 count	Type A. MIL Illumination.
Group 6 - ABS Pump Motor							
Group 7 - IBC Motor							

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
MD_PU_I_SENSE_COMMON_MODE_FAULT	C0596	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	If {common mode Isense offset - zero Isense offset} is outside the normal range (+/- SPUT_ISENSE_MAX_CM_ISHIFT), this fault is set.	If the current sampled at power-up with an injected common mode I-sense offset (positive & negative together), is outside +/- maximum common mode offset range (from the zero offset reading), this fault is raised.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1 ms	Type A. MIL Illumination.
MD_PU_I_SENSE_NEGATIVE_FAULT	C0596	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	If {zero Isense offset - negative Isense offset } is outside the normal range (SPUT_ISENSE_MIN_NEG_ISHIFT to SPUT_ISENSE_MAX_NEG_ISHIFT), this fault is set	If the current sampled at power-up with an injected negative I-sense offset, is outside minimum to maximum negative offset range (from the zero offset reading), this fault is raised.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1 ms	Type A. MIL Illumination.
MD_PU_I_SENSE_POSITIVE_FAULT	C0596	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	If {positive Isense offset - zero Isense offset} is outside the normal range (SPUT_ISENSE_MIN_POS_ISHIFT to SPUT_ISENSE_MAX_POS_ISHIFT), this fault is set.	If the current sampled at power-up with an injected positive I-sense offset, is outside minimum to maximum positive offset range (from the zero offset reading), this fault is raised.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1 ms	Type A. MIL Illumination.
MD_IEM_OCCURRENCE_FAULT	C0582	This monitor checks if: • Bridge FET failure • Invalid execution rate of a motor interrupt.	Compares the number of times each electric drive interrupt has occurred in a 4ms period, and sets if the interrupt count does not fall in an acceptable range	The occurrence counter of any enabled motor interrupt is outside an expected interval.	ECU is not shutting down.	1 count/4 ms	Type A. MIL Illumination.
MD_IEM_PLAUSIBILITY_FAULT	C0582	This monitor checks if: • Bridge FET failure • Invalid execution reason of a motor interrupt.	This fault sets if a motor control interrupt is executed with the wrong proirity level, or an interrupt is executed when it should be disabled.	Either a motor interrupt has been executed which wasn't explicitly enabled.	Motor Drive is in either "Running" or "Paused" state (i.e. not in "Init" or intermediate "Resuming" or "Terminated" state)	1 count	Type A. MIL Illumination.
MD_MOTOR_PHASE_VOLTAGE_1_HIGH_FAULT	C057F	This monitor checks if: Bridge FET failure	When phase 1 voltage is high, the microcontroller shall capture {M1_PH1_SEN phase voltage high}, if {M1_PH1_SEN phase voltage high} is less than RT_PHASE_VOLTAGE_HIGH_MIN then this fault is raised. Motor Phase Voltage HIGH Test is executed when the Inverter FET is switched on. IF motor phase <n> voltage < PHASE VOLTAGE THRESHOLD HIGH THEN faulty bucket is incremented	M1_PH1_SEN phase voltage high < 3.46V	executed when the Inverter FET is switched on. Motor PWM is on	18 msec/128 counts	Type A. MIL Illumination.
MD_MOTOR_PHASE_VOLTAGE_1_LOW_FAULT	C0580	This monitor checks if: Bridge FET failure	When phase 1 voltage is low, the microcontroller shall capture {M1_PH1_SEN phase voltage low}, if {M1_PH1_SEN phase voltage low} is greater than RT_PHASE_VOLTAGE_LOW_MAX then this fault is raised Motor Phase Voltage LOW Test is executed when the lower Inverter FET is switched on. IF motor phase <n> voltage > PHASE VOLTAGE THRESHOLD LOW THEN faulty bucket is incremented	M1_PH1_SEN phase voltage low > 0.99V	executed when the lower Inverter FET is switched on. Motor PWM is on	18 msec/128 counts	Type A. MIL Illumination.
MD_MOTOR_PHASE_VOLTAGE_2_HIGH_FAULT	C057F	This monitor checks if: Bridge FET failure	When phase 2 voltage is high, the microcontroller shall capture {M1_PH2_SEN phase voltage high}, if {M1_PH2_SEN phase voltage high} is less than RT_PHASE_VOLTAGE_HIGH_MIN then this fault is raised. Motor Phase Voltage HIGH Test is executed when the Inverter FET is switched on. IF motor phase <n> voltage < PHASE VOLTAGE THRESHOLD HIGH THEN faulty bucket is incremented	M1_PH1_SEN phase voltage high < 3.46V	executed when the Inverter FET is switched on.	18 msec/128 counts	Type A. MIL Illumination.
MD_MOTOR_PHASE_VOLTAGE_2_LOW_FAULT	C0580	This monitor checks if: Bridge FET failure	When phase 2 voltage is low, the microcontroller shall capture {M1_PH2_SEN phase voltage low}, if {M1_PH2_SEN phase voltage low} is greater than RT_PHASE_VOLTAGE_LOW_MAX then this fault is raised. Motor Phase Voltage LOW Test is executed when the lower Inverter FET is switched on. IF motor phase <n> voltage > PHASE VOLTAGE THRESHOLD LOW THEN faulty bucket is incremented	M1_PH1_SEN phase voltage low > 0.99V	executed when the lower Inverter FET is switched on.	18 msec/128 counts	Type A. MIL Illumination.
MD_MOTOR_PHASE_VOLTAGE_3_HIGH_FAULT	C057F	This monitor checks if: Bridge FET failure	When phase 3 voltage is high, the microcontroller shall capture {M1_PH3_SEN phase voltage high}, if {M1_PH3_SEN phase voltage high} is less than RT_PHASE_VOLTAGE_HIGH_MIN then this fault is raised. Motor Phase Voltage HIGH Test is executed when the Inverter FET is switched on. IF motor phase <n> voltage < PHASE VOLTAGE THRESHOLD HIGH THEN faulty bucket is incremented	M1_PH1_SEN phase voltage high < 3.46V	executed when the Inverter FET is switched on.	18 msec/128 counts	Type A. MIL Illumination.
MD_MOTOR_PHASE_VOLTAGE_3_LOW_FAULT	C0580	This monitor checks if: Bridge FET failure	When phase 3 voltage is low, the microcontroller shall capture {M1_PH3_SEN phase voltage low}, if {M1_PH3_SEN phase voltage low} is greater than RT_PHASE_VOLTAGE_LOW_MAX then this fault is raised. Motor Phase Voltage LOW Test is executed when the lower Inverter FET is switched on. IF motor phase <n> voltage > PHASE VOLTAGE THRESHOLD LOW THEN faulty bucket is incremented	M1_PH1_SEN phase voltage low > 0.99V	executed when the lower Inverter FET is switched on.	18 msec/128 counts	Type A. MIL Illumination.
MD_PU_PHASE_1_STUCK_HIGH_FAULT	C057F	This monitor checks if: • Top FET shorted • Top FET drive stuck on or • Phase sense stuck high	Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit Drive stage power up tests confirm that with all FETs off, no phases are driven, Phase voltages checked against expectation, if high raise fault	If the motor phase 1 voltage is near to battery level, before the bridge is activated, probably caused by a short circuit top motor FET, the fault is raised.	Battery/link between 7.1v and 18v	40 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
MD_PU_PHASE_1_STUCK_LOW_FAULT	C0580	This monitor checks if: • Bottom FET shorted • Bottom FET drive stuck on or • Phase sense stuck low	Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit Drive stage power up tests confirm that with all FETs off, no phases are driven, Phase voltages checked against expectation, if low raise fault	If the motor phase 1 voltage is near to 0v, before the bridge is activated, probably caused by a short circuit bottom motor FET, the fault is raised.	Battery/link between 7.1v and 18v	40 ms	Type A. MIL Illumination.
MD_PU_PHASE_2_STUCK_HIGH_FAULT	C057F	This monitor checks if: • Top FET shorted • Top FET drive stuck on or • Phase sense stuck high	Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit Drive stage power up tests confirm that with all FETs off, no phases are driven, Phase voltages checked against expectation, if high raise fault	If the motor phase 1 voltage is near to battery level, before the bridge is activated, probably caused by a short circuit top motor FET, the fault is raised.	Battery/link between 7.1v and 18v	40 ms	Type A. MIL Illumination.
MD_PU_PHASE_2_STUCK_LOW_FAULT	C0580	This monitor checks if: • Bottom FET shorted • Bottom FET drive stuck on or • Phase sense stuck low	Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit Drive stage power up tests confirm that with all FETs off, no phases are driven, Phase voltages checked against expectation, if low raise fault	If the motor phase 2 voltage is near to 0v, before the bridge is activated, probably caused by a short circuit bottom motor FET, the fault is raised.	Battery/link between 7.1v and 18v	40 ms	Type A. MIL Illumination.
MD_PU_PHASE_3_STUCK_HIGH_FAULT	C057F	This monitor checks if: • Top FET shorted • Top FET drive stuck on or • Phase sense stuck high	Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit Drive stage power up tests confirm that with all FETs off, no phases are driven, Phase voltages checked against expectation, if high raise fault	If the motor phase 1 voltage is near to battery level, before the bridge is activated, probably caused by a short circuit top motor FET, the fault is raised.	Battery/link between 7.1v and 18v	40 ms	Type A. MIL Illumination.
MD_PU_PHASE_3_STUCK_LOW_FAULT	C0580	This monitor checks if: • Bottom FET shorted • Bottom FET drive stuck on or • Phase sense stuck low	Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit Drive stage power up tests confirm that with all FETs off, no phases are driven, Phase voltages checked against expectation, if low raise fault	If the motor phase 3 voltage is near to 0v, before the bridge is activated, probably caused by a short circuit bottom motor FET, the fault is raised.	Battery/link between 7.1v and 18v	40 ms	Type A. MIL Illumination.
MD_PU_BRIDGE_BH1_UV_FAULT	C0580	This monitor checks if: • ECU hardware failure	Bridge driver boostrap high side 1 capacitor under voltage fault reported during Bridge driver configuration.	With bridge enabled and SOFF off, the FET IL1 is driven for 200us. After 200us, "high side buffer capacitor 1 under voltage" error in internal error register is still set.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1ms	Type A. MIL Illumination.
MD_PU_BRIDGE_ERR_STUCK_HI_FAULT	C0582	This monitor checks if: • Bridge Driver ERR line connectivity • Bridge driver incorrect operation.	Verify Error line goes active (low), when error condition is injected.	During self test, the Bridge Driver HW error output pin (IOHWAB_BRIDGE_1_ERROR) was not active, when Current Sense Amplifier 1&2 - Gain 2 was set to a invalid value	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	20ms	Type A. MIL Illumination.
MD_PU_BRIDGE_ERR_STUCK_LO_FAULT	C0582	This monitor checks if: • Bridge Driver ERR signal connectivity.	Verify Error line goes inactive (high), when injected error condition is removed.	When Bridge configuration is started by driving the HW output Pin (IOHWAB_BRIDGE_1_INHIBIT) inactive, the HW Input Pin (IOHWAB_BRIDGE_1_ERROR) stays active.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	20 ms	Type A. MIL Illumination.
MD_PU_BRIDGE_INIT_TIMEOUT_FAULT	C0582	This monitor checks if: • Micro controller SPI failure. • Bridge Driver failure.	Verify Bridge Driver initialization completed within SPUT_DRV_INIT_MAX_TIME.	If initialization of the bridge driver does not occur within 100ms @ 1ms /bit	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	100ms	Type A. MIL Illumination.
MD_PU_BRIDGE_MAX_POWER_DOWN_FAULT	C0582	This monitor checks if: • Incorrect Bridge Driver operation	Allow only BD_PU_MAX_POWER_DOWN_CYCLES of retry, during Bridge Driver power up sequence.	the number of power down cycles during a bridge driver power up sequence exceeds 3	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1ms	Type A. MIL Illumination.
MD_PU_BRIDGE_OC_TIMEOUT_FAULT	C0582	This monitor checks if: • Incorrect Bridge Driver operation	Verify intermediate over current tests are completed within SPUT_DRV_OVER_CURRENT_MAX_TIME.	Immediate overcurrent tests are not completed within 10ms @ 0.1us/bit	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	40ms	Type A. MIL Illumination.
MD_PU_BRIDGE_OCT_NOT_COMPLETED	C0582	This monitor checks if: • Incorrect Bridge Driver operation	Verify over current test is completed within SPUT_DRV_OCT_MAX_EXECUTION_TIME.	overcurrent tests are not completed within 50ms @ 0.1us/bit	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	100ms	Type A. MIL Illumination.
MD_PU_BRIDGE_UNACCEPTABLE_ERR	C0582	This monitor checks if: • Incorrect Bridge Driver operation	Verify no un-acceptable errors are reported by Bridge device during power up.	If the below unacceptable error bits are set. - Global test mode (gtm) - Overvoltage Internal Regulator 6 Error (err_ov_reg6) - Charge Pump 1 Overload Error(err_cp1) - Charge Pump 2 Overload Error (err_cp2) - Overtemperature Shutdown (sd_ot) - Charge PumpOvervoltage Shutdown at Pin CB or Pin CH2-CL2 (sd_ov_cp), - Vs Path Charge Pump Input Overload (sd_cp1), - Overtemperature Detection (err_ot_w) - Latent Fault Warning (lfw) - Error Correction of Control Register Failed(ctrl_reg_invalid), - err_ov_ld_vdh in External Errors.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	70ms	Type A. MIL Illumination.
MD_PU_ISENSE_ZERO_OFFSET_FAULT	C0596	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	Zero I sense outside valid range The microcontroller shall test that while M1_ITP (positive) offset is inactive and M1_ITN (negative) offset is inactive, M1_ISENSE_1 (zero I-sense offset) is within SPUT_ISENSE1_OFFSET_MAX_ERROR	zero Isense offset (M1_ISENSE_1) is outside the normal range	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1ms	Type A. MIL Illumination.
MD_PU_MCU_FET_OP_STUCK_ON_FAULT	C0582	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	While bridge driver is enabled and prior to driving top or bottom FETs a power up test shall be performed to check no top or bottom FET is stuck on Turn all FETs off (MCU outputs off, bridge should drive FETs off) Monitor phase voltage whether is high/low	Top and Bottom FET stuck on during a Power up test. (Phase voltage is high when FETs are turned OFF)	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	40 ms	Type A. MIL Illumination.
MD_PU_BRIDGE_CONFIGSTATE_CHG_FAULT	C0594	This monitor checks if: • Micro controller SPI failure. • Bridge Driver failure.	This failsafe guarantees that the bridge driver is in an acceptable mode (Normal, Safe Off, Config, or Error) during the power-up test sequence. Unknown, Idle, Config Lock, Self Test, Rectification, and Sleep modes will cause this fault to latch.	Bridge Driver remains in "Idle Mode" for 5ms in which it was expected that it transits to "Configuration Mode", after the configuraion has been sent via SPI.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	145 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
MD_PU_BRIDGE_OVER_CURRENT_FAULT	C0590	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	This failsafe tests that over current detection on the bridge driver is working as it should. This failsafe operates during the power-up test.	Self test was started and Current Sense Amplifier 1&2 - Gain 2 was set to a invalid value and bridge driver error output pin (IOHWAB_BRIDGE_1_ERROR) was active, but over current fault bit was not set in sBridgeDriver.CurrentSenseAmpErrorStatus. OR Self test was startedandCurrent Sense Amplifier 1&2 - Gain 2 was set to a valid value and bridge driver error output pin (IOHWAB_BRIDGE_1_ERROR) was inactive, but over current fault bit was set in sBridgeDriver.CurrentSenseAmpErrorStatus.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	25 msec	Type A. MIL Illumination.
MD_MOTOR_OPEN_PHASE1_FAULT	C0580	This monitor checks if: • Open Phase	d-axis and q-axis demand is compared with phase 1 measured current, if difference is less than threshold and if actual current is less then threshold, raise a fault	Low Speed Detection (0rpm..400rpm): average D-axis current errors (over last 12 samples in 200µs cycle) > 6A (ID_OPEN_PHASE_ERR_THRESHOLD) AND maximum of phase current amplitude > 10A (PHASE_CURRENT_DIAG_ENABLE)AND last 3 samples A1 or C1 < 0.5A (ZERO CURRENT SAMPLE THRESHOLD) AND motor phase 1 current < 1A (ZERO_PHASE_CURRENT_THRESHOLD) High Speed Detection (400rpm..2400rpm): last 4 samples of Q-axis current demand > 10A (CURR DEM THRESHOLD) AND motor phase 1 current < 1A (ZERO_PHASE_CURRENT_THRESHOLD)	• NOT in Motor Open Phase Back-Up Mode AND • motor mechanical speed < 2400 rpm (MAX_MECH_SPD_OPEN_PHASE_DIAG_EN) AND • ECU assist enabled	30 msec	Type A. MIL Illumination.
MD_MOTOR_OPEN_PHASE2_FAULT	C0580	This monitor checks if: • Open Phase	d-axis and q-axis demand is compared with phase 2 measured current, if difference is less than threshold and if actual current is less then threshold, raise a fault	Low Speed Detection (0rpm..400rpm): average D-axis current errors (over last 12 samples in 200µs cycle) > 6A (ID_OPEN_PHASE_ERR_THRESHOLD) AND maximum of phase current amplitude > 10A (PHASE_CURRENT_DIAG_ENABLE)AND last 3 samples A1 or C1 < 0.5A (ZERO CURRENT SAMPLE THRESHOLD) AND motor phase 2 current < 1A (ZERO_PHASE_CURRENT_THRESHOLD) High Speed Detection (400rpm..2400rpm): last 4 samples of Q-axis current demand > 10A (CURR DEM THRESHOLD) AND motor phase 1 current < 1A (ZERO_PHASE_CURRENT_THRESHOLD)	• NOT in Motor Open Phase Back-Up Mode AND • motor mechanical speed < 2400 rpm (MAX_MECH_SPD_OPEN_PHASE_DIAG_EN) AND • ECU assist enabled	30 msec	Type A. MIL Illumination.
MD_MOTOR_OPEN_PHASE3_FAULT	C0580	This monitor checks if: • Open Phase	d-axis and q-axis demand is compared with phase 3 measured current, if difference is less than threshold and if actual current is less then threshold, raise a fault	Low Speed Detection (0rpm..400rpm): average D-axis current errors (over last 12 samples in 200µs cycle) > 6A (ID_OPEN_PHASE_ERR_THRESHOLD) AND maximum of phase current amplitude > 10A (PHASE_CURRENT_DIAG_ENABLE)AND last 3 samples A1 or C1 < 0.5A (ZERO CURRENT SAMPLE THRESHOLD) AND motor phase 3 current < 1A (ZERO_PHASE_CURRENT_THRESHOLD) High Speed Detection (400rpm..2400rpm): last 4 samples of Q-axis current demand > 10A (CURR DEM THRESHOLD) AND motor phase 1 current < 1A (ZERO_PHASE_CURRENT_THRESHOLD)	• NOT in Motor Open Phase Back-Up Mode AND • motor mechanical speed < 2400 rpm (MAX_MECH_SPD_OPEN_PHASE_DIAG_EN) AND • ECU assist enabled	30 msec	Type A. MIL Illumination.
MD_MOTOR_I_SENSE_DYNAMIC_COMM_MODE_FAULT	C0582	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	If ({common mode I-sense offset} – {zero I-sense offset}) is outside RT_ISENSE1_MAX_CM_ISHIFT_RANGE then this fault is raised. reference value is taken before applying both voltage offsets (Common), diagnostic_sample point is measured, if diagnostic_sample > reference +/- threshold then raise a fault	Either current sample is outside a valid range set by the respective reference sample plus /minus [-35A (DM_ISenseRtMaxCmIShiftNeg)...+35A (DM_ISenseRtMaxCmIShiftPos)]	• ECU assist enabled AND • ECU is not initializing or shutting down	4count/16ms	Type A. MIL Illumination.
MD_MOTOR_I_SENSE_DYNAMIC_POSITIVE_FAULT	C0582	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	If {M1_ISENSE1 positive offset current} is outside expected limits then this fault is raised. reference value is taken before applying positive voltage offset (P), diagnostic_sample point is measured, if reference is not saturated and if diagnostic_sample < reference + threshold then raise a fault	the absolute current sample during test is lower than the induced offset	• ECU assist enabled AND • ECU is not initializing or shutting down	4count/16ms	Type A. MIL Illumination.
MD_MOTOR_I_SENSE_DYNAMIC_NEGATIVE_FAULT	C0582	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	If {M1_ISENSE1 negative offset current} is outside expected limits then this fault is raised. reference value is taken before applying negative voltage offset (N), diagnostic_sample point is measured, if reference is not saturated and if diagnostic_sample > reference + threshold then raise a fault	the absolute current sample during test is lower than the induced offset	• ECU assist enabled AND • ECU is not initializing or shutting down	4count/16ms	Type A. MIL Illumination.
MD_MOTOR_POSITION_SENSOR_FAULT	C058A	This monitor checks if: • The MPS indicates a failure or a “not normal” mode • The MPS has detected an internal problem • The SPI message has a CRC failure • The motor position data is not in the valid range	SPI error bits set during communication with MPS, or CRC error detected in SPI message.	mode_not_normal or fail bits set, incorrect CRC calculation, or invalid MPS data	• ECU is not shutting down.	5 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
MD_MOTOR_POSITION_MISSING_CALIB_FAULT	P0602	This monitor checks if: • Malfunctioning MPS • Unpowered MPS	The ED subsystem aggregates possible failure cases of the MPS1 SPI signal into a single DTC.	ED subsystem reports failure of MPS1 signal	• ECU is not shutting down.	1 msec (20 consecutive 50 usec observations)	Type A. MIL Illumination.
MD_MOTOR_POSITION_SENSOR_EEPROM_FAULT	C0596	This monitor checks if: • Malfunctioning MPS • Unpowered MPS	· SPI error bits set during communication with EEPROM on MPS sensor, or incorrect data fingerprint found in EEPROM data read from sensor	o QSPI0_STATUS bit 3 or bit 6 are set during communication with EEPROM o EEPROM identification page[0] != 0x20 || EEPROM identification page[1] != 0x00 || EEPROM identification page[2] != 0x09	N/A	1 count	Type A. MIL Illumination.
MD_ISENSE_CROSS_CHECK_FAULT	C0582	This monitor checks if: • Current Sense Circuitry	The microcontroller shall capture M1_ISENSE1 and M1_ISENSE2 current samples, if average difference between M1_ISENSE1 and M1_ISENSE2 over five samples is greater than RT_ISENSE_CROSS_CHECK_LIMIT, then this fault is raised and assist removed reads two independent ADC by 5 samples and averages it to measure current flow and compares, if difference is more than allowed,	The sum of the error between phase current samples (internal and external amplifier) is not in the range [-47A (MIN_ISENSE_DIFFERENCE) ...+47A (MAX_ISENSE_DIFFERENCE)] OR no new data from current sensors received	• ECU assist enabled AND • ECU is not initializing or shutting down	20 counts/80ms	Type A. MIL Illumination.
MD_IEM_SEQUENCE_ERROR_FAULT	C0595	This monitor checks if: • Interrupt failure	Motor Control tasks are deemed to not be executing in the correct order. For every configured interrupt, read out any complete sequences that are in the log. For each sequence read out, the CRC is calculated for the observation points, and is compared against the expected value for that interrupt/mode. Mode is determined from the first observation point in the sequence. A fault is raised when there is a mismatch and the CRC check is stopped for that interrupt.	Whenever a motor interrupt is entered and exited, everytime it writes a unique number into a rolling buffer. The diagnostic calculates the CRC over complete interrupt sequences (depending on the motor state) in the buffer and raises a fault if there is a mismatch.	• ECU is not shutting down	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_CLOCK_FAIL_FAULT	C0595	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	During run time Bridge Driver reports internal clock failure (using ERR line and SPI error registers).	• bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND • In register shutdown error "Internal Clock Supervision Shutdown" is set.	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_CONFIG_COMP_FAULT	C0595	This monitor checks if: • Bridge Driver incorrect operation.	To ensure correct configuraiton data is written into Bridge Driver IC. Configuration failure detection is required in order to mitigate: - Micro controller SPI failure. - Bridge Driver failure..	During initialization, if Bridge Driver state changes to CONFIG_LOCK, report config invalid fault.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	135ms	Type A. MIL Illumination.
MD_BRIDGE_CONFIG_ERROR_FAULT	C0595	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	During run time Bridge Driver reports config error (using ERR line and SPI error registers).	• bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) AND • SPI status "config valid" bit is not set AND • the fault has occurred more than once in this ignition cycle.	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_CONFIG_INVALID_FAULT	C0595	This monitor checks if: • Incorrect CRC transmitted during initialisation. • Micro controller SPI failure. • Bridge Driver failure.	During initialisation, if Bridge Driver state changes to CONFIG_LOCK, report config invalid fault.	Bridge Driver has entered the "Configuration Lock Mode" during configuration.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	135ms	Type A. MIL Illumination.
MD_BRIDGE_CONFIG_STALLED_FAULT	C0595	This monitor checks if: • Micro controller SPI failure. • Bridge Driver failure.	Verify configuration check is completed within BRIDGE_DRV_CFG_STALLED_TIMEOUT.	Bridge Driver configuration data check was not completed within 20ms.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	200 ms	Type A. MIL Illumination.
MD_BRIDGE_CB_UNDER_VOLTAGE_FAULT	C0580	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	During run time, the Bridge Driver reports charge pump buffer under voltage error on the CB pin of the Bridge driver ASIC (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND (In register shutdown error "CB undervoltage shutdown" is set AND In register internal error "CB undervoltage detection error" is set).	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_CF_BRIDGE_CONFIG_FAULT	C0595	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	During run time Bridge Driver reports error (using ERR line and SPI error registers).	• bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) AND • SPI status "config valid" bit is not set AND • the fault has occurred more than once in this ignition cycle.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_CF_BRIDGE_ECC_FAULT	C0595	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	During run time Bridge Driver reports error (using ERR line and SPI error registers).	special event register of bridge driver indicates that error correction of control register failed AND the fault has occurred more than once in this ignition cycle.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
MD_BRIDGE_CF_REG1_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	During run time Bridge Driver reports error (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register internal errors "overvoltage internal regulator 1 error" is set AND the fault has occurred only once in this ignition cycle.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_REFERENCE_VOLTAGE_FAULT	C0580	This monitor checks if: • Micro controller • Bridge Driver amplifier reference voltage ADC failure.	Verify Bridge Driver reference voltage is within limits.	HW Pin for reference voltage (IOHWAB_BRIDGE_1_REF_VOLTAGE) is not between 2.25V and 2.75V.	• ECU provides assist AND • No safe state on bridge driver	18ms/128 counts	Type A. MIL Illumination.
MD_BRIDGE_3V3_UNDER_VOLTAGE_FAULT	C0580	This monitor checks if: • Bridge Driver incorrect operation.	Monitor Bridge Driver reporting under voltage error on its VCC (V3V3) pin.	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register external errors "VCC Undervoltage Detection Error" is set.	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_3V3_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bridge Driver incorrect operation.	Bridge Driver is reporting over voltage on its VCC (V3V3) pin.	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register external errors "VCC Undervoltage Detection Error" is set.	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_ERR_STUCK_LO_FAULT	C0582	This monitor checks if: • Bridge Driver ERR line connectivity • Bridge driver incorrect operation.	Check M1_BD_ERR line state.	During self test, the bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR), when Current Sense Amplifier 1&2 - Gain 2 (=BD_REG_OP_GAI_2) was set to a valid value.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	40ms	Type A. MIL Illumination.
MD_BRIDGE_VS_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bridge Driver incorrect operation • Battery Voltage	During run time Bridge Driver reports VS over voltage error (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND (In register shutdown error "Vs Overvoltage Shutdown" is set OR In register external error "Vs Overvoltage Detection Error" is set).	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_VS_UNDER_VOLTAGE_A_FAULT	C0580	This monitor checks if: • Low battery voltage	Bridge driver will detect undervoltage condition. The software shall interrogate the Bridge Driver to determine whether the fault is valid and if valid raises the fault.	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register external errors "Vs Undervoltage Detection Error" is set.	• ECU provides assist AND • No safe state on bridge driver	18ms/128 counts	Type A. MIL Illumination.
MD_BRIDGE_VS_UNDER_VOLTAGE_B_FAULT	C0580	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports VS under voltage error (using ERR line and SPI error registers), but battery voltage is greater than BD_VSU_UV_DETECT_THRESHOLD.	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register external errors "VS Undervoltage Detection Error" is set AND battery voltage is >= 6.5V.	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_VDHP_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bridge Driver incorrect operation • Battery Voltage	During run time Bridge Driver reports VDHP over voltage error (using ERR line and SPI error registers).	• The voltage on the VS pin of the bridge driver ASIC is above 39.95V • Bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND (In register shutdown error "VDHP Overvoltage Shutdown" is set AND In register external error "VDHP Overvoltage Detection Error" is set).	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_VDHP_UV_A_FAULT	C0580	This monitor checks if: • Excessive local temperature OR failures that cause incorrect detection of over temperature.	Data read from Bridge Driver over SPI indicates an undervoltage on the VDHP pin of the Bridge Driver ASIC.	• The voltage on the VS pin of the bridge driver ASIC is below 3.96V • Bridge driver error output pin is active IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register External errors "VDHP Undervoltage Detection Error" is set	• ECU provides assist AND • No safe state on bridge driver	18msec/128 counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
MD_BRIDGE_VDHP_UV_B_FAULT	C0580	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports VDHP under voltage error (using ERR line and SPI error registers), but battery voltage is greater than BD_VDHU_UV_DETECT_THRESHOLD.	• The voltage on the VS pin of the bridge driver ASIC is below 3.96V • Bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register External errors "VDHP Undervoltage Detection Error" is set AND battery voltage is > 6.5V.	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_UNDEFINED_ERROR_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	During run time SPI error status flag OR Bridge ERR line is active, but no faults are reported in SPI error registers.	Bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set	• ECU provides assist AND • No safe state on bridge driver	1 count/1 ms	Type A. MIL Illumination.
MD_BRIDGE_UNEXPECTED_MODE_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	Bridge Driver reports unexpected state.	Below conditions are not satisfied. ((sBridgeDriver.ICMode == BRDG_NORMAL_OPERATION) || (sBridgeDriver.State == BD_SHUTDOWN) || ((sBridgeDriver.ICMode == BRDG_ERROR_MODE) && (IOHWAB_BRIDGE_1_ERROR == ACTIVE)))	• ECU provides assist AND • No safe state on bridge driver	16 counts/ 16ms	Type A. MIL Illumination.
MD_BRIDGE_UNEXPECTED_STATE_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	Verify Bridge driver state is as expected during initialisation.	Bridge driver mode is not at the expected state during configuration.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	32ms	Type A. MIL Illumination.
MD_BRIDGE_SOFF_STUCK_LO_FAULT	C0582	This monitor checks if: • M1_BD_SOFF signal not working correctly.	Check bridge driver status is reported as "normal" mode" when M1_BD_SOFF is inactive.	When bridge test pin (IOHWAB_BRIDGE_1_TEST) is driven active, bridge driver state (sBridgeDriver.State) did not change to BD_NORMAL.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	200 ms	Type A. MIL Illumination.
MD_BRIDGE_SPI_MSG_FAILED_FAULT	C0595	This monitor checks if: • Bridge Driver incorrect operation • Microcontroller SPI failure.	Bridge Driver reports SPI errors (using SPI error registers) OR received SPI message CRC is invalid.	("SPI error flag" is set in SPI status AND Either "Invalid Address Access", "SPI Time-out", "SPI Frame error", "SPI Time-out", "SPI CRC error" is set in SPI communication and configuration error register) OR Invalid SPI response is received.	Ignition State = ON OR Wake ON CAN	1000ms	Type A. MIL Illumination.
MD_BRIDGE_SPI_RESP_TIMEOUT_FAULT	C0595	This monitor checks if: • Incorrect low level SPI driver operation.	Verify Bridge Driver low level SPI communication is working.	Low level SPI driver is not responding.	(Ignition State = ON OR Wake ON CAN AND Battery Voltage > 6V AND Bridge Driver is not reporting under voltage	14ms	Type A. MIL Illumination.
MD_BRIDGE_REG_UNDER_VOLTAGE_FAULT	C0580	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports internal regulator under voltage error (using ERR line and SPI error registers), but battery voltage is greater than BD_IRU_UV_DETECT_THRESHOLD.	• Bridge Driver internal regulator voltage < 6.5V @1/256V/bit • Bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register internal error "Undervoltage Internal Regulator 4 or 5 or 6 Error" is set.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1 ms	Type A. MIL Illumination.
MD_BRIDGE_REG1_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports Internal regulator over voltage error (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register internal errors "overvoltage internal regulator 1 error" is set AND the fault has occurred only once in this ignition cycle.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1 ms	Type A. MIL Illumination.
MD_BRIDGE_REG6_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports Internal regulator over voltage error (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register internal errors "overvoltage internal regulator 6 error" is set	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
MD_BRIDGE_RECONFIGURED_EVENT	C0582	This monitor checks if: • Faults detected which require reconfiguration of Bridge driver.	To indicate when Bridge driver reconfiguration was performed.	Bridge Driver reconfiguration was requested.	EcuC.rootState_active == EcuC_MotorDriveOn AND DrvStg.SafeStateRequired == FALSE AND Battery Voltage > 6V AND Bridge Driver is not reporting under voltage	1 count/1 ms	Type A. MIL Illumination.
MD_BRIDGE_OVER_CURRENT_FAULT	C0590	This monitor checks if: • Bridge Driver incorrect operation.	Bridge Driver reporting amplifier over current errors.	IOHWAB_BRIDGE_1_ERROR is active OR in SPI status "error flag" is set AND In register current sense amplifier errors "err_oc_op1 or err_oc_op2 or err_oc_op3" are set.	EcuC.rootState_active == EcuC_MotorDriveOn AND DrvStg.SafeStateRequired == FALSE AND Battery Voltage > 6V AND Bridge Driver is not reporting under voltage	1 count/1 ms	Type A. MIL Illumination.
MD_BRIDGE_OVER_TEMP_ERROR_FAULT	C05C2	This monitor checks if: • Excessive local temperature OR failures that cause incorrect detection of over temperature.	During run time Bridge Driver reports over temperature error (using SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register shutdown error "Overtemperature Shutdown" is set.	• ECU provides assist AND • No safe state on bridge driver	1 count/1 ms	Type A. MIL Illumination.
MD_BRIDGE_OSF_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports output stage feedback failure (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register for output stage feedback errors any error is set	• ECU provides assist AND • No safe state on bridge driver	1 count /1ms	Type A. MIL Illumination.
MD_BRIDGE_ECC_FAIL_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports ECC failure (using SPI error registers).	special event register of bridge driver indicates that error correction of control register failed AND the fault has occurred more than once in this ignition cycle.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_HS_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports high side capacitor over voltage error (using ERR line and SPI error registers).	• Bridge Driver highside capacitor voltage < 6.5V @1/256V/bit • bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register internal error "High-side Buffer Capacitor 1 or 2 or 3 Overvoltage Detection Error" is set.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_HS_UNDER_VOLTAGE_FAULT	C0580	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports high side capacitor under voltage error (using ERR line and SPI error registers), but battery voltage is greater than BD_HBCU_UV_DETECT_THRESHOLD.	• Bridge Driver highside capacitor voltage < 6.5V @1/256V/bit • bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register internal error "High-side Buffer Capacitor 1 or 2 or 3 Undervoltage Detection Error" is set.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_NOT_DISABLED_FAULT	C0582	This monitor checks if: • Bridge Driver enable signal connectivity.	The microprocessor shall test that when M1_BD_ENA (bridge driver enable) is inactive, motor FETs can not be driven.	Set bridge driver HW enable Pin (IOHWAB_BRIDGE_1_ENABLE) inactive and set all three bottom FETs ON. After 100us all bottom FETS were not disabled.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	6 ms	Type A. MIL Illumination.
MD_BRIDGE_SOFF_NOT_DISABLED_FAULT	C0582	This monitor checks if: • Bridge Driver SOFF signal connectivity.	The microprocessor shall test that when SOFF pin is inactive, motor FETs can not be driven.	Set bridge driver HW SOFF Pin inactive and set all three bottom FETs ON. After 100us all bottom FETS were not disabled.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	8 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
MD_BRIDGE_LATENT_WARNING_EVENT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	The BD has reported a 'latent fault' (over SPI)	In SPI status "SPI special event" is set AND In special events register "SPI Latent Fault Warning" is set.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_NOT_ENABLED_FAULT	C0582	This monitor checks if: • Bridge Driver enable signal connectivity.	The microprocessor shall test that when M1_BD_ENA (bridge driver enable) is active motor FETs can be driven.	Set bridge driver HW enable Pin (IOHWAB_BRIDGE_1_ENABLE) active with all three bottom FETS already ON. After 100us even one bottom FET was not enabled.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	8 msec	Type A. MIL Illumination.
MD_BRIDGE_SOFF_NOT_ENABLED_FAULT	C0582	This monitor checks if: • Bridge Driver SOFF signal connectivity.	The microprocessor shall test that whenSOFF pin is active motor FETs can be driven.	Set bridge driver HW SOFF Pin active with all three bottom FETS already ON. After 100us even one bottom FET was not enabled.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	6 msec	Type A. MIL Illumination.
MD_BRIDGE_CP_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports charge pump over voltage error (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register external error "charge pump overvoltage detection error" is set.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_CP1_OVERLOAD_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports CP1 overload error (using ERR line and SPI error registers).	special event register of bridge driver indicates that error correction of control register failed AND (In register internal errors "Charge Pump 1 Overload Error" is set OR In register shutdown errors "Vs Path Charge Pump Input Overload" is set).	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_CP2_OVERLOAD_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports CP2 overload error (using ERR line and SPI error registers).	special event register of bridge driver indicates that error correction of control register failed AND (In register internal errors "Charge Pump 2 Overload Error" is set	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_DDP_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports digital driving path failure (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register shutdown error "Digital Driving Path Stucked Shutdown" is set.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_DRV_BIST_CB_UV_FAULT	C0580	This monitor checks if: • Bridge Driver incorrect operation.	Perform Bridge driver charge pump buffer (CB) under voltage self test.	When Bridge Driver was put into CB under voltage self test mode and after 5msec, bridge driver error output pin was not active (IOHWAB_BRIDGE_1_ERROR)	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	45 ms	Type A. MIL Illumination.
MD_BRIDGE_DRV_BIST_CSA_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	Perform Bridge driver amplifier gain BIST.	When Bridge Driver was put into CSA Gain self test mode, bridge driver error output pin is not active (IOHWAB_BRIDGE_1_ERROR) OR Isense reading was not within limits.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	60 ms	Type A. MIL Illumination.
MD_BRIDGE_DRV_BIST_CSA_VRO_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	Perform Bridge driver CSA VRO BIST.	When Bridge Driver was put into CSA VRO self test and self test was finished, one of the CSA 1/2/3 supply over voltage/under voltage error bit was not set.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	90 ms	Type A. MIL Illumination.
MD_BRIDGE_DRV_BIST_SHORT_CCT_FAULT	C0582	This monitor checks if: • Bridge Driver short circuit detection not working.	Bridge driver built in high/low side short circuit detection test.	When Bridge Driver was put into short circuit test mode and FET was driven, bridge driver error output pin was not active (IOHWAB_BRIDGE_1_ERROR) OR Short circuit error bits were not set in register OR High-side 1/2/3 Drain Source Measurement were not at expected value.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	120 ms	Type A. MIL Illumination.
MD_BRIDGE_DRV_BIST_TIMEOUT_FAULT	C0582	This monitor checks if: • Bridge Driver BIST not working correctly.	Built-in selftest timeout.	Bridge Driver built in self test was not completed within 100msec.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1000ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
MD_BRIDGE_DRV_BIST_VCC_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	Perform Bridge Driver's VCC built in self test.	When Bridge Driver was put into VCC self test mode, bridge driver error output pin was not active (IOHWAB_BRIDGE_1_ERROR) OR VCC under voltage error bit was not set in external error register	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	40 ms	Type A. MIL Illumination.
MD_BRIDGE_DRV_INHIBIT_FAULT	C0582	This monitor checks if: • Bridge Driver inhibit signal connectivity • Bridge Driver incorrect operation.	Verify Bridge Driver will be in SLEEP mode, if Bridge driver is inhibited.	When HW inhibit Pin (IOHWAB_BRIDGE_1_INHIBIT) is active, the bridge driver operation mode register did not indicate that it is in the expected Sleep Mode.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	20 ms	Type A. MIL Illumination.
MD_BRIDGE_DRV_WAKE_UP_FAULT	C0582	This monitor checks if: • Bridge Driver inhibit signal connectivity • Bridge Driver incorrect operation.	Remove Bridge inhibit and verify SPI comms is started and Bridge Driver state changes to IDLE.	When HW inhibit Pin (IOHWAB_BRIDGE_1_INHIBIT) is driven inactive, the bridge driver operation mode register did not transit from Sleed Mode to the expected Idle Mode.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	20 ms	Type A. MIL Illumination.
MD_BRIDGE_SHORT_CIRCUIT_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	This failsafe checks the SPI communication from the bridge driver to see if it is reporting a short circuit fault. This failsafe operates at run-time	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register Short Circuit Errors any of the "Short Circuit at High/Low-side 1 or 2 or 3" are set.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	3 msec	Type A. MIL Illumination.
MOTOR_OVER_TEMP_WARN	C05C2	This monitor checks if: Motor over temperature.	Motor temperature is greater than threshold.	Motor_Temp > THR	Power ON, Continuous Failsafing	20 msec	Type A. MIL Illumination.
MOTOR_DEMAG_WARN	C05C2	This monitor checks if:		TM_Demag_Warn == TRUE		5 msec	Type A. MIL Illumination.
MOTOR_OVER_TEMP_FAIL	C05C2	This monitor checks if: Motor over temperature.	Motor temperature is greater than threshold.	Electric Drive Temperature > 154°	Power ON, Continuous Failsafing	20 msec	Type A. MIL Illumination.
MD_PU_BRIDGE_PIR_CLOSE1_LSD_FAULT	C0580	This monitor checks if: o Bridge driver disabled o Bridge driver in safe off mode o Bridge driver malfunctioning	· Driven phase is detected as not low when it should be driven low.	· Driven phase voltage > 1.2V when < 1.2V expected	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	10 ms	Type A. MIL Illumination.
MD_PU_BRIDGE_PIR_CLOSE1_OPEN_CCT_FAULT	C0580	This monitor checks if: o Open motor phase	Non-driven phase voltages not pulled low while FETs are driven closed.	· phase voltage > 1.2V when < 1.2V expected	· If MD_PU_BRIDGE_PIR_CLOSE1_LSD_FAULT detects, this fault will not detect.	690ms	Type A. MIL Illumination.
Group 8 - Brake Hydraulic Monitor							
Group 10 - Ground Monitor							
GROUND_1_DISCONNECTED	U3008	This monitor checks if: • Disconnected Ground	The GND_1 and GND_2 connections are independent wire connections to vehicle ground. A loss of either individual circuit detectable. Normally each wire should carry 50% of the total current load. The ground loss detection circuit feedbacks are compared to determine the actual current ratio using the formula in fault equation. Gnd_1_voltage is based on Gnd_1_Fdbk_A Gnd_2_voltage is based on Gnd_2_Fdbk_B If the resulting value is above 0.9 then a missing a missing ground is indicated and GND_1 disconnected fault is set.	Voltageactual= (Gnd1voltage - Gnd2voltage /Gnd1voltage+Gnd2voltage)	• Polaris is initialized. • No faulty ADCs detected.	200ms	Type A. MIL Illumination.
GROUND_2_DISCONNECTED	U3009	This monitor checks if: • Disconnected Ground	The GND_1 and GND_2 connections are independent wire connections to vehicle ground. A loss of either individual circuit detectable. Normally each wire should carry 50% of the total current load. The ground loss detection circuit feedbacks are compared to determine the actual current ratio using the formula in fault equation. Gnd_1_voltage is based on Gnd_1_Fdbk_A Gnd_2_voltage is based on Gnd_2_Fdbk_B If resulting value is below -0.9,GND_2 disconnected fault is set	Voltageactual= (Gnd1voltage - Gnd2voltage /Gnd1voltage+Gnd2voltage)	• Polaris is initialized. • No faulty ADCs detected.	200ms	Type A. MIL Illumination.
Group 11 - Switches							
Group 12 - Pressure Sensor							
SCP1_CORRELATION_ERROR	C0574	This monitor checks if: SCP1 signal failure	The SCP1,SCP2 and PTS sensor signals are used to compare and identify a single failed sensor signal. This fault is set if the difference exceeds the error threshold value.	|SCP_1 - SCP_2| > 5 Bar	Input signals valid for some time (allow system/signal to initialize)	125-500 ms 18000 Counts	Type A. MIL Illumination.
SCP2_CORRELATION_ERROR	C0574	This monitor checks if: SCP2 signal failure	The SCP1,SCP2 and PTS sensor signals are used to compare and identify a single failed sensor signal. This fault is set if the difference exceeds the error threshold value.	|SCP_1 - SCP_2| > 5 Bar	Input signals valid for some time (allow system/signal to initialize)	125-500 ms 18000 Counts	Type A. MIL Illumination.
SCP1_OFFSET_ERROR	C0574	This monitor checks if: SCP1 signal failure	The offset required to zero the Secondary circuit pressure sensor is larger than the specification limit.	|SCP_1_Off| > 10 Bar	The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result. To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake,	100 ms Goal: 18000	Type A. MIL Illumination.
SCP2_OFFSET_ERROR	C0574	This monitor checks if: SCP2 signal failure	The offset required to zero the Secondary circuit pressure sensor is larger than the specification limit.	|SCP_2_Off| > 10 Bar	The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result. To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake,	100 ms Goal: 18000	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
BP_MODEL_TOO_HIGH_ERROR	C053D	This monitor checks if: Common cause Boost Pressure Sensor failure (in-range high)	The system models an expected boost pressure based on motor position change. This fault indicates that the boost pressure sensor indicates higher pressure than predicted by the model and than evidenced by the vehicle deceleration.	• Valid braking request (driver or autonomous) • BP_Model (MPS) < Boost pressure - 50 Bar • Vehicle deceleration is not observed	• Signal valid; • No ABS; • vehicle at speed and is slowing down. • driver not on throttle and requested enough pressure	500 ms Goal:18000	Type A. MIL Illumination.
BP_MODEL_TOO_LOW_ERROR	C053D	This monitor checks if: Common cause Boost_P failure (in-range-low)	The system models an expected boost pressure based on motor position change. This fault indicates that the boost pressure sensor indicates lower pressure than predicted by the model and than evidenced by the vehicle deceleration.	• Valid braking request (driver or autonomous) • BP_Model (MPS) > Boost pressure + 5 Bar • Vehicle deceleration is observed	• Signal valid; • No ABS; • DAP close to end position; • vehicle at speed not slowing down much; • driver not on throttle and requested enough pressure	500 ms Goal:18000	Type A. MIL Illumination.
BP1_CORRELATION_ERROR	C053D	This monitor checks if: BP1 signal failure	The BP1, BP2, and DAP position signals are used to compare and identify a single failed sensor signal	|Boost_P_1 – Boost_P_2| > 5 Bar	Input signals valid for some time (allow system/signal to initialize)	125-500 ms 18000 Counts	Type A. MIL Illumination.
BP2_CORRELATION_ERROR	C053D	This monitor checks if: BP2 signal failure	The BP1, BP2, and DAP position signals are used to compare and identify a single failed sensor signal	|Boost_P_1 – Boost_P_2| > 5 Bar	Input signals valid for some time (allow system/signal to initialize)	125-500 ms 18000 Counts	Type A. MIL Illumination.
BP_RAW_OFFSET_ERROR	C053D	This monitor checks if: Boost Pressure Sensor Failure	The offset required to zero the Boost Pressure sensor is larger than the specification limit of 50 bar.	|BP_RAW_Off| > 50 BAR	• Input signal valid; • Driver request, DAP position, suggest there should be no pressure; • Vehicle acceleration, vehicle at speed.	500 ms Goal:18000	Type A. MIL Illumination.
BP1_OFFSET_ERROR	C053D	This monitor checks if: BP1 signal failure	The offset required to zero the Boost Pressure sensor is larger than the specification limit	|BOOST_P_1_Off| > 10 Bar	The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result. To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake.	100 ms Goal: 18000	Type A. MIL Illumination.
BP2_OFFSET_ERROR	C053D	This monitor checks if: BP2 signal failure	The offset required to zero the Boost Pressure sensor is larger than the specification limit	|BOOST_P_2_Off| > 10 Bar	The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result. To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake.	100 ms Goal: 18000	Type A. MIL Illumination.
MC_PRES_SEN_ERRATIC	C053D	This monitor checks if: • Intermittent failure of the pressure sensor. • Intermittent open or short in the internal circuitry of the printed circuit board.	• Pressure Sensor Erratic • This diagnostic checks both raw Boost Pressure principle and reference signals.	Ohmic Fault Status = (Sensor open or shorted to sensor supply) AND (Sensor shorted to ground) Ohmic Fault Status ? Previous Ohmic Fault Status	• Sensor voltage supply in range • Boost Pressure Sensor is enabled	80 ms Goal: 800	Type A. MIL Illumination.
MC_PRES_SEN_SHORTED_LOW	C053E	This monitor checks if: • Defective pressure sensor. • Defective pressure sensor connector. • Defective printed circuit board. • Defective microprocessor feedback input port.	• Pressure Sensor Shorted Low • This diagnostic checks both raw Boost Pressure principle and reference signals.	principal sensor voltage < 4.61% of principle sensor supply voltage OR reference sensor voltage < 4.85% of reference sensor supply voltage	• Sensor voltage supply in range • Boost Pressure Sensor is enabled	100 ms	Type A. MIL Illumination.
MC_PRES_SEN_OPEN_OR_SHRT_HIGH	C053F	This monitor checks if: • Defective pressure sensor. • Defective pressure sensor connector. • Defective printed circuit board. • Defective microprocessor feedback input port.	• Pressure Sensor Open or Shorted High • This diagnostic checks both raw Boost Pressure principle and reference signals.	principal sensor voltage > 95.24% of principle sensor supply voltage OR reference sensor voltage > 94.50% of reference sensor supply voltage	• Sensor voltage supply in range • Boost Pressure Sensor is enabled	100 ms	Type A. MIL Illumination.
SC_PRES_SEN_SHORTED_LOW	C0571	This monitor checks if: • Defective pressure sensor. • Defective pressure sensor connector. • Defective printed circuit board. Defective microprocessor feedback input port.	• Pressure Sensor Shorted Low • This diagnostic checks both raw Boost Pressure principle and reference signals.	principal sensor voltage < 4.61% of principle sensor supply voltage OR reference sensor voltage < 4.85% of reference sensor supply voltage	• Sensor voltage supply in range • Secondary Circuit Pressure Sensor is enabled	100 ms	Type A. MIL Illumination.
SC_PRES_SEN_OPEN_OR_SHRT_HIGH	C0572	This monitor checks if: • Defective pressure sensor. • Defective pressure sensor connector. • Defective printed circuit board. Defective microprocessor feedback input port.	• Pressure Sensor Open or Shorted High • This diagnostic checks both raw Boost Pressure principle and reference signals.	principal sensor voltage > 95.24% of principle sensor supply voltage OR reference sensor voltage > 94.50% of reference sensor supply voltage	• Sensor voltage supply in range • Secondary Circuit Pressure Sensor is enabled	100 ms	Type A. MIL Illumination.
SC_PRES_SEN_ERRATIC	C0574	This monitor checks if: • Intermittent failure of the pressure sensor. • Intermittent open or short in the internal circuitry of the printed circuit board.	• Pressure Sensor Erratic • This diagnostic checks both raw Boost Pressure principle and reference signals.	Ohmic Fault Status = (Sensor open or shorted to sensor supply) AND (Sensor shorted to ground) Ohmic Fault Status ? Previous Ohmic Fault Status	• Sensor voltage supply in range • Secondary Circuit Pressure Sensor is enabled	80 ms Goal: 800	Type A. MIL Illumination.
PRESSURE_SENSOR_MISSING_CALIBRATION	C0560	This monitor checks if: • Missing Calibration • NVRAM error	This fault only checks if the EOL calibration is sucessful or not. If the calibration was not yet done or if the calibration is not successful, then this fault is set. The NVRAM contains both calibrated offset and status, but only the status is checked to set the fault.	status != SUCCESSFUL	Any time after system wake up and read NVRAM	500 ms Goal:18000	Type A. MIL Illumination.
Group 13 - Vacuum Sensor							
Group 14 - Steering Angle Sensor							

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
SWA_GAIN_ERROR	C0051	This monitor checks if: • Defective steering angle sensor. • Defective cable. • Defective printed circuit board. • Defective microprocessor feedback input port.	• Steering Wheel Angle Sensor - Gain Error • The monitoring recognizes offset faults as well as amplification fault.	Tight Check: Difference between zeroed measured SWA signal and estimated SWA signal > Tight Check threshold Tight check threshold is based on a function of vehicle speed, Ay and Yaw Rate with minimum threshold of 50 deg. Loose Check: Difference between zeroed SWA signal and estimated SWA signal > Loose Check threshold Loose check threshold is based on a function of vehicle speed, Ay and Yaw Rate with minimum threshold of 100 deg.	1. Yaw Rate, Lat Acc, SWA and wheel speed info are valid 2. MCP is initialized 3. Vehicle speed > 4.0 m/s while driving forward 4. Emissions Rolls Test Inactive Tight Check: 1. Driving is stable Loose Check: 1. Driving is marginally stable	If SWA gain error= 2*threshold Goal: 900 ms else Goal: 1.8 s	Type C, No MIL, "Emissions Neutral Diagnostic "
SWA_OFFSET_ERROR	C0051	This monitor checks if: • electronic or mechanical fault in sensor • mechanical attachment of the sensor • incorrect wheel geometry	• Steering Angle Sensor - Offset Error • The SWA signal shows an offset out of specification.	Before Initialization: High offset: |Learned offset-Stored End of line offset from NVRAM| > 23° Low offset: |Learned offset-Stored End of line offset from NVRAM| > 18° After Initialization: |Learned offset-Stored End of line offset from NVRAM| > 18°	1. Yaw Rate, Lat Acc, SWA and wheel speed info are valid 2. MCP is initialized 3. Vehicle speed > 4.0 m/s while driving forward 4. Emissions Rolls Test Inactive Tight Check: 1. Driving is stable Loose Check: 1. Driving is marginally stable	Before initialization: High offset: 100 ms Low offset: 1.8 s After Initialization: 100 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
SWA_RAW_OFFSET_ERROR	C0051	This monitor checks if: • electronic or mechanical fault in sensor • mechanical attachment of the sensor • incorrect wheel geometry	• Steering Wheel Angle Sensor - Raw Offset • The SWA signal has to show an implausible high value before the initialization.	Difference between measured SWA and estimated SWA > 175° ABS(ABS(Yaw_Rate.Conv_To_Swa_s16) - ABS(Swa.Turn_Corrected_Delayed_s16)) > SWA_RAW_OFFSET_ERROR_THR_S16 SWA_RAW_OFFSET_ERROR_THR_S16= 175 deg	1. Yaw Rate, Lat Acc, SWA and wheel speed info are valid 2. MCP is initialized 3. Vehicle speed > 4.0 m/s while driving forward 4. Emissions Rolls Test Inactive Tight Check: 1. Driving is stable Loose Check: 1. Driving is marginally stable	200 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
SWA_MAX_VALUE_ERROR	C0051	This monitor checks if: • electronic or mechanical fault in sensor • mechanical attachment of the sensor • Incorrect wheel geometry	• Steering Angle Sensor – Max Value Error • The SWA signal shows a greater value than physically possible in the vehicle.	Absolute SWA sensor: |Swa Turn Corrected| > 720° OR Relative SWA sensor: |Swa Turn Corrected| > 1440° before initialization OR Relative SWA sensor: |Swa zeroed| > 720° after initialization	1. SWA is valid and calibrated 2. Emissions Rolls Test Inactive	200 ms OR 200 ms before initialization OR 200 ms after initialization	Type C, No MIL, "Emissions Neutral Diagnostic "
SWA_NOT_ALIVE_ERROR	C0051	This monitor checks if: • electronic or mechanical fault in sensor hardware	• Steering Wheel Angle - Not Alive Error,Also known as “Constant Value Fault” • The SWA signal does not change while the Yaw Rate changes:	|Yaw rate derivative| > 5°/s²	1. Yaw rate and SWA valid 2. Emissions Rolls Test Inactive 3. Wheel speed information valid 4. Vehicle speed > 2.5 m/s 5. Difference between wheel speeds front and rear ? 5 m/sec 6. Difference between measured and estimated Yaw rate < 6°/s 7. Yaw Rate has to be > 3°/s once and < -3°/s once	3 s	Type C, No MIL, "Emissions Neutral Diagnostic "
SWA_STEP_ERROR	C0051	This monitor checks if: • electronic or mechanical fault in sensor hardware	• Steering Wheel Angle Sensor - Step Error • The SWA signal has to show a gradient above a certain threshold.	Raw SWA signal change > 3000°/s Set previous signal for next cycle.	1. SWA is valid 2. Emissions Rolls Test Inactive	100 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
SWA_MISSING_CALIBRATION_ERROR	U0420	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• When the incoming message is unpacked, the calibration bit will be checked immediately.	StrWhlAngSenCalStat == 0x0	• Fault will not be set during the following conditions: • within the first 5 seconds after System Power Mode has transitioned to RUN • Supply Voltage is not in the range 9V <= V <= 16V • Within the first 5 seconds of recovery from an under or over voltage condition • CAN Bus Off Failure is latched	10 count	Type C, No MIL, "Emissions Neutral Diagnostic "
Group 15 - Lateral Acceleration Sensor							

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
LAT_SENSOR_NOT_ALIVE_ERROR	C0061	This monitor checks if: • electronic fault in sensor	• Lat Acceleration Sensor - Not Alive Fault • The Lat Acc signal does not change or is locked at a rail value. • This failure is set if the lateral acceleration sensor is not able to change its value anymore or if it is outside the specified max range.	1. lat acc signal ? +/- 25 m/s² OR 2. Lat Acc is constant lat acc signal < +/- 14 m/s² AND Vehicle Speed > 3 m/s²	Emissions Rolls Test Inactive AND 1. Lat Acc is valid Wheel speed is valid vehicle speed > 3 m/s²	1. 1 s 2. 100 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
LAT_SENSOR_STEP_ERROR	C0061	This monitor checks if: • electronic fault in sensor • mechanical mounting of sensor	• Lat Acceleration Sensor - Step Error • The Lat Acc signal has to show a gradient above a certain threshold.	Raw Lat Acc signal change is > 800 m/s³	Lat accel is valid ABS is not active	100 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
LAT_SENSOR_RAW_OFFSET_ERROR	C0061	This monitor checks if: • Sensor Open • Open circuit in ECU in series with sensor input	• Lat Acceleration Sensor - Raw Offset Error • The Lat Acc signal has to show an implausible high value while standing still.	Lat Acc signal > 6.5 m/sec²	• Lat Acc is valid • Wheel speed info is valid • Vehicle is standing still	200 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
LAT_SENSOR_OFFSET_ERROR	C0061	This monitor checks if: • Sensor Open • Open circuit in ECU in series with sensor input	• Lat Acceleration Sensor - Offset Error • The Lat Acc signal shows an offset out of specification.	Before Initialization: 1. 1 Continuously learned offset is > 4 m/sec² OR 2. 2 Continuously learned offsets > 1.8 m/sec² for 4 sec WHILE vehicle speed > 13.8 m/s OR driving distance > 150m before initialization OR 3. 3 Continuously learned offsets > 3 m/s² for 4 sec WHILE vehicle speed < 13.8 m/sec AND driving distance < 150 m before initialization After Initialization: 4. 8 "extended learn" offsets are > 1.8 m/s² (Extended learn offsets are determined while vehicle driving straight over accumulated distances on the order of 250m)	• Lat Acc valid • Yaw Rate, wheel speed information and steering angle are valid • Vehicle speed > 4.2 m/sec • Stable forward driving	1. 100 ms 2. 1.8 s 3. 1.8 s 4. 100 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
LAT_SENSOR_GAIN_ERROR	C0061	This monitor checks if: • electronic fault in sensor	• Lat Acceleration Sensor - Gain Error • This function computes the difference between the measured ay signal and an ay estimate, based on a vehicle model. If the difference between the two is above a threshold for a certain period of time, a sensor fault is set.	1. The difference between the measured Lat Acc (zeroed) and the estimated Lat Acc is > failure threshold OR 2. The difference between the measured Lat Acc (zeroed) and the estimated Lat Acc is > two times the failure threshold The fault basic threshold is based on the initialization state: Before Initialization: 4 m/sec² + delta After Initialization: 2 m/sec² + delta Where delta is based on the driving situation, a function of vehicle speed, Yaw Rate, or steering angle. The model based on steering angle is considered to be the most robust one.	• No active Lat Accel fault • ay-signal is valid • Yaw Rate signal is valid • No active Wss faults • Vehicle-speed > 4.2 m/sec, while driving forward	1. 1.5 s 2. .75 s	Type C, No MIL, "Emissions Neutral Diagnostic "
Group 16 - Longitudinal Acceleration Sensor							
LONG_SENSOR_NOT_ALIVE_ERROR	C0551	This monitor checks if: • electronic fault in sensor	• Longitudinal Sensor - Constant Error • The Long Acc signal does not change or is locked at a rail value.	1. long acc signal >= +/- 25 m/s² OR 2. Long Acc is constant AND long acc signal < +/- 14 m/s² AND Vehicle Speed > 3 m/s²	• Emissions Rolls Test Inactive AND • Long Acc is valid • Wheel speed is valid • vehicle speed > 3 m/sec	1. 1 s 2. 100 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
LONG_SENSOR_STEP_ERROR	C0551	This monitor checks if: • electronic fault in sensor • mechanical mounting of sensor	• Long Acceleration Sensor - Step Error • The Long Acceleration signal has to show a gradient above a certain threshold.	Raw Long Acc signal change is > 800 m/s³	• Long Acc is valid • ABS not active • Emissions Rolls Test Inactive	100 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
LONG_SENSOR_RAW_OFFSET_ERROR	C0551	This monitor checks if: • electronic fault in sensor • mechanical mounting of the sensor	• Long Acceleration Sensor - Raw Offset Error • The Long Acc signal has to show an implausible high value while standing still.	Long Acc signal > 8 m/s²	• Long Acc is valid • Wheel speed info is valid • Vehicle is standing still • Emissions Rolls Test Inactive	200 ms	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
LONG_SENSOR_OFFSET_ERROR	C0551	This monitor checks if: • electronic fault in sensor • mechanical mounting of sensor	• Long Acceleration Sensor - Offset Error • The Long Acc signal shows an offset out of specification.	3 continuously learned offsets are > 2.5 m/s²	• Long Acc is valid • Wheel speed information is valid • All four wheel speeds > 3 m/s • stable forward driving • No vehicle control activities such as ABS, TC, and VSC • Emissions Rolls Test Inactive	1. 100 ms 2. 1.8 s 3. 1.8 s 4. 10 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
LONG_SENSOR_GAIN_ERROR	C0551	This monitor checks if: • electronic fault in sensor	• Long Acceleration Sensor - Gain Error • This monitoring recognizes offset faults as well as amplification faults.	Change in estimated Long Acc > 0.2 m/s² AND Measured Long Acc-Estimated Long Acc > 0.8 m/s²	• Long Acc and wheel speed information are valid • All four wheel speeds > 3 m/s • Stable forward driving • Accelerator position gradient < 600%/sec • Emissions Rolls Test Inactive	200 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
Group 17 - Yaw Rate Sensor							
YAW_SENSOR_NOT_ALIVE_ERROR	C0063	This monitor checks if: • electronic fault in sensor	• Yaw Rate Sensor – Not Alive Error • The Yaw Rate signal does not change or is locked at a rail value.	1. Yaw rate is constant AND |Yaw rate| < 85°/s AND Vehicle Speed > 3 m/s² 2. |Yaw rate| ? 130°/s	• Emissions Rolls Test Inactive AND 1. Yaw Rate is valid Wheel speed info is valid Vehicle speed > 3 m/s	1. 1 s 2. 100 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
YAW_SENSOR_STEP_ERROR	C0063	This monitor checks if: • defective sensor • mechanical mounting of the sensor • Stone impingement at the floor pan	• Yaw Rate Sensor - Step Error • The Yaw Rate signal has to show a gradient above a certain threshold.	Yaw rate gradient > 800°/s²	• Yaw Rate is valid • Emissions Rolls Test Inactive	100 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
YAW_SENSOR_RAW_OFFSET_ERROR	C0063	This monitor checks if: • electronic sensor fault	• Yaw Rate Sensor Raw Offset Error • The Yaw Rate signal has to show an implausible high value while standing still.	Low error threshold: If initialization info is valid and below threshold |Yaw rate| > 50°/s	• Yaw Rate is valid • Wheel speed info is valid • Vehicle is standing still • Emissions Rolls Test Inactive	200 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
YAW_SENSOR_OFFSET_ERROR	C0063	This monitor checks if: • electronic sensor fault	• Yaw Rate Sensor - Offset Error • The Yaw Rate signal shows an offset out of specification.	While Standing Still 1 Continously learned offset > 5 deg/sec while vehicle standing still. (Offset must remain present as vehicle driven away following statndstill condition) Before Initialization while driving: 2 learned offset is > 8°/s OR 3 Continuously learned offsets are > 5°/s for 1 s After Initialization while driving: 4 "extended learn" offsets are > 5°/s during straight driving (Extended learn offsets are determined while vehicle driving straight over accumulated distances on the order of 250m)	• Yaw Rate is valid • Steering angle, Lat Acc and wheel speed informaiton are valid • Vehicle speed > 4.2 m/s • Stable forward driving • Emissions Rolls Test Inactive	1. 100 ms 2. 1.8 s 3. 100 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
YAW_SENSOR_GAIN_ERROR	C0063	This monitor checks if: • electronic fault in sensor	• Yaw Rate Sensor - Gain Error • This monitoring recognizes offset faults as well as amplification faults.	1. The difference between the measured Yaw rate (zeroed) and the estimated Yaw rate is > failure threshold OR 2. The difference between the measured Yaw rate (zeroed) and the estimated Yaw rate is > two times the failure threshold The fault basic threshold is based on the initialization state: Before Initialization: 6°/s + delta After Initialization: 3°/s + delta Where delta is based on the driving situation, a function of vehicle speed, Ay, steering angle and steering angle derivative.	• Yaw Rate is valid • Steering angle, Lat Acc and wheel speed information are valid • Vehicle speed > 2.5 m/s driving forward • Emissions Rolls Test Inactive	1. 1 s 2. 500 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
Group 18 - Pedal Travel Sensor							
PTS_TO_SCP_MODEL_TOO_HIGH_ERROR	C05D2	This monitor checks if: • Master cylinder seal leakage to reservoir • Pedal Simulator seal leakage to reservoir • In-range failure of SCP sensor	The BHS function includes a model of expected simulator Pressure based on driver pedal position. MODEL_TOO_HIGH_ERROR detects the situation where the modeled pressure is much higher than the measured pressure. Given certain travel, some amount of minimun pressure is expected in the SC. Otherwise something is wrong.	BHS modeled pressure > SCP Measured Pressure + 20 Bar Look up table (add lookup table to appendices)	PTS > the minimum point on the lookup table	500 ms 18000 Counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
PTS_TO_SCP_MODEL_TOO_LOW_ERROR	C05D3	This monitor checks if: • Pedal Simulator Valve is closed or blocked • Pedal Simulator seized/fails to store fluid • In-range failure of SCP sensor	The BHS function includes a model of expected simulator Pressure based on driver pedal position. MODEL_TOO_LOW_ERROR detects the situation where the modeled pressure is much lower than the measured pressure.	BHS modeled pressure < SCP Measured Pressure – 20 Bar	The brake event is not a fast apply (which may cause unpredictable high pressure)	500 ms 18000 Counts	Type A. MIL Illumination.
PTS1_OUT_OF_RANGE_ERROR	C05CC	This monitor checks if: • Failure of PTS1 • Failure of travel sensor cursor rod	During normal operation the input piston travel is physically limited to ~25 mm, and during NO_BOOST operation it is limited to ~36 mm. The sensor is capable of measuring travel up to 43 mm. Reported travel by a single sensor in excess of these limits is indicative of a sensor error.	• PTS1 signal > 38 mm AND • PTS2 signal and SCP signal agree that actual travel is in range Not checking for SCP	Signal is valid	5 s 18000 Counts	Type A. MIL Illumination.
PTS2_OUT_OF_RANGE_ERROR	C05CF	This monitor checks if: • Failure of PTS2 • Failure of travel sensor cursor rod	During normal operation the input piston travel is physically limited to ~25 mm, and during NO_BOOST operation it is limited to ~36 mm. The sensor is capable of measuring travel up to 43 mm. Reported travel by a single sensor in excess of these limits is indicative of a sensor error.	• PTS2 signal > 38 mm AND • PTS1 signal and SCP signal agree that actual travel is in range Not checking for SCP	Signal is valid	5 s 18000 Counts	Type A. MIL Illumination.
PTS1_STEP_ERROR	C05CC	This monitor checks if: • Failure of PTS1 signal line	The PTS1 sensor signal changes at a physically implausible rate, resulting in a signal that disagrees with PTS2 signal, and a modeled pressure that disagrees with the SCP (i.e. PTS2 model and SCP signals agree on driver braking level, PTS1 model and SCP disagree)	• PTS1 signal gradient > 700 mm/s • |PTS1 – PTS2| > Error_threshold • Model(PTS1) <> SCP and Model(PTS2) == SCP	Signal is valid	100ms Goal: 18000	Type A. MIL Illumination.
PTS2_STEP_ERROR	C05CF	This monitor checks if: • Failure of PTS2 signal line	The PTS2 sensor signal changes at a physically implausible rate, resulting in a signal that disagrees with PTS1 signal, and a modeled pressure that disagrees with the SCP (i.e. PTS1 model and SCP signals agree on driver braking level, PTS2 model and SCP disagree)	• PTS2 signal gradient > 700 mm/s • |PTS1 – PTS2| > Error_threshold • Model(PTS2) <> SCP and Model(PTS1) == SCP	Signal is valid	100ms Goal: 18000	Type A. MIL Illumination.
PTS1_SENT_RECEIVE_ERROR	C2A13	This monitor checks if: PTS1 SENT data error	The PTS2 SENT message is comprised of a 12 bit data value (pedal travel), a 12 bit data value (motor position), a 4 bit CRC, and a 4 bit status field.	PTS1 data < Lower_Threshold OR PTS1 data > Upper_Threshold OR PTS1 upper nibbles + PTS1 lower nibbles != 4095	Any of the following conditions: • SENT message Checksum error • SENT status field indicates receive failure • Received pedal travel is out-of-range low (0) • Received pedal travel is out-of-range high (4095)	5ms	Type A. MIL Illumination.
PTS2_SENT_RECEIVE_ERROR	C2A14	This monitor checks if: PTS2 SENT data error	The PTS1 SENT message is comprised of a 12 bit data value, its 12 bit complement, a 4 bit CRC, and a 4 bit status field	PTS2 data < Lower_Threshold OR PTS2 data > Upper_Threshold	Any of the following conditions: • SENT message Checksum error • SENT status field indicates receive failure • Data value and its complement do not combine to 0xFFF • Received position is out-of-range low (0) • Received position is out-of-range high (4095)	5ms	Type A. MIL Illumination.
PTS1_SENT_MESSAGE_MISSING	C2A13	This monitor checks if: Signal line is open or shorted to GND. Shorted to supply Wiring	The SW indicates the failure to the driver interface and set the status of the received Pedal and Motor position value to invalid within FTTD_PEDAL_MOTOR POSITION_VALUE.	N/A	N/A	5 msec	Type A. MIL Illumination.
PTS2_MPS2_SENT_MESSAGE_MISSING	C2A14	This monitor checks if: Signal line is open or shorted to GND. Shorted to supply Wiring	the SW indicates the failure to the driver interface and set the status of the received Pedal and Motor position value to invalid within FTTD_PEDAL_MOTOR POSITION_VALUE.	N/A	N/A	5 msec	Type A. MIL Illumination.
PTS1_CORRELATION_ERROR	C05D0	This monitor checks if: PTS1 Signal Failure	The PTS1, PTS2, and BAS sensor signals are used in a 2-out-of-3 correlation scheme to identify a single failed sensor signal	• |PTS1 – PTS2| > 2 mm AND • |PTS1 – BAS| > 2 mm AND • |PTS2 – BAS| < 2 mm	Signal is valid	125-500 ms 18000 Counts	Type A. MIL Illumination.
PTS2_CORRELATION_ERROR	C05D0	This monitor checks if: PTS2 Signal Failure	The PTS1, PTS2, and BAS sensor signals are used in a 2-out-of-3 correlation scheme to identify a single failed sensor signal	• |PTS1 – PTS2| > 2 mm AND • |PTS2 – BAS| > 2 mm AND • |PTS1 – BAS| < 2 mm	Signal is valid	125-500 ms 18000 Counts	Type A. MIL Illumination.
PTS_MISSING_CALIBRATION_ERROR	C05D4	This monitor checks if: • Missing Calibration • NVRAM error	The PTS calibrations are stored in NVRAM and reused at the start of each drive cycle. This fault sets if the stored status indicates one of the failure cases for calibration: • PTS sensor electrical fault • Vehicle moving during calibration • Brake applied during calibration • Offset too big • Offset too small • Offset not steady	not SUCESSFUL	• PTS EOL zeroing was not completed successfully After system start up and read from NVRAM	10 msec	Type A. MIL Illumination.
PTS1_OFFSET_ERROR	C05CC	This monitor checks if: • defective sensor • mechanical mounting of the sensor	The offset required to zero the PTS sensor is larger than the specification limit.	|PTS1 Offset| > 2.5 mm	The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result. To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake.	100ms Goal: 18000	Type A. MIL Illumination.
PTS2_OFFSET_ERROR	C05CF	This monitor checks if: • defective sensor • mechanical mounting of the sensor	The offset required to zero the PTS sensor is larger than the specification limit.	|PTS2 Offset| > 2.5 mm	The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result. To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake.	100ms Goal: 18000	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
Group 19 - Motor Position							
MPS2_CORRELATION_ERROR	C058E	This monitor checks if: • MPS2 Failure • Note: MPS1 failure results in BOOSTED_BRAKE_SYSTEM_FAILURE for lack of motor rotation / pressure build	MPS1 is SPI based with a 50 usec update rate. MPS2 is SENT based with a 1 msec update rate. During motor rotation there is an expected difference in MPS1 and MPS2 based on the different time sampling rates (time lag on MPS2). MPS 1 and 2 moving different direction; or MPS 1 and 2 stopped at different relative postion than history	|MPS1 – MPS2| > 2 Degrees + 3 Degrees (motor speed offset) MPS 1 and 2 moving different direction; or MPS 1 and 2 stopped at different relative postion than history	Signal is valid	100 ms Goal: 18000	Type A. MIL Illumination.
MPS2_SENT_RECEIVE_ERROR	C2A1A	This monitor checks if: MPS2 Signal Failure	Monitor MPS2 sent data received from the SentSensor.	This failsafe detects when MPS2 sent data received from the SentSensor is out of the valid range.	MPS signal data is received.	5 msec	Type A. MIL Illumination.
MPS_BIST_FAULT	C058A	This monitor checks if: MPS Built-in-Self-Test failure	Testing of this module should include running BIST at various MPS angles. The ECU performs an independent calculation parallel to internal MPU sensor BIST software. The fault will occur when the parallel calculations don't match.	The value calculated within the MPS does not equal the ECU calculated value.	BIST Inputs are not faulty.	30 msec	Type A. MIL Illumination.
MPS1_NOT_ALIVE_FAILURE	C058A	This monitor checks if: MPS1 Signal Failure	Any Condition	MPS == MPS_prev	MPS1 does not change for 5 consecutive readings.	100ms	Type A. MIL Illumination.
Group 22 - Power Supply Failures							
SYS_ASIC_VDBAT_RANGE_FAILURE	U3006	This monitor checks if: • VDBAT Voltage is outside the voltage range	• KL30_1 Supply voltage outside of the specified range • If the ASIC A/D value for VDBat is outside the acceptable range (VDBat < 6V or VDBat >25V) continuously for 100ms then the fault is set.	6V < KL30_1 Supply Voltage > 25V	• ASIC's VDBAT Voltage Result SPI field is outside the range of 6 and 25 volts for 100msec	100ms	Type A. MIL Illumination.
SYS_ASIC_PDBAT_RANGE_FAILURE	U3007	This monitor checks if: • PDBAT Voltage is outside the voltage range	• KL30_2 Supply voltage outside of the specified range • If the ASIC A/D value for PDBat is outside the acceptable range (PDBat < 6V or PDBat >23V) continuously for 100ms then the fault is set.	6V < KL30_2 Supply Voltage > 23V	• ASIC's PDBAT Voltage Result SPI field is outside the range of 6 and 23 volts for 100msec	100ms	Type A. MIL Illumination.
KL30_1_OPEN_OR_SHRTED_TO_GND	U3006	This monitor checks if: • Fuse blown (Open) • Short_to_Ground	A feedback ratio is calculated based on the KL30_1_Fdbk_A and KL30_2_Fdbk_B. • If the feedback ratio is lower than the valid lower threshold ratio, then KL30_1_Open_or_Shrted_to_Gnd fault is set	• Ratio = (KL30_1-KL30_2)/(KL30_1+KL30_2) • If PSSW1 AND PSSW2 are turned OFF OR at least one safety switch is turned ON • Fault is set if ratio is less than -30% • If PSSW1 AND/OR PSSW2 are turned ON and all safety switches are turned OFF, • Fault is set if ratio is less than -10%	• Power ON, Continuous Failsafing	75ms	Type A. MIL Illumination.
KL30_2_OPEN_OR_SHRTED_TO_GND	U3007	This monitor checks if: • Fuse blown (Open) • Short_to_Ground	A feedback ratio is calculated based on the KL30_1_Fdbk_A and KL30_2_Fdbk_B. • If this feedback ratio exceeds the valid upper threshold ratio, then KL30_2_Open_or_Shrted_to_Gnd fault is set. Note: Although the SW to tries to detect Fuse Blown/Shorted to ground with both switches on, fuse blown fault will not be detected due to the nature of the circuit and shorted to ground also may not be detected due to the damage that may be caused by this condition. Do not test this condition.	• Ratio = (KL30_1-KL30_2)/(KL30_1+KL30_2) • If PSSW1 AND PSSW2 are turned OFF OR at least one safety switch is turned ON, • Fault is set if ratio is greater than 30% • If PSSW1 AND/OR PSSW2 are turned ON and all safety switches are turned OFF, • Fault is set if ratio is greater than 10%	• Power ON, Continuous Failsafing	75ms	Type A. MIL Illumination.
SYSTEM_VOLTAGE_LOW	P0562	This monitor checks if: • Voltage Supply is providing low voltage levels. • Defective cables. • Defective printed circuit board.	System voltage is monitored continuously but the fault is not enabled during Engine crank. When the system voltage is continuously lower than 8.5V for more than 150 msec then the fault is set. When the system voltage is continuously greater than 9.0V for more than 100 msec then the fault is cleared.	Filtered system voltage < 8.5V	• Engine is not being cranked • System is not re-initializing or shutting down • System is not shutting down	150 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
SYSTEM_VOLTAGE_EXCESSIVE_LOW	P0562	This monitor checks if: • Voltage Supply is providing excessively low voltage level. • Defective cable. • Defected printed circuit board.	System voltage is monitored continuously but the fault is not enabled during Engine crank. When the system voltage is continuously lower than 7.5V for more than 150 msec then the fault is set.	Filtered system voltage < 7.5V	• Engine is not being cranked • System is not re-initializing or shutting down • System is not shutting down	150 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
SYSTEM_VOLTAGE_HIGH	P0563	This monitor checks if: • Voltage Supply is providing high voltage levels. • Defective printed circuit board.	System voltage is monitored continuously but the fault is not enabled during Engine crank. When the system voltage is continuously greater than 16.8V for more than 100 msec then the fault is set. When the system voltage is continuously less than 16.3V for more than 100 msec then the fault is cleared.	Filtered system voltage > 16.8 V	• Engine is not being cranked • System is not re-initializing or shutting down • System is not shutting down	100 ms	Type B. MIL Illumination.
SYSTEM_VOLTAGE_EXCESSIVE_HIGH	P0563	This monitor checks if: • Voltage Supply is providing excessively high voltage levels. • Defective printed circuit board.	System voltage is monitored continuously but the fault is not enabled during Engine crank. When the system voltage is continuously greater than 18.8V for more than 15 msec then the fault is set. When the system voltage is continuously less than 18.3V for more than 100 msec then the fault is cleared.	Filtered system voltage > 18.8V	• Engine is not being cranked • System is not re-initializing or shutting down • System is not shutting down	15 ms	Type B. MIL Illumination.
SYSTEM_VOLTAGE_ECU_SELF_TEST_HOLD	P0562	This monitor checks if: • Voltage Supply is providing excessively high voltage levels. • Defective printed circuit board.	System Self Test will not start if either of the following conditions are present: System is not initialized System Voltage is outside the Excessive range (< 7.5V or >18.8V) If the System Self Test is delayed continuously for more than 100 msec then the fault is set.	Filtered system voltage < 7.5V or Filtered system voltage > 18.8V	• System is not initialized • System Voltage is outside the Excessive range (<7.5 V or >18.8V)	100 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
SYSTEM_VOLTAGE_ERRATIC	P0562	This monitor checks if: • Voltage Supply is toggling between low voltage levels to High voltage levels. • Defective cables. • Defective printed circuit board.	If the filtered System Voltage toggles outside the Excessive Low or Excessive High range but does not stay there long enough to mature the fault then this fault is matured by an up/down counter on the condition	If the Filtered sysem voltage toggles as per the below range Filtered system voltage ? 8.5V Filtered system voltage ? 16.8 V	• Engine is not being cranked • System is not re-initializing or shutting down • System is not shutting down	300ms minimum	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
PRIMARY_WAKEUP_LINE_STUCK_LOW	P2534	This monitor checks if: HW ignition line failure	The MCU compares the state of the Primary Wakeup Line with the Engine Cranking CAN signal from the ECM. If the Primary Wakeup Line is read as Low but is mismatched with a True Engine Cranking signal for a continuous 3 sec then the fault is set This fault is not enabled if the Missing PPEI Engine General Status 1 CAN message fault is set.	State of Primary Wakeup line != Engine Cranking CAN Signal from ECM	• Primary Wakeup COMMS Signal is Valid (Singal is Valid when MISSING_PPEI_ENGINE_GENERAL_STATUS_1 fault is not latched)	3s	Type A. MIL Illumination.
PRIMARY_WAKEUP_LINE_STUCK_HIGH	P2535	This monitor checks if: HW ignition line failure	The MCU compares the state of the Primary Wakeup Line with the Engine Cranking CAN signal from the ECM. If the Primary Wakeup Line is read as High but is mismatched with a False Engine Cranking signal for a continuous 3 sec then the fault is set This fault is not enabled if the Missing PPEI Engine General Status 1 CAN message fault is set.	State of Primary Wakeup line != Engine Cranking CAN Signal from ECM	• Primary Wakeup COMMS Signal is Valid (Singal is Valid when MISSING_PPEI_ENGINE_GENERAL_STATUS_1 fault is not latched) • AND • Primary Wakeup Line is ON	3s	Type A. MIL Illumination.
SECONDARY_WAKEUP_LINE_STUCK_LOW	P2537	This monitor checks if: HW ignition line failure	The MCU compares the state of the Secondary Wakeup Line with the Propulsion System Active CAN signal from the ECM. If the Secondary Wakeup Line is read as Low but is mismatched with a True Propulsion System Active signal for a continuous 1 sec then the fault is set This fault is not enabled if the Missing PPEI Propulsion Gen Stat 1 CAN message fault is set.	State of Secondary Wakeup line != Engine Cranking CAN Signal from ECM	• 5ms after CRANK • Secondary Wakeup COMMS Signal is Valid (Singal is Valid when MISSING_PPEI_PROPULSION_GEN_STAT_1_HS fault is not latched) • Secondary Wakeup Line is ON	1s	Type B. MIL Illumination.
INTERNAL_5V_SUPPLY_VOLT_ERRATIC	P0606	This monitor checks if: • Defective internal 5 V supply circuit • Defective printed circuit board • Defective microprocessor feedback input port • Defective Polaris ASIC feedback input port	If the filtered 5V supply toggles outside the allowed range but does not stay there long enough to mature the INTERNAL_5V_SUPPLY_VOLT_FAILURE then this fault is matured by an up/down counter on the condition	If the filtered System Voltage toggles as per the below range Filtered system voltage ? 4.75V Filtered system voltage ? 5.25 V	• Internal 5V supply is enabled • AND • None of the following are taking place: • System is initializing • System is re-initializing • Engine is being cranked • When requested by Diagnostic commands System is shutting down	800 counts/80ms minimum	Type A. MIL Illumination.
ECU_SELF_TEST_TIMEOUT	P0606	This monitor checks if: Faulted ECU	If the ECU self test does not complete in the alloted amount of time, then set this fault. This fault allows to properly inform the driver that the EBCM functionality is not available. Note: Timeout fault is latched if system self-test doesn't finish within 2 seconds. This time doesn't include the on-hold time if the battery voltage is out of range.	None	Runs duting startup	5 msec	Type A. MIL Illumination.
PWR_PTS_MPS_SUP1_RANGE_LOW	C05D1	This monitor checks if: • Defective motor position sensor • Defective pedal travel sensor • Defective printed circuit board	The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS). The MCU monitors the feedbacks on these two voltage supplies. If either supply is continuously < 4.85V for 100ms then the respective supply fault is set.	if PWR<4.85 for 100ms	• MPS1 sensor is enabled • PTS1 sensor is enabled AND • None of the following are taking place: • System is initializing • System is re-initializing • Engine is being cranked • When requested by Diagnostic commands System is shutting down	100ms	Type A. MIL Illumination.
PWR_PTS_MPS_SUP1_RANGE_HIGH	C05D1	This monitor checks if: • Defective motor position sensor • Defective pedal travel sensor • Defective printed circuit board	The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS). The MCU monitors the feedbacks on these two voltage supplies. If either supply is continuously > 5.15V for 100ms then the respective supply fault is set.	if PWR>5.15V for 100ms	• MPS1 is enabled • PTS1 is enabled AND • None of the following are taking place: • System is initializing • System is re-initializing • Engine is being cranked • When requested by Diagnostic commands System is shutting down	100ms	Type A. MIL Illumination.
PWR_PTS_MPS_SUP1_ERRATIC	C05D1	This monitor checks if: • Defective motor position sensor • Defective pedal travel sensor • Defective printed circuit board	The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS). The MCU monitors the feedbacks on these two voltage supplies. If a supply feedback is outside the acceptable range (< 4.85V or > 5.15V) then the respective erratic fault is matured at a weight of 50 toward a goal of 800 (fastest maturation = 80 msec). If the feedback voltage returns within the 4.85 - 5.15V range then the erratic fault is dematured at a weight of 1. Once the fault goal is reached then the fault is set and is ignition latched.	if PWR<4.85 or >5.15V	• MPS1 is enabled • PTS1 is enabled AND • None of the following are taking place: • System is initializing • System is re-initializing • Engine is being cranked • When requested by Diagnostic commands System is shutting down	80ms minimum	Type A. MIL Illumination.
PWR_PTS_MPS_SUP2_RANGE_LOW	C05BB	This monitor checks if: • Defective motor position sensor • Defective pedal travel sensor • Defective printed circuit board	The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS). The MCU monitors the feedbacks on these two voltage supplies. If either supply is continuously < 4.85V for 100ms then the respective supply fault is set.	if PWR<4.85 for 100ms	• MPS2 is enabled • PTS2 is enabled AND • None of the following are taking place: • System is initializing • System is re-initializing • Engine is being cranked • When requested by Diagnostic commands System is shutting down	100ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
PWR_PTS_MPS_SUP2_RANGE_HIGH	C05BB	This monitor checks if: • Defective motor position sensor • Defective pedal travel sensor • Defective printed circuit board	The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS). The MCU monitors the feedbacks on these two voltage supplies. If either supply is continuously > 5.15V for 100ms then the respective supply fault is set.	if PWR>5.15V for 100ms	• MPS2 is enabled • PTS2 is enabled AND • None of the following are taking place: • System is initializing • System is re-initializing • Engine is being cranked • When requested by Diagnostic commands System is shutting down	100ms	Type A. MIL Illumination.
PWR_PTS_MPS_SUP2_ERRATIC	C05BB	This monitor checks if: • Defective motor position sensor • Defective pedal travel sensor • Defective printed circuit board	The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS). The MCU monitors the feedbacks on these two voltage supplies. If a supply feedback is outside the acceptable range (< 4.85V or > 5.15V) then the respective erratic fault is matured at a weight of 50 toward a goal of 800 (fastest maturation = 80 msec). If the feedback voltage returns within the 4.85 - 5.15V range then the erratic fault is dematured at a weight of 1. Once the fault goal is reached then the fault is set and is ignition latched.	if PWR<4.85 or >5.15V	• MPS2 is enabled • PTS2 is enabled AND • None of the following are taking place: • System is initializing • System is re-initializing • Engine is being cranked • When requested by Diagnostic commands System is shutting down	80ms minimum	Type A. MIL Illumination.
PWR_SW_COIL_SUP_OPEN	C053B	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30 supply inputs are switched on/off by the two Power Switches. The downstream KL30_INT supplies the ABS Coils, the BB Coils and the Motor Driver. These three circuits are individually switched on/off by separate Safety Relays. When the Safety Relay is on the downstream voltage feedback is expected to be high. The MCU monitors the voltage feedback downstream from the ABS Coil Safety Relay. If the feedback voltage is less than 80% of KL30_INT for a continuous 50 msec then the fault is set.	If Feedback Voltage < 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.
PWR_SW_COIL_SUP_SHORT	C053B	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30 supply inputs are switched on/off by the two Power Switches. The downstream KL30_INT supplies the ABS Coils, the BB Coils and the Motor Driver. These three circuits are individually switched on/off by separate Safety Relays. When the Safety Relay is off the downstream voltage feedback is expected to be low. The MCU monitors the voltage feedback downstream from the ABS Coil Safety Relay. If the feedback voltage is not less than 80% of KL30_INT for a continuous 50 msec then the fault is set.	If Feedback Voltage > 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.
PWR_SW_BB_COIL_SUP_OPEN	C053B	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30 supply inputs are switched on/off by the two Power Switches. The downstream KL30_INT supplies the ABS Coils, the BB Coils and the Motor Driver. These three circuits are individually switched on/off by separate Safety Relays. When the Safety Relay is on the downstream voltage feedback is expected to be high. The MCU monitors the voltage feedback downstream from the BB Coil Safety Relay. If the feedback voltage is less than 80% of KL30_INT for a continuous 50 msec then the fault is set.	If Feedback Voltage < 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.
PWR_SW_BB_COIL_SUP_SHORT	C053B	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30 supply inputs are switched on/off by the two Power Switches. The downstream KL30_INT supplies the ABS Coils, the BB Coils and the Motor Driver. These three circuits are individually switched on/off by separate Safety Relays. When the Safety Relay is off the downstream voltage feedback is expected to be low. The MCU monitors the voltage feedback downstream from the BB Coil Safety Relay. If the feedback voltage is not less than 80% of KL30_INT for a continuous 50 msec then the fault is set.	If Feedback Voltage > 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.
PWR_SW_MOT_SUP_OPEN	C0595	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30 supply inputs are switched on/off by the two Power Switches. The downstream KL30_INT supplies the ABS Coils, the BB Coils and the Motor Driver. These three circuits are individually switched on/off by separate Safety Relays. When the Safety Relay is on the downstream voltage feedback is expected to be high. The MCU monitors the voltage feedback downstream from the Motor Safety Relay. If the feedback voltage is less than 80% of KL30_INT for a continuous 50 msec then the fault is set.	If Feedback Voltage < 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.
PWR_SW_MOT_SUP_SHORT	C0595	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30 supply inputs are switched on/off by the two Power Switches. The downstream KL30_INT supplies the ABS Coils, the BB Coils and the Motor Driver. These three circuits are individually switched on/off by separate Safety Relays. When the Safety Relay is off the downstream voltage feedback is expected to be low. The MCU monitors the voltage feedback downstream from the Motor Safety Relay. If the feedback voltage is not less than 80% of KL30_INT for a continuous 50 msec then the fault is set.	If Feedback Voltage > 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.
PWR_SW_PSSW1_SUP_OPEN	U3006	This monitor checks if: • Disconnected Switch • PCB Problem	This fault is not enabled is a Watchdog fault is already set. The KL30_1 and KL30_2 voltage supply inputs are individually switched on/off by separate Power Switch circuits. When either Switch is turned on then it's respective Power Switch Feedback is expected to be high. If the feedback voltage is less than 80% of it's respective KL30_x supply voltage for a continuous 50 msec then the fault is set	If Feedback Voltage < 80%of KL30_x	• Power ON, Continuous Failsafing	50 msec	Type A. MIL Illumination.
PWR_SW_PSSW1_SUP_SHORT	U3006	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30_1 and KL30_2 voltage supply inputs are individually switched on/off by separate Power Switch circuits. When both Switches are turned off then both Power Switch Feedbacks are expected to be low. If the feedback voltage is not less than 80% of it's respective KL30_x supply voltage for a continuous 50 msec then the fault is set.	If Feedback Voltage > 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.
PWR_SW_PSSW2_SUP_OPEN	U3007	This monitor checks if: • Disconnected Switch • PCB Problem	This fault is not enabled is a Watchdog fault is already set. The KL30_1 and KL30_2 voltage supply inputs are individually switched on/off by separate Power Switch circuits. When either Switch is turned on then it's respective Power Switch Feedback is expected to be high. If the feedback voltage is less than 80% of it's respective KL30_x supply voltage for a continuous 50 msec then the fault is set.	If Feedback Voltage < 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
PWR_SW_PSSW2_SUP_SHORT	U3007	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30_1 and KL30_2 voltage supply inputs are individually switched on/off by separate Power Switch circuits. When both Switches are turned off then both Power Switch Feedbacks are expected to be low. If the feedback voltage is not less than 80% of it's respective KL30_x supply voltage for a continuous 50 msec then the fault is set.	If Feedback Voltage > 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.
SYS_ASIC_VCP12_U12_VOLTAGE_LOW	P0606	This monitor checks if: Defective vehicle battery or Charging system Otherwise: -Defective system ASIC -Defective printed circuit board. • Defective system ASIC	The Polaris ASIC provides an internal VCP12 voltage regulator which is required to operate the I_SSR amplifier and to maintain regulation of the VA5p0 regulators and the U3 and U1 linear regulators. If the VCP12 voltage is less that 7.25 V for 44 ?sec then the Polaris sets the VPC12 Low Voltage Warning SPI bit to True. Software monitors this SPI bit. If it is continuously True for more than 100 msec then the fault is set.	VCP12 voltage is less that 7.25 V for 44 ?sec	• Polaris is initialized	100 msec	Type A. MIL Illumination.
SYS_ASIC_CHARGE_PUMP_OVER_VOLT	P0606	This monitor checks if: • Defective system ASIC	The Polaris ASIC provides a two-stage charge pump to produce a voltage greater than the VCP12 voltage. If the charge pump voltage exceeds VCP12 voltage by more than 13V for 53 msec then the Polaris sets the Charge Pump Overvoltage Limit SPI bit to True. Software monitors this SPI bit. If it is continuously True for more than 100 msec then the fault is set.	charge pump voltage exceeds VCP12 voltage by more than 13V for 53 msec	• Polaris is initialized	100 msec (145.2 ms)	Type A. MIL Illumination.
SYS_ASIC_VDG_RANGE_FAULT	P0606	This monitor checks if: • Defective system ASIC	Verify that the KL30_1 Power Switch command is not stuck On. The ASIC VDG pin controls the KL30_1 Power Switch. While the Power Switch is commanded off, the SW reads the ASIC's VDG voltage feedback. When the VDG voltage is continuously >= 1.0V for more than 100 msec then the fault is set.	SSR ON: VDBat+3V <= VDG <= VDBat+12V SSR OFF: VDG <= 1.0V	• Polaris is initialized	100 msec	Type A. MIL Illumination.
SYS_ASIC_VBAT_SW_OVERCURRENT	P0606	This monitor checks if: • Defective system ASIC	The Polaris ASIC provides an overcurrent protected VBAT_SW output used for powering sensors and external circuits. If the VBAT_SW current draw exceeds 150 mA for 800 ?sec then the Polaris sets the VBAT_SW Overcurrent SPI bit to True. Software monitors this SPI bit. If it is continuously True for more than 25 msec then the fault is set.	VBAT_SW Enable and VBAT_SW Over-Current SPI bits are both TRUE	• Polaris is initialized	25 msec	Type A. MIL Illumination.
SYS_ASIC_VBAT_SW_CORR	P0606	This monitor checks if: • Defective system ASIC	The MCU shall read the ASIC's VBAT_SW Voltage Result SPI field and perform a plausibility check against the measured VBAT voltage pin on the MCU. When the difference between the two voltage values is continuously > 1.75V for more than 25 msec then the fault is set.	voltage difference > 1.75 volts	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_VBAT_SW_DISABLE_CORR	P0606	This monitor checks if: • Defective wiring harness • Defective ASCI • Defective CPU • Defective circuit board	Check that the ASIC VBAT_SW output is not leaking or stuck On. The MCU shall read the ASIC's VBAT_SW Voltage Result SPI field when the commanded VBAT_SW state is Off. If the voltage is continuously > 1.5V for more than 25 msec then the fault is set.	voltage difference > 1.5 volts	-Polaris is initialized -Power Switch is OFF	25 msec	Type A. MIL Illumination.
SYS_ASIC_U5_FAILURE	P0606	This monitor checks if: • Defective system ASIC	The U5 power supply regulates battery voltage down to 5V to supply such circuits as network communication transceivers, internal sensors and ADC references. If U5 is outside the acceptable range (<4.75V or >5.1V) continuously for 105 ?sec then the ASIC shall continue to attempt to regulate U5 and set the U5 Out of Range Warning SPI bit to True. Software monitors this SPI bit. If it becomes True then the fault is set immediately.	The MCU shall monitor the ASIC's U5 Out of Range Warning SPI bit. (<4.75V or >5.1V)	• Polaris is initialized	5 msec	Type A. MIL Illumination.
SYS_ASIC_CHARGE_PUMP_UNDER_VOLT	P0606	This monitor checks if: • Defective system ASIC	The Polaris ASIC provides a two-stage charge pump to produce a voltage greater than the VCP12 voltage. If the charge pump voltage exceeds VCP12 voltage by less than 9.5V for 5.5 msec then the Polaris sets the Charge Pump Undervoltage Limit SPI bit to True. Software monitors this SPI bit. If it is continuously True for more than 100 msec then the fault is set.	If the charge pump voltage exceeds VCP12 voltage by less than 9.5V for 5.5 msec	• Polaris is initialized	100 msec (105.5 ms)	Type A. MIL Illumination.
U5_ASIC_ADC_REF_FAULT	P0606	This monitor checks if: • Defective system ASIC or circuit board	The 5V regulated supply is read at the ASIC. If it is not within the range, then the fault is set.	Asic U5 is not within the 4.75V and 5.25V	Polaris is initialized	80 msec	Type A. MIL Illumination.
SYS_ASIC_U3_UV_RESET_FAULT	P0606	This monitor checks if: • ASIC power supply block problem • Defective ASIC • PCB problem	• When the U5, U3, or U1 Undervoltage Diagnostic SPI bit is set, the ASIC shall raise the effective U5 out of range lower warning level, or the U3 or U1 undervoltage fault threshold above the maximum U5, U3, or U1 regulation voltage, thus forcing a U5 out of range warning or U3 or U1 undervoltage fault. • Periodically, the MCU shall store a flag in NVM indicating that it will perform a U5, U3 or U1 undervoltage diagnostic. The MCU shall then force one of the three test modes and start a timer.	The MCU shall detect a fault if it does not receive a reset within the expected time. If a reset occurs, the MCU shall check NVM and the ASIC's Reset Source SPI Register, and verify that the reset was due to a planned test.	• Runs during initialization	10 msec	Type A. MIL Illumination.
BOOSTED_BRAKE_SYSTEM_DYNAMIC_LEAK	C05B0	This monitor checks if: Monitors for leaks in the braking system at the circuit level during braking events. This is different from the Static Leak check which looks for leaks at the channel level at shutdown.	The leak detection logic compares pressure gradient threshold against the measured pressure gradient. Once the error last longer than a time threshold, and the pressure error integral passes its threshold, leak is detected. The pressure gradient can be estimated from Dap flow rate and PV information; Similarly, pressure can be estimated from Dap volume and PV information. Here the worst case PV is taken	There are 12 calibrations associated with this failsafe so it is impossible to describe the interation of all of them in this document. Ulitimately when the pressure error integral exceeds 20 bar AND the pressure gradient error integral exceeds 3000 Bar/s the fault is set.	Boost control active Boost pressure > 2 Bar Advancing DAP (no replenishment mode) No slip control active Faded brakes have not been detected	5 msec	Type A. MIL Illumination.
BOOSTED_BRAKE_SYSTEM_LEAK_ISO_FAILED	C05B0	This monitor checks if: Set if the leakage circuit cannot be isolated successfully	Brake fluid leak on a channel or circuit without the ability to identify the location of the leak	BOOSTED_BRAKE_SYSTEM_DYNAMIC_LEAK AND Circuit cannot be isolated	BOOSTED_BRAKE_SYSTEM_DYNAMIC_LEAK already present.	230 msec	Type A. MIL Illumination.
BOOST_POWER_MANAGEMENT_ENABLED_WARNING	P0562	This monitor checks if: This fault is set if the Power mode is not in Crank, and the System Voltage is outside an under_volt_threshold of 8.5 V.	This fault is set if the Power mode is not in Crank, and the System Voltage is outside an under_volt_threshold of 8.5 V.	Motor Voltage < 8.5V	Disabled in Crank mode	20 msec	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
BOOST_POWER_MANAGEMENT_ACTIVE_FAILURE	P0562	This monitor checks if: This fault is set if the Power mode is not in Crank, and the System Voltage is outside an under_volt_threshold of 7.4 V.	This fault is set if the Power mode is not in Crank, and the System Voltage is outside an under_volt_threshold of 7.4 V.	Motor Voltage < 7.4V	Disabled in Crank mode	70 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
BOOST_SYSTEM_FADED_BRAKES_DETECTED	C0072	This monitor checks if: Monitor the estimated brake rotor temperatures, the system compliance, the boost pressure, and the measured deceleration during braking events. Based on a model calculate a Brake Fade Factor that will detect brake fade.	If the fade factor is greater than TBD for TBD msec, this fault is set.	Average brake rotor temperature > 400C Brake Fade Factor > 50% 2 conditions above exists for 800 msec	Boost control active No slip control active Vehicle speed > 4 m/s	800 msec	Type A. MIL Illumination.
PTU_ESTABLISH_HOME_POSITION	C0021	This monitor checks if: Set if motor could not find home position during startup	Motor could not find home position in 4sec. Motor gets stuck somewhere	Motor still moving to find home position for 4 sec	Cycle IGN or Clear Code	1 msec	Type A. MIL Illumination.
ACU_NOT_CONFIGURED	P0602	This monitor checks if: Set if EOL sensor Learn or Comp Port Learn has not done or failed	Read DID 46, if DID 46 == 0F 00, clear the fault, otherwise, set the fault	Read DID 46, if DID 46 == 0F 00, clear the fault, otherwise, set the fault	Learn all EOL sensor, and comp port learn again and clear code	5 msec	Type A. MIL Illumination.
STATIC_CIRCUIT0_LEAK_DETECTED	C05B0	This monitor checks if: System Leak	Leak fault, commands each circuit to build 30 bar pressure and checks for a leak by holding for 1sec. If the pressure drops to 24 bar, this fault is set.	Checks every wheel if there is a leak during shutdown.	Runs During Shutdown	5 msec	Type A. MIL Illumination.
STATIC_CIRCUIT1_LEAK_DETECTED	C05B0	This monitor checks if: System Leak	Leak fault, commands each circuit to build 30 bar pressure and checks for a leak by holding for 1sec. If the pressure drops to 24 bar, this fault is set.	Checks every wheel if there is a leak during shutdown.	Runs During Shutdown	5 msec	Type A. MIL Illumination.
BRAKE_BY_WIRE_HIGH_LEVEL_MONITOR_FAILURE	C0021	This monitor checks if: Base brake values are energized in a boosted brake mode, while there are any parts of the boost logic which indicate that boosted brakes should not be enabled.	The goal of this fault monitor is to look for conditions where the base brake values are energized in a boosted brake mode, while there are any parts of the boost logic which indicate that boosted brakes should not be enabled. The validity of the driver inputs, base brake mode, Actuator control mode, Boost/Brake Arbitrator states, and the Electric drive states must all agree that boosted brakes are allowed for the base brake valves to be in a boosted condition. Otherwise the fault will be matured.	• (Pedal Travel signal is not valid AND SCP is invalid) OR • Boost Arb targeted pressure is not available OR • BOOST System in INHIBITED OR • Electric Drive state is not active or not running OR • Actuator Control is not allowed	• Pedal travel sensor signal • SCP value • Boost Arb state • Electric drive status	200 msec	Type A. MIL Illumination.
BRAKE_BLEED_NOT_COMPLETED	C15C7	This monitor checks if: DID NOT write DID B2	DID B2 == 0	DID B2 == 0	Runs Continuous	5 msec	Type A. MIL Illumination.
BOOST_STARTUP_FAILURE	C0021	This monitor checks if:	After mode manger completes system self test the boost system looks to intialize the boost controller. If during this phase the conditions are not correct we will set a fault.	When boost control state is in initialze state a timer is incremented allowing a set time to initialize before a fault should be set.	Run during the power up initializtion of boost arbitration	4 seconds	Type A. MIL Illumination.
Group 25 - Special Mode							
Group 27 - CAN Device							
CAN_1_BUS_OFF_COMMS_FAULT	U0077	This monitor checks if: • CE bus Shorted • CAN transceiver faulty	CAN peripheral locks for the bit errors in transmitted messages and increments Tx error counter if any error is detected. if Tx error counter reaches 256 the fault get set.	if txerror counter reaches 256 and doesn't transmit any message for the fault maturation time.	• When wake lines are enabled. • Node supervisor is in enabled state	175 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
CAN_1_LIST_INIT_TIMEOUT_COMMS_FAULT	U3000	This monitor checks if: • CAN hardware initialization failure	When time taken to initialize the message object exceeds the configured time out	Message object initilization timeout has occurred.	None	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "
Group 28 - CAN Communication							
MISSING_PPEI_POWERTRAIN_CONFIG_DATA	U0100	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 2.5 seconds OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	2.5 sec	Type B. MIL Illumination.
MISSING_PPEI_ENGINE_GENERAL_STATUS_4	U0100	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 1.25 seconds OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	1.25 sec	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
MISSING_PPEI_PLATFORM_ENG_CNTRL_REQUESTS	U0140	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for .625 seconds OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	0.625 sec	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_PPEI_ENGINE_TORQUE_STATUS_3	U0100	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	250 msec	Type B. MIL Illumination.
MISSING_PPEI_TRANS_GENERAL_STATUS_2	U0101	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	250 msec	Type B. MIL Illumination.
MISSING_PPEI_PLATFORM_GENERAL_STATUS	U0140	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for .25 seconds OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	250 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_PPEI_TORQUE_REQUEST_STATUS	U0100	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	250 msec	Type B. MIL Illumination.
GMLAN_ABA_ACT_POS_PROT_FAULT	U0401	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	ARC + Protection_Value != 0	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "
GMLAN_ABA_ACT_POS_ARC_FAULT	U0401	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. •Any alive rolling count value that matches the previously received value will activate the fault counter. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	New_ARC - Prev_ARC >= 2	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_PPEI_ENGINE_TORQUE_STATUS_2	U0100	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	250 msec	Type B. MIL Illumination.
GMLAN_ENGTRQ_FSTAT_TRQ_FAIL	C2A07	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked.	EngTrqRdFlrSt == 0x1 OR EngTrqRdFlrSt == 0x2 OR EngTrqRdFlrSt ==0x4	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
GMLAN_ENGTRQ_FSTAT_ABOVE_RANGE	U0401	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• COMMS Message must be received. When correct message is received by EBCM, it is unpacked and pertinent signals are checked for a range error.	EngTrqRdFlrSt >= 5	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	1 Count	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_PPEI_TRANS_GENERAL_STATUS_1	U0101	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	250 msec	Type B. MIL Illumination.
MISSING_ETEI_TRANSMISSION_GENERAL_STATUS	U0101	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	250 msec	Type B. MIL Illumination.
MISSING_PPEI_ENGINE_GENERAL_STATUS_1	U0100	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	250 msec	Type B. MIL Illumination.
GMLAN_ENG_SPEED_STAT_ABOVE_RANGE	U0401	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• COMMS Message must be received. When correct message is received by EBCM, it is unpacked and pertinent signals are checked for a range error.	EngSpdStat_0 == 0x02	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	1 Count	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_ACTIVE_REAR_STEER_STATUS_CE	U0134	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring Problem at message receiving module	The EBCM is monitoring the CAN bus for message Active_Rear_Steer_Status_CE(0x176) and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	250 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
ARS_ALIGN_COMP_FAULT	U0435	This monitor checks if: ARS module detects that its alignment calibration has not been completed.	If the signal ARSAlgmtCmplt (Active Rear Steer Alignment Complete) of message Active_Rear_Steer_Status_CE (0x176) is received with "FALSE" Value (0x0) for 10 messages in a row then this fault is set.	"FALSE" Value (0x0) is received.	• Fault will not be set during the following conditions: • within the first 5 seconds after System Power Mode has transitioned to RUN • Within the first 5 seconds of recovery from an under or over voltage condition CAN Bus Off Failure is latched	100 msec / 10 msgs	Type C, No MIL, "Emissions Neutral Diagnostic "
ARS_OPER_STAT_FAULT	U0435	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring Problem at message receiving module	If the signal ARSOpStat (Active Rear Steer Operational Status) of message Active_Rear_Steer_Status_CE(0x176) is received with “TemporarilyUnavailable” (0x1) or “PermanentlyFailed” (0x3) or any other unknown Value for 50 messages in a row then this fault is set.	Received value is not "NORMAL" (0x0)	• Fault will not be set during the following conditions: • within the first 5 seconds after System Power Mode has transitioned to RUN • Supply Voltage is not in the range 9V <= V <= 16V • Within the first 5 seconds of recovery from an under or over voltage condition CAN Bus Off Failure is latched	500 msec / 50 msgs	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_PPEI_CGM_GENERAL_STATUS_HS	U0146	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring Problem at message receiving module	The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	250 msec	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
MISSING_PPEI_HYBRID_GENERAL_STATUS_3_HS	U0100	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring Problem at message receiving module	The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	250 msec	Type B. MIL Illumination.
MISSING_PRFRMNC_TRCTN_CNTRL_ENG_STAT_HS	U0100	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring Problem at message receiving module	The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	250 msec	Type B. MIL Illumination.
MISSING_PPEI_STEERING_WHEEL_ANGLE_CE	U0131	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for .025 seconds OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	30 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
SWA_CHECKSUM_FAULT	U0420	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	ARC + CHKSUM != 0	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "
SWA_ARC_FAULT	U0420	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. •Any alive rolling count value that matches the previously received value will activate the fault counter. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	New_ARC - Prev_ARC >= 2	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_IMU_YAW_LONG_ACC_CE	U0151	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for .025 seconds OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	.25 sec	Type C, No MIL, "Emissions Neutral Diagnostic "
INERTIAL_DATA_RED_CHECKSUM_FAULT	U0452	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	ARC + CHKSUM != 0	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "
INERTIAL_DATA_RED_ARC_FAULT	U0452	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. •Any alive rolling count value that matches the previously received value will activate the fault counter. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	New_ARC - Prev_ARC >= 2	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "
LONG_ACCEL_NOT_AVAILABLE	U0452	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• When the incoming message is unpacked, the signal will be checked immediately.	IMULonAccPriAval == 0x0	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	1 Count	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
MISSING_IMU_YAW_LATITUD_ACC_CE	U0151	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for .025 seconds OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	.25 sec	Type C, No MIL, "Emissions Neutral Diagnostic "
INERTIAL_DATA_CHECKSUM_FAULT	U0452	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	ARC + CHKSUM != 0	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "
INERTIAL_DATA_ARC_FAULT	U0452	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. •Any alive rolling count value that matches the previously received value will activate the fault counter. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	New_ARC - Prev_ARC >= 2	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "
BODY_INFORMATION_HS_ARC_FAULT	U0422	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. •Any alive rolling count value that matches the previously received value will activate the fault counter. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	New_ARC - Prev_ARC >= 2	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	N/A	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_PPEI_DRV_PREF_MODE_SWITCH_STATUS	U0100	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for .25 seconds OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	.25 sec	Type B. MIL Illumination.
MISSING_PPEI_ENGINE_GENERAL_STATUS_6	U0100	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for .25 seconds OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	.25 sec	Type B. MIL Illumination.
MISSING_ETRS_GENERAL_REQUEST_2_HS	U0100	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for .25 seconds OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	.25 sec	Type B. MIL Illumination.
MISSING_PPEI_PROPULSION_GEN_STAT_1_HS	U0100	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for .25 seconds OR Message length is less than defined by DBC	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • CAN Bus Off Failure is detecting or latched • System Power Mode is in crank mode.	.25 sec	Type B. MIL Illumination.
ARS_STATUS_CE_CHKSUM_FAULT	U0435	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	ARC + CHKSUM != 0	• Fault will not be set during the following conditions: • within the first 5 seconds after System Power Mode has transitioned to RUN • Supply Voltage is not in the range 9V <= V <= 16V • Within the first 5 seconds of recovery from an under or over voltage condition CAN Bus Off Failure is latched	fastest maturation is 3 consecutive bad checksums (30 msec). Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
ARS_ACTUAL_ANGLE_SIGNAL_INVALID	U0435	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring Problem at message receiving module	If the signal ARSActAnglV (Active Rear Steer Actual Angle Validity) of message Active_Rear_Steer_Status_CE(0x176) is received with Invalid Value (0x1) then this fault is set immediately.	Validity Bit = 1 (Valid = 0, Invalid = 1)	• Fault will not be set during the following conditions: • within the first 5 seconds after System Power Mode has transitioned to RUN • Supply Voltage is not in the range 9V <= V <= 16V • Within the first 5 seconds of recovery from an under or over voltage condition CAN Bus Off Failure is latched	1 msg (10 msec)	Type C, No MIL, "Emissions Neutral Diagnostic "
ARS_STATUS_CE_ARC_FAULT	U0435	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. •Any alive rolling count value that matches the previously received value will activate the fault counter. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	New_ARC - Prev_ARC >= 2	• Fault will not be set during the following conditions: • within the first 5 seconds after System Power Mode has transitioned to RUN • Supply Voltage is not in the range 9V <= V <= 16V • Within the first 5 seconds of recovery from an under or over voltage condition CAN Bus Off Failure is latched	fastest maturation is 3 consecutive count sequence errors (30 msec). Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
ARS_SIG_SUP_ERR_FAULT	U0435	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring Problem at message receiving module	If the signal ARSActAnglV (Active Rear Steer Actual Angle Validity) of message Active_Rear_Steer_Status_CE(0x176) is received with Invalid Value (0x1) then this fault is set immediately.	Validity Bit = 1 (Valid = 0, Invalid = 1)	• Fault will not be set during the following conditions: • within the first 5 seconds after System Power Mode has transitioned to RUN • Supply Voltage is not in the range 9V <= V <= 16V • Within the first 5 seconds of recovery from an under or over voltage condition CAN Bus Off Failure is latched	1 msg (10 msec)	Type C, No MIL, "Emissions Neutral Diagnostic "
Group 30 - Configuration							
Group 32 - Miscellaneous							
Group 33 - Electronic Park Brake							
PB_WAKE_UP_LINE_VOLTAGE_FAULT	C0616	This monitor checks if: • Transceiver faulty • PCB probelm	The Sw monitors the A2D feedback received from INH pin of LIN transceiver if this voltage drops below the threshold voltage for 60msec we set this fault indicating EPB wake up is not possible .	If the transceiver feedback drops below voltage 6v	• Power ON, Continuous Failsafing	30 msec	Type A. MIL Illumination.
PB_MICRO_ROM_FAULT	C0616	This monitor checks if: S12 micro ROM failure, S12 micro ALU/instruction set fault	S12 micro calculates a CCITT CRC16 checksum over the complete FLASH memory. If that does not match with the stored checksum, the fault is set The complete ROM is checked during startup, it is consecutively checked during normal operation (complete check takes 1.28 s) and in sleep mode (complete check takes approx. 60 seconds)	Each ROM section is checksummed byte by byte. Each byte will be added to the current checksum for a section. If the byte being checked is the last byte of a section, then the setion is verified for a correct checksum stored at the end of the section.	Continuous	10 msec	Type A. MIL Illumination.
PB_MOTOR_SUPPLY_OC	C0616	This monitor checks if: • open supply	Precondition: no FC_A2D_REFERENCE_FAULT detected! When the measured Motor Supply Voltage is less than 2V the Fault is set.	Motor Supply Voltage < 2v	• No Actuation	160 ms	Type A. MIL Illumination.
PB_MOTOR_SUPPLY_OC_RR	C0616	This monitor checks if: • open supply	Precondition: no FC_A2D_REFERENCE_FAULT detected! When the measured Motor Supply Voltage is less than 2V the Fault is set.	Motor Supply Voltage < 2v	• No Actuation	160 ms	Type A. MIL Illumination.
PB_MICRO_ADC_REFERENCE_FAULT	C0616	This monitor checks if: ECU internal defect. Incorrect 5V supply from ASIC.	The conversion of all input voltages on the S12 micro is based on an ADC reference voltage. This fault indicates this voltage is outside of expected tolerance so none of the voltage readings can be considered accurate.	The EPB Micro fault flag PB_MICRO_ADC_REFERENCE_FAULT = True	Filtered system voltage >= 7.5V AND SYSTEM_VOLTAGE_EXCESSIVE_LOW fault not set.	50 msec	Type A. MIL Illumination.
PB_MICRO_ADC_CAL_DATA_IMPLAUSIBLE	C0616	This monitor checks if: Wrong calibration, ECU defect	Each S12 micro ADC input has calibration data saved in the EEPROM in Main micro, which is sent from the Main micro to the S12 micro at Initialization multiple times. If all "versions" of these calibrations do not match, the ADC calibration data is considered implausible.	Gain values and offset values are compared between the main micro and the EPB micro. If values disagree, fault is set.	• Periodic	10 msec	Type A. MIL Illumination.
PB_MICRO_ADC_CAL_FAULT	C0616	This monitor checks if: Wrong calibration, ECU defect	This fault is set if valid ADC calibration data is never received by the S12 micro.	Periodic ADC calibration indicates that calibration data is invalid	• Periodic	1000 msec	Type A. MIL Illumination.
PB_MOTOR_MISSING_INITIALIZATION_ERROR	C0616	This monitor checks if: • Calibration values for EPB are missing or out of range	• During initialization, the Park Brake motor offset and gain values are read from NVRAM. If the values are not within an acceptable range, the SW will use default values from ROM.	Calibration values in NVRAM are missing or out of range	• Runs during initialization	10 msec	Type A. MIL Illumination.
PB_APPLY_ENABLE_WRONG_STATE	C0616	This monitor checks if: S12 micro/Zenon hardware fault. FET SC/OC.	Monitor routine calculates the expected apply enable state using the same algorithms and input parameters as S12 micro and compares the expected state to the real state of the related FET's enable line.	No successful FET activation	Continuous failsafing	40 s	Type A. MIL Illumination.
PB_APPLY_ENABLE_NO_CONTROL	C0616	This monitor checks if: S12 micro/Zenon hardware fault. FET SC/OC.	FET is requested to be activated, but the monitoring shows the FET as unactivated.	No successful FET activation	Continuous failsafing	10 ms	Type A. MIL Illumination.
PB_RELEASE_ENABLE_WRONG_STATE	C0616	This monitor checks if: S12 micro/Zenon hardware fault. FET SC/OC.	Monitor routine calculates the expected apply enable state using the same algorithms and input parameters as S12 micro and compares the expected state to the real state of the related FET's line.	No successful FET activation	Continuous failsafing	40 s	Type A. MIL Illumination.
PB_RELEASE_ENABLE_NO_CONTROL	C0616	This monitor checks if: S12 micro/Zenon hardware fault. FET SC/OC.	FET is requested to be activated, but the monitoring shows the FET as unactivated.	No successful FET activation	Continuous failsafing	10 ms	Type A. MIL Illumination.
EPB_COMMAND_RANGE_ERROR	C0616	This monitor checks if: • EPB decel request out of range	• This failsafe monitors the decel request received from the EPB and checks to see if it is out of range	Decel Request from EPB is greater than 9.83 m/s	• Continuous failsafing	250 msec	Type A. MIL Illumination.
PB_HSB_INIT_FAULT	C0616	This monitor checks if: • Failure of the Host Safety Barrier to complete its normal initialization.	• The HSB self test is included in the system self test, and it is run to ensure that the HSB still has control over the apply/release enable lines. This fault also sets if indeterminate states of the enable lines are detected.	HSB Initialization Failed	Runs during system self test	10 ms	Type A. MIL Illumination.
Group 35 - Vacuum Pump Control							
Group 36 - Brake Pad Life Monitoring							
Group 38 - Systematic Errors							

Component/ System	Fault Code	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter and Enable Condition	Time Required	MIL Illumination
TASK_OVERRUN_CORE0	P0606	This monitor checks if: Software Error ECU Hardware Failure Input Signals To ECU causing high interrupt load	A timer alarm used to activate a periodic task expires and the prior activation/execution of this task has not run to completion. If the number of multiple activations allowed (2) for the task has already been reached a fault is set.	multiple activation counter >= max number of activations Task_Overrun_Cnt>0	Always Enabled	9 counts Time: 10 ms Note: Although weight and goal implies setting after 2 occurrences, faults sets 10 ms later after the 1st occurence of 2 overruns in a row due to latching of the fault bit.	Type A. MIL Illumination.
TASK_OVERRUN_CORE1	P0606	This monitor checks if: Software Error ECU Hardware Failure Input Signals To ECU causing high interrupt load	A timer alarm used to activate a periodic task expires and the prior activation/execution of this task has not run to completion. If the number of multiple activations allowed (2) for the task has already been reached a fault is set.	multiple activation counter >= max number of activations Task_Overrun_Cnt>0	Always Enabled	9 counts Time: 10 ms Note: Although weight and goal implies setting after 2 occurrences, faults sets 10 ms later after the 1st occurence of 2 overruns in a row due to latching of the fault bit.	Type A. MIL Illumination.
TASK_OVERRUN_CORE2	P0606	This monitor checks if: Software Error ECU Hardware Failure Input Signals To ECU causing high interrupt load	A timer alarm used to activate a periodic task expires and the prior activation/execution of this task has not run to completion. If the number of multiple activations allowed (2) for the task has already been reached a fault is set.	multiple activation counter >= max number of activations Task_Overrun_Cnt>0	Always Enabled	9 counts Time: 10 ms Note: Although weight and goal implies setting after 2 occurrences, faults sets 10 ms later after the 1st occurence of 2 overruns in a row due to latching of the fault bit.	Type A. MIL Illumination.
RUNNING_RESET_FAILURE	P0562	This monitor checks if: • Keep Alive Voltage Regulator not functional. • Processor looses complete power (system voltage). • Processor is incorrectly reset.	• Two blocks in NVRAM are used to failsafe the systems mode manager's ability to control the system shutdown process. During system initialization (each new ignition cycle), the contents of these two blocks are compared. If a mismatch is found, it indicates that mode manager was unable to control the system shutdown process on the previous ignition cycle. • Counter: Count 1-up • Monitor Rate: 10ms Note- This fault also sets when there is a startup after an improper shutdown with the vehicle not in park AND with the drivers foot on the brake pedal.	System failed to finish NVRAM update on the last module shut-down (ex. Disconnect battery from module before shutdown)	• System is not re-initializing AND • System is not shutting down	5ms	Type C, No MIL, "Emissions Neutral Diagnostic "
MPU_FAULT_TRW_SCS_CORE0	P0606	This monitor checks if: Software Error Partial Microcontroller Failure	Memory Protection Unit (MPU) detects an attempted memory access where there is no defined address range providing the needed permission.	None	Always Enabled	10 ms	Type A. MIL Illumination.
MPU_FAULT_TRW_SCS_CORE1	P0606	This monitor checks if: Software Error Partial Microcontroller Failure	Memory Protection Unit (MPU) detects an attempted memory access where there is no defined address range providing the needed permission.	None	Always Enabled	10 ms	Type A. MIL Illumination.
MPU_FAULT_TRW_SCS_CORE2	P0606	This monitor checks if: Software Error Partial Microcontroller Failure	Memory Protection Unit (MPU) detects an attempted memory access where there is no defined address range providing the needed permission.	None	Always Enabled	10 ms	Type A. MIL Illumination.
ITBC_LSM_FAULT	P0606	This monitor checks if: If the ITBC tasks execute out of order, or if a task is skipped or if the tasks do not complete, then this fault is set.	Set this fault , if the order of execution of ITBC tasks is not correct. If the tasks skip or if some tasks are left incomplete	None	• LIN communication	10 msec	Type A. MIL Illumination.
ICC_FAILURE_CORE0	P0606	This monitor checks if: ICC send or receive have been skipped.	ICC failsafe mechanism determines if any ICC receives or sends were skipped. At the beginning of every 10ms slot, every core in the scheduler runs the failsafe that checks if any of the ICC sends or receives were skipped in the previous 10ms slot. In case it was skipped the failsafe matures the ICC fault. The failsafe also tries to get back the ICC receives and sends to work normally from the next 10ms Slot.	At the beginning of every 10ms slot, every core in the scheduler runs the failsafe that checks if any of the ICC sends or receives were skipped in the previous 10ms slot.	Always Enabled	60 msec	Type A. MIL Illumination.
ICC_FAILURE_CORE1	P0606	This monitor checks if: ICC send or receive have been skipped.	ICC failsafe mechanism determines if any ICC receives or sends were skipped. At the beginning of every 10ms slot, every core in the scheduler runs the failsafe that checks if any of the ICC sends or receives were skipped in the previous 10ms slot. In case it was skipped the failsafe matures the ICC fault. The failsafe also tries to get back the ICC receives and sends to work normally from the next 10ms Slot.	At the beginning of every 10ms slot, every core in the scheduler runs the failsafe that checks if any of the ICC sends or receives were skipped in the previous 10ms slot.	Always Enabled	60 msec	Type A. MIL Illumination.
ICC_FAILURE_CORE2	P0606	This monitor checks if: ICC send or receive have been skipped.	ICC failsafe mechanism determines if any ICC receives or sends were skipped. At the beginning of every 10ms slot, every core in the scheduler runs the failsafe that checks if any of the ICC sends or receives were skipped in the previous 10ms slot. In case it was skipped the failsafe matures the ICC fault. The failsafe also tries to get back the ICC receives and sends to work normally from the next 10ms Slot.	At the beginning of every 10ms slot, every core in the scheduler runs the failsafe that checks if any of the ICC sends or receives were skipped in the previous 10ms slot.	Always Enabled	60 msec	Type A. MIL Illumination.
Group 42 - Temperature Sensor							
Group 50 - Debug Only Faults							

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Door Open Switch Signal - Door Ajar Switch Signal Not Plausible	B2A00	Compares the Door Ajar and Door Open Switch for mismatch	Door Open Switch AND Door Ajar switch	=OPEN = CLOSED	Ignition Not Fault Active	= Run/Crank OR = Accessory U0422	80 failure out of 80 samples 12.5 ms loop	Emissions-neutral default action Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric Park Brake Availability Status Message Counter Incorrect	C1280	Detects error on ARC & PV reported by CHCM / ECM about signal $22A from EBCM on HS GMLAN	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Battery voltage A diagnostic code clear event or diagnostic re-enable event is not in progress for:	within proper operating range for 3,000 msec >3,000 msec	8 failures out of 10 samples 100 ms loop	DTC Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric Park Brake Application Status Message Counter Incorrect	C1281	Detects error on ARC & PV reported by CHCM / ECM about signal $22A from EBCM on HS GMLAN	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Battery voltage A diagnostic code clear event or diagnostic re-enable event is not in progress for:	within proper operating range for 3,000 msec for a time > 3,000 msec	8 failures out of 10 samples 100 ms loop	DTC Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Unable to Engage Neutral	P073D	Detects the inability to achieve or remain in Neutral.	Actual Arbitrated Transmission Range	≠Neutral	Actual Transmission Range Commanded Transmission Range AND CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup	= Good value = Neutral =False =False =True = True =True =Park =False	10,000 msec from Park 10,000 msec from Reverse 10,000 msec from Drive	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Unable to Engage Reverse	P073E	Detects the failure to achieve the expected command to Reverse range.	Actual Arbitrated Transmission Range	≠Reverse	Actual Transmission Range Commanded Transmission Range AND CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup	= Good value = Reverse =False =False =True =True =True =Park =False	10,000 msec from Park 3,600,000 msec from Neutral* 3,600,000 msec from Drive* *Internal does not diagnose shifts from N&D	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Position Sensor/ Switch A Circuit Low	P07B3	The Park Button Circuit Diagnostic detects a reading LowCorrelation diagnosic compares the two switches behind the Park pushbutton	Park Position Measured Voltage	< Low 446 counts 446 counts = 43.6% of 5 Volts 1023 counts = 5 Volts			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Position Sensor/ Switch A Circuit High	P07B4	The Park Button Circuit Diagnostic detects a reading High	Park Position Measured Voltage	> High 853 counts 853 counts = 83.3% of 5 Volts. 1023 Counts = 5 V			16 Failures out of 20 Samples (SIB is 5 msec loop)	Type B, two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Position Sensor/ Switch A Circuit Performance	P07B5	The Park Button Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Park Position Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	DTC not set	P07B3 OR P07B4	100 Failures out of 120 Samples =500 msec (SIB is 5 msec loop)	Type B, two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Position Sensor/ Switch B Circuit Low	P07B9	The Park Button Circuit Diagnostic detects a reading Low	Park Position Measured Voltage	< Low 446 counts 446 counts = 43.6% of 5 Volts. 1023 Counts = 5 V	Diagnostic Enable Calibration	=TRUE	16 Failures out of 20 Samples (SIB is 5 msec loop)	Type B, two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Position Sensor/ Switch B Circuit High	P07BA	The Park Button Circuit Diagnostic detects a reading High	Park Position Measured Voltage	> High 853 counts 853 counts = 83.3% of 5 Volts. 1023 Counts = 5 V	Diagnostic Enable Calibration	=TRUE	16 Failures out of 20 Samples (SIB is 5 msec loop)	Type B, two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Position Sensor/ Switch B Circuit Performance	P07BB	The Park Button Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Park Position Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	Diagnostic Enable Calibration DTC not set	=TRUE P07BA or P07B9	100 Failures out of 120 Samples =500 msec (SIB is 5 msec loop)	Type B two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Position Switch A/B Correlation	P07BE	Correlation diagnosic compares the two switches behind the Park pushbutton	Compares Park Switch A and Park Switch B "PRESSED" and "RELEASED" states. Park 1 and Park 2 are both valid states (RELEASED or PRESSED), but disagree.	One Switch Stuck On: Valid, but not equal continuously	Not Fault Active ECM is: Diagnostic System Disabling Variable = Park Comparison Diagnostics Enabling Calibration = Park Correlation Diagnostics Enabling Calibration = Vehicle Speed is low enough to honor Park request. Vehilce speed:	P07B3, P07B4, P07B5, P07B9, P07BA, P07BB awake =FALSE = TRUE = TRUE <= Calibrated limit. The calibration name for the vehicle speed for checking for the Park button correlation diagnostics DTC: 10.50 and 10.00 (Hysteresis)	One Switch Stuck On: 2,400 failures out of 3,000 samples at 12.5 ms rate	DTC Type B, two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Unable to Engage Park	P07E4	Detects the inability to achieve or remain in Park.	Actual Arbitrated Transmission Range	≠Park	Actual Transmission Range Commanded Transmission Range AND CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup	= Good value = Park =False =False =True = True =True =Park =False	10,000 msec from Reverse 10,000 msec from Neutral 10,000 msec from Drive	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Unable to Engage Drive	P07E5	Detects the failure to achieve the expected command to Drive range.	Actual Arbitrated Transmission Range	≠Drive	Actual Transmission Range Commanded Transmission Range AND CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup	= Good value = Drive =False =False =True = True =True =Park =False	10,000 msec from Park 10,000 msec from Reverse 10,000 msec from Neutral	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear Lever X Position Sensor 1 Circuit Range/ Performance	P082A	Detects Gear Lever X Position Sensor 1 circuit is reading outside "good" values	Gear Lever Position Sensor 1 Measured Duty Cycle on X OR Gear Lever Position Sensor 1 Frequency error detection flag on X OR Gear Lever Position Sensor 1 Measured Duty Cycle on X and Gear Lever Position Sensor 2 Measured Duty Cycle on X differ by more than	Are outside the shifter path of movement 5.5% to meet 100 Nm force on shifter from nominal path OR = True >12%	Not Fault Active Controller has been awake for at least	P082B, P082C 0.05 seconds	3 failures out of 4 samples 25ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear Lever X Position Sensor 1 Circuit Low	P082B	Detects Gear Lever X Position Sensor 1 circuit reading low	Gear Lever Position Sensor 1 Measured Duty Cycle on X	< 5%	Controller has been awake for at least	0.05 seconds	3 failures out of 4 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Detects Gear Lever X Position Sensor 1 circuit reading high	P082C	Gear Lever Position Sensor 1 Measured Duty Cycle on X	Gear Lever Position Sensor 1 Measured Duty Cycle on X	> 95%	Controller has been awake for at least	0.05 seconds	3 failures out of 4 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear Lever Y Position Sensor 1 Circuit Performance	P082D	Detects Gear Lever Y Position Sensor 1 circuit is reading outside "good" values	Gear Lever Position Sensor 1 Measured Duty Cycle on Y OR Gear Lever Position Sensor 1 Frequency error detection flag on Y OR Gear Lever Position Sensor 1 Measured Duty Cycle on Y and Gear Lever Position Sensor 2 Measured Duty Cycle on Y differ by more than	Are outside the shifter path of movement 5.5% to meet 100 Nm force on shifter from nominal path = True > 12%	Not Fault Active Controller has been awake for at least	P082E, P082F 0.05 seconds	3 failures out of 4 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear Lever Y Position Sensor 1 Circuit Low	P082E	Detects Gear Lever Y Position Sensor 1 circuit reading low	Gear Lever Position Sensor 1 Measured Duty Cycle on Y	<5%	Controller has been awake for at least	0.05 seconds	3 failures out of 4 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear Lever Y Position Sensor 1 Circuit High	P082F	Detects Gear Lever Y Position Sensor 1 circuit reading high	Gear Lever Position Sensor 1 Measured Duty Cycle on Y	>95%	Controller has been awake for at least	0.05 seconds	3 failures out of 4 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear Lever X Position Sensor 2 Circuit Performance	P089B	Detects Gear Lever X Position Sensor 2 circuit is reading outside "good" values	Gear Lever Position Sensor 2 Measured Duty Cycle on X OR Gear Lever Position Sensor 2 Frequency error detection flag on X OR Gear Lever Position Sensor 2 Measured Duty Cycle on X and Gear Lever Position Sensor 1 Measured Duty Cycle on X differ by more than	Are outside the shifter path of movement 5.5% to meet 100 Nm force on shifter from nominal path = True >12%	Not Fault Active Controller has been awake for at least	P089C, P089D 0.05 seconds	3 failures out of 4 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear Lever X Position Sensor 2 Circuit Low	P089C	Detects Gear Lever X Position Sensor 2 circuit reading low	Gear Lever Position Sensor 2 Measured Duty Cycle on X	< 5%	Controller has been awake for at least	0.05 seconds	3 failures out of 4 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear Lever X Position Sensor 2 Circuit High	P089D	Detects Gear Lever X Position Sensor 2 circuit reading high	Gear Lever Position Sensor 2 Measured Duty Cycle on X	>95 %	Controller has been awake for at least	0.05 seconds	3 failures out of 4 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear Lever Y Position Sensor 2 Circuit Performance	P08A0	Detects Gear Lever Y Position Sensor 2 circuit is reading outside "good" values	Gear Lever Position Sensor 2 Measured Duty Cycle on Y OR Gear Lever Position Sensor 2 Frequency error detection flag on Y OR Gear Lever Position Sensor 1 Measured Duty Cycle on Y and Gear Lever Position Sensor 2 Measured Duty Cycle on Y differ by more than	Are outside the shifter path of movement 5.5% to meet 100 Nm force on shifter from nominal path = True > 12%	Not Fault Active Controller has been awake for at least	P08A1, P08A2 0.05 seconds	3 failures out of 4 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear Lever Y Position Sensor 2 Circuit Low	P08A1	Detects Gear Lever Y Position Sensor 2 circuit reading low	Gear Lever Position Sensor 2 Measured Duty Cycle on Y	<5%	Controller has been awake for at least	0.05 seconds	3 failures out of 4 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear Lever Y Position Sensor 2 Circuit High	P08A2	Detects Gear Lever Y Position Sensor 2 circuit reading high	Gear Lever Position Sensor 2 Measured Duty Cycle on Y	>95%	Controller has been awake for at least	0.05 seconds	3 failures out of 4 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Wheel Speed Sensor Sequence Number Incorrect	P15FD	Detects error on ARC reported by the CHCM/ ECM about signal $0C1 from EBCM on HS GMLAN	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1	Current ARC ≠ Previous ARC +1	Controler On Run-Crank Active Sequence Number Error DTC Enabling calibration:	> 3,000 ms =TRUE for 0.5 seconds =TRUE	10.00 seconds. After this time has expired, if the failure conditions continue for another 4 seconds, the corresponding diagnostic will be set.	DTC Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Transmission Range Control Performance	P16F4	Determines if the Electronic Transmission Range Select control module software incorrectly processes a range request which would result in an unsafe condition	Driver Requested Arbitrated Range Commanded OR: Transmission range control routine Transmission range control routine Transmission range control routine	is issued unexpectedly OR ≠ expected range Does not issue Park or Neutral command quickly enough in response to driver request Issues a request to Drive, Low or Manual without a matching input by the customer within a calibrated time T1. Issues a request to Reverse without a matching input by the customer within a calibrated time limit T2.	TRCR Global Diagnostic Enable CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup	= True =False =False =True = True =True =Park =False	Drive acquisition = 200 msec Reverse acquisition = 200 msec Neutral acquisition = 200 msec Park acquisition = 200 msec Park Exit acquisition = 200 msec Park Exit correlation = 2050 msec	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powerflow Engaged Signal Message Incorrect	P1772	Detects error on ARC & PV reported by CHCM/ ECM about signal $197 from TCM on HS GMLAN	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Battery voltage A diagnostic code clear event or diagnostic re-enable event is not in progress for:	within proper operating range for at least 3,000 msec for a time > 3,000 msec	8 failures out of 10 samples 12.5 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IMS State Signal Message Incorrect	P1773	Detects error on ARC & PV reported by CHCM/ ECM about signal $197 from TCM on HS GMLAN	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Battery voltage A diagnostic code clear event or diagnostic re-enable event is not in progress for:	within proper operating range for > 3,000 msec for a time > 3,000 msec	8 failures out of 10 samples 12.5 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Availability Signal Message Incorrect	P1778	Detects error on ARC & PV reported by CHCM / ECM about signal $3F5 from TCM on HS GMLAN	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Battery voltage A diagnostic code clear event or diagnostic re-enable event is not in progress:	within proper operating range for 3,000 msec for a time > 3,000 msec	8 failures out of 10 samples Signal in the 250 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Unexpected Range Change Detected	P1787	Detects an unexpected change in transmission range.	Actual Arbitrated Transmission Range The internal system only diagnoses range changes in and out of Park.	≠ Previous Value	Actual Tranmission Range Range Change Achievement Diag	= Good value = Not running	1,500 ms	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Current Transmissio n Range Unknown	P1789	Detects the failure of the ETRS system to identify the current transmission range with sufficient confidence.	Actual Transmission Range	= Undefined	Range Indication Source AND CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup	= Valid =False =False =True = True =True =Park =False	80 failures out of 100 samples 12.5 ms loop	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Enable Switch A Circuit Low	P17A3	Detects Selector Enable Switch A circuit reading low	Shift Enable Switch Measured Voltage Percent	< Low 446 counts 1023 counts = 5 Volts			16 Failures out of 20 Samples (SIB is 5 msec loop)	Emissions Neutral Default Action, Type C, No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Enable Switch A Circuit High	P17A4	Detects Selector Enable Switch A circuit reading high	Selector Enable Switch Measured Voltage Percent	> High = 853 counts 853 counts = 83.3% of 5 Volts. 1023 Counts = 5 V			16 Failures out of 20 Samples (SIB is 5 msec loop)	Emissions Neutral Default Action, Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Enable Switch A Circuit Performance	P17A5	Detects Selector Enable Switch A circuit reading outside "Released" or "Pressed" values	Selector Enable Switch Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	Not Fault Active	P17A4, P17A3	100 Failures out of 120 Samples =500 msec (SIB is 5 msec loop)	Emissions Neutral Default Action, Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Enable Switch A/B Correlation	P17A6	Correlation diagnosic compares both switches	Measured Voltage Percent of Selector Enable Switch A and Switch B	Are both VALID, (Release or Pressed), but disagree. Pressed: 49% - 61% Released: 70% - 82%	Interlock comparison diagnostic enabling calibration = The controller has been awake for at least:	1 =0.05 seconds	12.5 ms rate 24,000 failures out of 24,000 samples	Emissions Neutral Default Action, Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Enable Switch B Circuit Low	P17A7	Detects Selector Enable Switch B circuit reading low	Selector Enable Switch Measured Voltage	< Low 446 counts 446 counts = 43.6% of 5 Volts. 1023 Counts = 5 V			16 Failures out of 20 Samples (SIB is 5 msec loop)	Emissions Neutral Default Action, Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Enable Switch B Circuit High	P17A8	Detects Selector Enable Switch B circuit reading high	Selector Enable Switch Measured Voltage	> High 853 counts 853 counts = 83.3% of 5 Volts. 1023 Counts = 5 V			16 Failures out of 20 Samples (SIB is 5 msec loop)	Emissions Neutral Default Action, Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Enable Switch B Circuit Performance	P17A9	Detects Selector Enable Switch B circuit reading outside "Released" or "Pressed" values	Selector Enable Switch Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	Not Fault Active	P17A8, P17A7	100 Failures out of 120 Samples =500 msec (SIB is 5 msec loop)	Emissions Neutral Default Action, Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selection Signal Message Counter Incorrect	P17D7	ARC & PV reported SIB for $1E8 signal from the ECM on Powertrain Sensor CAN BusDetects the failure of the ETRS system to identify the current transmission range with sufficient confidence.	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Ignition	Run or Run/Crank	1 second	Type B two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Control Module Memory Checksum Error	P17D8	[1] This DTC will be stored if any software or calibration check sum is incorrect. [2] Circuit Monitor mismatch occurs	[1] Calculated Checksum [2] Switch circuit calculated values:	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration) ≠ switch circuit monitor values	Ignition OR Accessory	Run or Run/Crank ON	[1] 1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background [2] Test runs during calculation of switch circuit values	Type A one trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Control Module Read Only Memory (ROM) Error	P17D9	Reports a failure if the BIST (=Built in Self Test) for [1] the ROM checksum or [2] the ROM Error correcting code (ECC) check fails.	[1] Checksum at power-up [2] ROM ECC	≠ checksum at power-down = fault	Ignition OR Accessory:	Run or Run/Crank ON	[1] 1 failure Frequency: Once at power-up [2] 1 failure Frequency: Runs continuously in the background	Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Control Module Internal Random Access Memory (RAM) Error	P17DA	Indicates that control module is unable to correctly write and read data to and from RAM.	Data read	≠ Data written	Ignition: OR Accessory	Run or Run/Crank ON	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures This test runs continuously in the background	Type A one trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Control Module Processor	P17DB	Indicates the ECU has detected an internal processor fault. This DTC is dependent on the microprocessor and includes self testing not listed. [1] Microprocessor ALU Integrity Diagnostic Monitor Algorithm [2] Main Processor Configuration Register Test [3] Seed and Key fault (Set by ECM when seeds and keys do not match) [4] Stack overflow [5] Program Counter Exception Error [6] Watchdog Fails to reset	[1] Calculated key from rolling seed [2] Processor register [3] <This test has no threshold value.> [4] Unused stack memory above maximum stack used [5] Illegal instruction loaded into program counter [6] Set when a fault that should cause a reset fails to cause a reset.	[1] ≠ expected key [2] ≠ expected processor register value [3] No threshold value [4] ≠ initialized special pattern [5] No threshold value [6] No threshold value	For all six cases: Ignition Accessory	For all six cases: Run or Run/Crank OR ON	[1] 1 failure Test runs continuously (20ms loop or less) [2] 1 failure Test runs continuously (20ms loop or less) [3] 1 failure Test runs continuously (25ms loop or less) [4] 1 failure Test run by OS on task switches [5] 1 failure [6] 1 failure	Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Control Module Ignition On/ Start Switch Circuit Low	P17E0	Detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine Controller Run Crank Terminal Status - CAN Message	= 1 indicating RUN/ CRANK	4.5 sec in 5.5 second window	Type B two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Control Module Ignition On/ Start Switch Circuit High	P17E1	Detects if the Ignition1 Switch circuit is shorted to vehicle supply voltage	Ignition 1 voltage	> 11.7 V	Engine Controller Run Crank Terminal Status - CAN Message	= 0, indicating NOT RUN/CRANK	4.5 sec in 5.5 second window	Type B two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Position Switch A/B Circuit Stuck On	P17F3	Checks if both switches have been pressed for a long time	Park Position is PRESSED	≥ 60 seconds	Not Fault Active Controller is "on"	P07B3, P07B4, P07B4, P07B9, P07BA, P07BB >~ 100 ms	1 failures out of 1 samples	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Enable Switch A/B Circuit Stuck On	P17F4	Checks if switch has been pressed for a long time Note The DTC routine for this DTC is in the S B, but the calibrations are in the ECM Checks if both switches have been pressed for a long time	Enable Switch A or B are PRESSED	≥ 600 seconds	eESDR b ntrlckStuckDiagEnbl Controller is	True "On"	1 failures out of 1 samples	Emissions Neutral Default Action, Type C No M

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Position Switch A/B Circuit Stuck Off	P189D	Compares Park Switch A and Park Switch B "PRESSED" and "RELEASED" states	When either is “PRESSED” for 100 ms then pressed event is entered. Fault is incremented if other switch	 Is not pressed during event.	Not Fault Active Controller is on Park button switches Vehicle Speed	P07B3, P07B4, P07B5, P07B9, P07BA, P07BB >~100 ms =valid <= Park Request Spd	7 synchronized failures in a row. *note: these samples can accumulate over key-cycles	DTC Type B, Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Primary Signal Message Counter Incorrect	P189E	Monitor $1EC CAN frame from SIB LS and set a DTC: P189E that indicates an ARC or ChkSum error from the $1EC CAN frame persists long enough to satisfy fail criteria. Linear shifter.	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value Compares Park Switch A and Park Switch B "PRESSED" and "RELEASED" states.	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Battery voltage A diagnostic code clear event or diagnostic re-enable event is not in progress for:	within proper operating range for 3,000 msec for a time 3,000 msec	sampled in the 12.5 ms loop 8 failures out of 10 samples	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Secondary Signal Message Counter Incorrect	P189F	Monitor $2EC CAN frame from SIB LS and set a DTC: P189F that indicates an ARC or check sum error from the $2EC CAN frame persists long enough to satisfy fail criteria.	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value Compares Park Switch A and Park Switch B "PRESSED" and "RELEASED" states.	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Battery voltage A diagnostic code clear event or diagnostic re-enable event is not in progress for:	within proper operating range for 3,000 msec for a time 3,000 msec	sampled in the 12.5 ms loop 8 failures out of 10 samples	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication (Powertrain Expansion CAN Bus) Bus Off	U0074	CAN bus is monitored continuously while GMLAN frames are being transmitted.	Bus status= Monitored continuously while GMLAN frames are being transmitted. Upon notification of bus off condition (passed up to the application from the handler), the algorithm checks for this condition every 1000ms.	=off	Vehicle Power mode: Any virtual network that the module participates in is: ECU operational condition: U0074_00_ENABLE =	Off, Accessory, Run active In ECU_COMM_Actie state. True	1000ms	Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Chassis Expansion CAN Bus Off	U0077	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state. Bus Off events counter exceeds its calibrated failure threshold before consecutive tests counter exceeds the calibrated sample threshold.	Bus status	=off	Controller On= Ignition= Vehicle Power Mode Condition= Virtual Network Condition: ECU Operational condition: U0077_00_ENABLE	'True Run / Crank or Accessory Off or Accessory or Run Any Virtual Network that the module participates in is active. While in the ECU_COMM_Active state True	500 ms Monitored continuously	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With TCM	U0101	Detects that CAN serial data communication has been lost with the TCM Transmission Control Module on HS GMLAN.	CAN messages are monitored continuously while GMLAN frames are being transmitted. Message $0C1 and/or $197 and/or $1F5 and/or $3F5:	=Undetected.	Controller On: Ignition: Non-OBD Control Modules: Vehicle Power Mode condition: OBD Control Modules, e.g. ECM: Accessory Wake Up: Virtual Network condition: Bus off DTC U0073 U0101_00_ENABLE=	=True = Run or Crank or Accessory RUN Active Any Virtual Network that the module participates in is active. Not fault active Enabled	1 second	DTC Type B. Two trips.

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Brake System Control Module	U0129	Detects that CAN serial data communication has been lost with the EBCM Transmission Control Module on GMLAN.	CAN messages are monitored continuously while GMLAN frames are being transmitted. One or more of the messages $0C1, $214, $22A, $500 :	=Undetected.	Controller On: Ignition: OBD Control Modules, e.g. ECM: Accessory Wake Up: Virtual Network condition: Bus off DTC U0073 U0129_00_ENABLE=	=True = Run or Crank or Accessory Active Any Virtual Network that the module participates in is active. Not fault active Enabled	Frame $0C1: 1 sec Frame $214: 10 sec Frame $22A: 1 sec Frame $500: 10 sec	Type A, one trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Body Control Module, BCM	U0140	Detects that CAN serial data communication has been lost with the BCM Transmission Control Module on HS GMLAN.	CAN messages are monitored continuously while GMLAN frames are being transmitted. Message $0F1, $12A, $139, $140, $142, $160, $1F1, $21D, $3F1 =	Undetected	Controller On: Ignition: Non OBD Control Modules: Vehicle Power Mode condition: OBD Control Modules, e.g. ECM: Accessory Wake Up: Virtual Network condition: Bus off DTC U0073 U0140_00_ENABLE=	=True = Run or Crank or Accessory RUN Active Any Virtual Network that the module participates in is active. Not fault active Enabled	Message: $0F1: 1 sec $12A: 1 sec $139: 1 sec $140: 10 sec $142: 10 sec $160: 1 sec $1F1: 1 sec $21D: 1 sec $3F1: 10 sec	Type C.

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Body Control Module	U0422	Signal between the BCM and door switches is unreliable	Driver Door Ajar Switch Virtual Device Availability OR Driver Door Open Switch Virtual Device Availability	= INVALID = INVALID	Battery voltage A diagnostic code clear event or diagnostic re-enable event is not in progress for	within proper operating range for 3,000 msec. for a time 3,000 msec.	12.5 ms loop 8 failures out of 10 samples.	Emissions-neutral default action, Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Transmission Control Module on Engine Control Module LIN Bus 1	U135E	Detects that LIN serial data communication has been lost with the LIN Bus	TCM to ECM: Message $01 Bus Status	= Undetected	Controller On Ignition	> 3,000 ms = Run/Crank OR = Accessory	1.0 second	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Control Module Lost Communication with Engine Control Module on Powertrain Sensor CAN Bus	U18C6	Detects that CAN serial data communication has been lost with the ECM.	Powertrain Sensor Bus Message $1E2 OR $1E8	=Undetected	Ignition Run/Crank Voltage Ignition	11V < RC Volt < 32V = Run/Crank OR = Accessory	1.0 second	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Transmission Range Selector Control Module on Powertrain Sensor CAN Bus	U18D2	Detects that CAN serial data communication has been lost with the SIB on the Powertrain (NOX) Sensor Bus	$2F3, $4C4, $1EC	=Undetected	Controller On Ignition	> 3,000 ms = Run/Crank OR = Accessory	Messages: $2F3, $1EC: 1.0 second Message $4C4: 10 seconds	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Transmission Range Selector Control Module on Powertrain Expansion CAN Bus	U18D3	Detects that CAN serial data communication has been lost with the SIB PT Exp Bus	TRS Buttons Message: $2C2 TRS Linear Shifter Message: $2EC	=Undetected	Controller On Ignition	> 3,000 ms = Run/Crank OR = Accessory	1.0 second	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Control Module Powertrain Expansion CAN Bus Off	U240D	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Powertrain Expansion Bus Status	= off	Ignition	= Run or Run/Crank	1 second	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Control Module Powertrain Sensor CAN Bus Off	U240E	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Powertrain Sensor Bus Status	=off	Ignition=	Run or Run/Crank	1 second	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Transmission Control Module to Electronic Transmission Control Module on LIN BUS.	U250D	Detects if Range Command Echo from TCM matches current Range Command (For Internal ETRS only)	Check Range Command Echo vs Range Command when Range Command Poke is called	Range Command Echo ≠ Range Command	Diagnostic Enable Calibration Recent Range Command Transition TCM LIN Node or Bus Fault Active	= TRUE = FALSE = FALSE	80 failures out of 100 samples 50 ms loop	DTC Type B, Two Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required		MIL Illum.
Transmission Range Selector X-Axis Position Sensor 1	P082C	Monitoring of Gear Lever X position sensor 1 for Out of Range Check- High	Raw PWM signal value from the shifter 1 of Gear Lever X Position Sensor	>=	95.0147	%	(				0.5	sec	2 Trips
							System Power Mode	=	Run crank active calibration	-			
							OR						
							System Power Mode	=	Accessory On calibration	-			
							)			-			
							for time	>=	0.4	sec			
							No pending or confirmed DTCs	=	see sheet inhibit tables	-			
							Basic enabling conditions are met	=	see sheet enable tables	-			
	P082B	Monitoring of Gear Lever X position sensor 1 for Out of Range Check- Low	Raw PWM signal value from the shifter 1 of Gear Lever X Position Sensor	<=	4.9853	%	(				0.5	sec	2 Trips
							System Power Mode	=	Run crank active calibration	-			
							OR						
							System Power Mode	=	Accessory On calibration	-			
							)			-			
							for time	>=	0.4	sec			
							No pending or confirmed DTCs	=	see sheet inhibit tables	-			
							Basic enabling conditions are met	=	see sheet enable tables	-			
	P082A	**Path 1:** CAN Communication signaL for Shift Lever Diagnosis of Primary Gear Lever X Position Sensor 1	CAN Communication signaL for Shift Lever Diagnosis of Primary Gear Lever X Position Sensor 1	=	TRUE	-	(				0.5	sec	2 Trips
			OR				System Power Mode	=	Run crank active calibration	-			
			CAN Communication signaL for Shift Lever Diagnosis of Secondary Gear Lever X Position Sensor 1	=	TRUE	-	OR						
							System Power Mode	=	Accessory On calibration	-			
							)			-			
							for time	>=	0.4	sec			
							ETRS Linear Shifter Alpha 1 Sample Circuit Error is not set	=	TRUE	-			
							No pending or confirmed DTCs	=	see sheet inhibit tables	-			
							Basic enabling conditions are met	=	see sheet enable tables	-			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Path 2: ETRS LInear Shifter Both Combinations Using Alpha 1 Outside of Field Of Play Flag	ETRS LInear Shifter Both Combinations Using Alpha 1 Outside of Field Of Play Flag	= TRUE -	(		0.5 sec	2 Trips
					System Power Mode	= Run crank active calibration -		
					OR			
					System Power Mode	= Accessory On calibration -		
					)	-		
					for time	>= 0.4 sec		
					((			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	> 0.1131 -		
					OR			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	< -0.099 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	> 0.5091 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	< -0.5374 -		
					)			
					(			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	> 0.1131 -		
					OR			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	< -0.099 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	> 0.5091 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	< -0.5374 -		
					)			
					(			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	> 0.1131 -		
					OR			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	< -0.099 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	> 0.5091 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	< -0.5374 -		
					))			
					((			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	> 0.1131 -		
					OR			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	< -0.099 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	> 0.5091 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	< -0.5374 -		
					)			
					(			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	> 0.1131 -		
					OR			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	< -0.099 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	> 0.5091 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	< -0.5374 -		
					)			
					(			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	> 0.1131 -		
					OR			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	< -0.099 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	> 0.5091 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	< -0.5374 -		
					))			
					for time	>= 0.4 sec		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		
		Path 3: Monitoring signal variation between Shifter 1 and Shifter 2 and checking the validity of the combinations of Linear Shifters.	Absolute value of difference between Raw PWM signal from Shifter Alpha 1 and Adjusted signal from Shifter Alpha 2	>= 12.0235 %	(		0.5 sec	2 Trips
			ETRS Linear Shifter Both Combinations Using Alpha 2 Outside of Field Of Play Flag	= FALSE -	System Power Mode	= Run crank active calibration -		
					OR			
					System Power Mode	= Accessory On calibration -		
					)	-		
					for time	>= 0.4 sec		
					((			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	>= -0.5374 -		
					)			
					OR			
					(			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	>= -0.5374 -		
					)			
					OR			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	>= -0.5374 -		
					))			
					((			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	>= -0.5374 -		
					)			
					OR			
					(			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	>= -0.5374 -		
					)			
					OR			
					(			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	>= -0.5374 -		
					))			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		
		Path 4: Monitoring signal variation between Shifter 1 and Shifter 2	Absolute value of difference between Raw PWM signal from Shifter Alpha 1 and Adjusted signal from Shifter Alpha 2	>= 12.0235 %	(		0.5 sec	2 Trips
					System Power Mode	= Run crank active calibration -		
					OR			
					System Power Mode	= Accessory On calibration -		
					)	-		
					for time	>= 0.4 sec		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Path 5: Advanced performance diagnosis and monitoring signal variation between Shifter 1 and Shifter 2	Absolute value of difference between Raw PWM signal from Shifter Alpha 1 and Adjusted signal from Shifter Alpha 2	>= 12.0235 %	(		0.5 sec	2 Trips
					System Power Mode	= Run crank active calibration -		
					OR			
					System Power Mode	= Accessory On calibration -		
					)	-		
					for time	>= 0.4 sec		
					((			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	>= -0.5374 -		
					)			
					OR			
					(			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	>= -0.5374 -		
					)			
					OR			
					(			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	>= -0.5374 -		
					))			
					((			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	>= -0.5374 -		
					)			
					OR			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	>= -0.5374 -		
					)			
					OR			
					(			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	>= -0.5374 -		
					))			
					ETRS Diagnotics - Advanced performance diagnostics enabled	= TRUE -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		
	P1789	ETRS TRCR Diagnostics - Current Transmission Range Unknown	Filtered gear lever current range is undefined	= TRUE _	ETRS TRCR Diagnostics - Current Range Diagnostics Enable Flag is set	= TRUE _	0 sec	2 Trips
			for time	>= 0.5 sec	System is not in PARK mode and system power is used by accessories or system wakeup	= TRUE _		
					Ignition ON	= TRUE		
					(			
					Current range of gear lever is in PARK position	= FALSE		
					Initialization of gear selection in progress is active	= FALSE _		
					)			
					OR			
					(			
					Current range command is in parking range	= FALSE		
					Current range command is in power mode OFF range	= FALSE _		
					)			
					Engine Transmission Range Selection brake command is in deny driver override command	= FALSE _		
					Engine Transmission Range Selection brake command is in allow driver override command	= FALSE _		
					Manufacturer Enable Counter used to automatically arm Seed & Key	= 0 _		
					Basic enabling conditions are met	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required		MIL Illum.
Transmission Range Selector X-Axis Position Sensor 2	P089D	Monitoring of Gear Lever X position sensor 2 for Out of Range Check- High	Raw PWM signal value from the shifter 2 of Gear Lever X Position Sensor	>=	95.0147	%	(				0.5	sec	2 Trips
							System Power Mode	=	Run crank active calibration	-			
							OR						
							System Power Mode	=	Accessory On calibration	-			
							)			-			
							for time	>=	0.4	sec			
							No pending or confirmed DTCs	=	see sheet inhibit tables	-			
							Basic enabling conditions are met	=	see sheet enable tables	-			
	P089C	Monitoring of Gear Lever X position sensor 2 for Out of Range Check- Low	Raw PWM signal value from the shifter 2 of Gear Lever X Position Sensor	<=	4.9853	%	(				0.5	sec	2 Trips
							System Power Mode	=	Run crank active calibration	-			
							OR						
							System Power Mode	=	Accessory On calibration	-			
							)			-			
							for time	>=	0.4	sec			
							No pending or confirmed DTCs	=	see sheet inhibit tables	-			
							Basic enabling conditions are met	=	see sheet enable tables	-			
	P089B	**Path 1:** CAN Communication signaL for Shift Lever Diagnosis of Primary Gear Lever X Position Sensor 2	CAN Communication signaL for Shift Lever Diagnosis of Primary Gear Lever X Position Sensor 2 OR	=	TRUE	-	(				0.5	sec	2 Trips
							System Power Mode	=	Run crank active calibration	-			
			CAN Communication signaL for Shift Lever Diagnosis of Secondary Gear Lever X Position Sensor 2	=	TRUE	-	OR						
							System Power Mode	=	Accessory On calibration	-			
							)			-			
							for time	>=	0.4	sec			
							ETRS Linear Shifter Alpha 2 Sample Circuit Error is not set	=	TRUE	-			
							No pending or confirmed DTCs	=	see sheet inhibit tables	-			
							Basic enabling conditions are met	=	see sheet enable tables	-			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
		Path 2: ETRS LInear Shifter Both Combinations Using Alpha 2 Outside of Field Of Play Flag	ETRS LInear Shifter Both Combinations Using Alpha 2 Outside of Field Of Play Flag	= TRUE -	(				0.5 sec	2 Trips
					System Power Mode	=	Run crank active calibration	-		
					OR					
					System Power Mode	=	Accessory On calibration	-		
					)			-		
					for time	>=	0.4	sec		
					((					
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	>	0.1131	-		
					OR					
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	<	-0.099	-		
					OR					
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	>	0.5091	-		
					OR					
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	<	-0.5374	-		
					)					
					(					
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	>	0.1131	-		
					OR					
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	<	-0.099	-		
					OR					
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	>	0.5091	-		
					OR					
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	<	-0.5374	-		
					)					
					(					
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	>	0.1131	-		
					OR					
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	<	-0.099	-		
					OR					
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	>	0.5091	-		
					OR					
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	<	-0.5374	-		
					))					
					(					
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	>	0.1131	-		
					OR					
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	<	-0.099	-		
					OR					
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	>	0.5091	-		
					OR					
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	<	-0.5374	-		
					)					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required		MIL Illum.
							(						
							ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	>	0.1131	-			
							OR						
							ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	<	-0.099	-			
							OR						
							ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	>	0.5091	-			
							OR						
							ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	<	-0.5374	-			
							)						
							(						
							ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	>	0.1131	-			
							OR						
							ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	<	-0.099	-			
							OR						
							ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	>	0.5091	-			
							OR						
							ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	<	-0.5374	-			
							))						
							No pending or confirmed DTCs	=	see sheet inhibit tables	-			
							Basic enabling conditions are met	=	see sheet enable tables	-			
		Path 3: Monitoring signal variation between Shifter 1 and Shifter 2 and checking the validity of the combinations of Linear Shifters.	Absolute value of difference between Raw PWM signal from Shifter Alpha 1 and Adjusted signal from Shifter Alpha 2	>=	12.0235	%	(				0.5	sec	2 Trips
			ETRS Linear Shifter Both Combinations Using Alpha 2 Outside of Field Of Play Flag	=	FALSE	-	System Power Mode	=	Run crank active calibration	-			
							OR						
							System Power Mode	=	Accessory On calibration	-			
							)			-			
							for time	>=	0.4	sec			
							((						
							ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	<=	0.1131	-			
							ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	>=	-0.099	-			
							ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	<=	0.5091	-			
							ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	>=	-0.5374	-			
							)						
							OR						
							(						
							ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	<=	0.1131	-			
							ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	>=	-0.099	-			
							ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	<=	0.5091	-			
							ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	>=	-0.5374	-			
							)						
							OR						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required	MIL Illum.
					(					
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	<=	0.1131	-		
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	>=	-0.099	-		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	<=	0.5091	-		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	>=	-0.5374	-		
					))					
					((					
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	<=	0.1131	-		
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	>=	-0.099	-		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	<=	0.5091	-		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	>=	-0.5374	-		
					)					
					OR					
					(					
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	<=	0.1131	-		
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	>=	-0.099	-		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	<=	0.5091	-		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	>=	-0.5374	-		
					)					
					OR					
					(					
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	<=	0.1131	-		
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	>=	-0.099	-		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	<=	0.5091	-		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	>=	-0.5374	-		
					))					
					No pending or confirmed DTCs	=	see sheet inhibit tables	-		
					Basic enabling conditions are met	=	see sheet enable tables	-		
		Path 4: Monitoring signal variation between Shifter 1 and Shifter 2	Absolute value of difference between Raw PWM signal from Shifter Alpha 1 and Adjusted signal from Shifter Alpha 2	>= 12.0235 %	(				0.5 sec	2 Trips
					System Power Mode	=	Run crank active calibration	-		
					OR					
					System Power Mode	=	Accessory On calibration	-		
					)			-		
					for time	>=	0.4	sec		
					No pending or confirmed DTCs	=	see sheet inhibit tables	-		
					Basic enabling conditions are met	=	see sheet enable tables	-		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Path 5: Advanced performance diagnosis and monitoring signal variation between Shifter 1 and Shifter 2	Absolute value of difference between Raw PWM signal from Shifter Alpha 1 and Adjusted signal from Shifter Alpha 2	>= 12.0235 %	(		0.5 sec	2 Trips
					System Power Mode	= Run crank active calibration -		
					OR			
					System Power Mode	= Accessory On calibration -		
					)	-		
					for time	>= 0.4 sec		
					((			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	>= -0.5374 -		
					)			
					OR			
					(			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	>= -0.5374 -		
					)			
					OR			
					(			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	>= -0.5374 -		
					))			
					((			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	>= -0.5374 -		
					)			
					OR			
					(			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	>= -0.5374 -		
					)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR (ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination)) ETRS Diagnotics - Advanced performance diagnostics enabled No pending or confirmed DTCs Basic enabling conditions are met	<= 0.1131 - >= -0.099 - <= 0.5091 - >= -0.5374 - = TRUE - = see sheet inhibit tables - = see sheet enable tables -		
Transmission Range Selector Y-Axis Position Sensor 1	P082F	Monitoring of Gear Lever Y position sensor 1 for Out of Range Check- High	Raw PWM signal value from the shifter 1 of Gear Lever Y Position Sensor	>= 95.0147 %	(System Power Mode OR System Power Mode) for time No pending or confirmed DTCs Basic enabling conditions are met	= Run crank active calibration - = Accessory On calibration - - >= 0.4 sec = see sheet inhibit tables - = see sheet enable tables -	0.5 sec	2 Trips
	P082E	Monitoring of Gear Lever Y position sensor 1 for Out of Range Check- Low	Raw PWM signal value from the shifter 1 of Gear Lever Y Position Sensor	<= 4.9853 %	(System Power Mode OR System Power Mode) for time No pending or confirmed DTCs Basic enabling conditions are met	= Run crank active calibration - = Accessory On calibration - - >= 0.4 sec = see sheet inhibit tables - = see sheet enable tables -	0.5 sec	2 Trips
	P082D	**Path 1:** CAN Communication signaL for Shift Lever Diagnosis of Primary Gear Lever Y Position Sensor 1	CAN Communication signaL for Shift Lever Diagnosis of Primary Gear Lever Y Position Sensor 1 OR CAN Communication signaL for Shift Lever Diagnosis of Secondary Gear Lever Y Position Sensor 1	= TRUE - = TRUE -	(System Power Mode OR System Power Mode) for time ETRS Linear Shifter Beta 1 Sample Circuit Error is not set No pending or confirmed DTCs Basic enabling conditions are met	= Run crank active calibration - = Accessory On calibration - - >= 0.4 sec = TRUE - = see sheet inhibit tables - = see sheet enable tables -	0.5 sec	2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required		MIL Illum.
		Path 2: ETRS LInear Shifter Both Combinations Using Beta 1 Outside of Field Of Play Flag	ETRS LInear Shifter Both Combinations Using Beta 1 Outside of Field Of Play Flag	=	TRUE	-	(				0.5	sec	2 Trips
							System Power Mode	=	Run crank active calibration	-			
							OR						
							System Power Mode	=	Accessory On calibration	-			
							)			-			
							for time	>=	0.4	sec			
							((						
							ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	>	0.1131	-			
							OR						
							ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	<	-0.099	-			
							OR						
							ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	>	0.5091	-			
							OR						
							ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	<	-0.5374	-			
							)						
							(						
							ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	>	0.1131	-			
							OR						
							ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	<	-0.099	-			
							OR						
							ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	>	0.5091	-			
							OR						
							ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	<	-0.5374	-			
							)						
							(						
							ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	>	0.1131	-			
							OR						
							ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	<	-0.099	-			
							OR						
							ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	>	0.5091	-			
							OR						
							ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	<	-0.5374	-			
							))						
							((						
							ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	>	0.1131	-			
							OR						
							ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	<	-0.099	-			
							OR						
							ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	>	0.5091	-			
							OR						
							ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	<	-0.5374	-			
							)						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	> 0.1131 -		
					OR			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	< -0.099 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	> 0.5091 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	< -0.5374 -		
					)			
					(			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	> 0.1131 -		
					OR			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	< -0.099 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	> 0.5091 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	< -0.5374 -		
					))			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		
		Path 3: Monitoring signal variation between Shifter 1 and Shifter 2 and checking the validity of the combinations of Linear Shifters.	Absolute value of difference between Raw PWM signal from Shifter Beta 1 and Adjusted signal from Shifter Beta 2	>= 12.0235 %	(		0.5 sec	2 Trips
			ETRS Linear Shifter Both Combinations Using Beta 2 Outside of Field Of Play Flag	= FALSE -	System Power Mode	= Run crank active calibration -		
					OR			
					System Power Mode	= Accessory On calibration -		
					)	-		
					for time	>= 0.4 sec		
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	>= -0.5374 -		
					)			
					OR			
					(			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	>= -0.5374 -		
					)			
					OR			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required		MIL Illum.
					(						
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	<=	0.1131	-			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	>=	-0.099	-			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	<=	0.5091	-			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	>=	-0.5374	-			
					))						
					((						
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	<=	0.1131	-			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	>=	-0.099	-			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	<=	0.5091	-			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	>=	-0.5374	-			
					)						
					OR						
					(						
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	<=	0.1131	-			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	>=	-0.099	-			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	<=	0.5091	-			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	>=	-0.5374	-			
					)						
					OR						
					(						
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	<=	0.1131	-			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	>=	-0.099	-			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	<=	0.5091	-			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	>=	-0.5374	-			
					))						
					No pending or confirmed DTCs	=	see sheet inhibit tables	-			
					Basic enabling conditions are met	=	see sheet enable tables	-			
		Path 4: Monitoring signal variation between Shifter 1 and Shifter 2	Absolute value of difference between Raw PWM signal from Shifter Beta 1 and Adjusted signal from Shifter Beta 2	>= 12.0235 %	(				0.5	sec	2 Trips
					System Power Mode	=	Run crank active calibration	-			
					OR						
					System Power Mode	=	Accessory On calibration	-			
					)			-			
					for time	>=	0.4	sec			
					No pending or confirmed DTCs	=	see sheet inhibit tables	-			
					Basic enabling conditions are met	=	see sheet enable tables	-			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Path 5: Advanced performance diagnosis and monitoring signal variation between Shifter 1 and Shifter 2	Absolute value of difference between Raw PWM signal from Shifter Beta 1 and Adjusted signal from Shifter Beta 2	>= 12.0235 %	(		0.5 sec	2 Trips
					System Power Mode	= Run crank active calibration -		
					OR			
					System Power Mode	= Accessory On calibration -		
					)	-		
					for time	>= 0.4 sec		
					((			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	>= -0.5374 -		
					)			
					OR			
					(			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	>= -0.5374 -		
					)			
					OR			
					(			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	>= -0.5374 -		
					))			
					((			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	>= -0.5374 -		
					)			
					OR			
					(			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	>= -0.5374 -		
					)			
					OR			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required		MIL Illum.
							(						
							ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	<=	0.1131	-			
							ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	>=	-0.099	-			
							ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	<=	0.5091	-			
							ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	>=	-0.5374	-			
							))						
							ETRS Diagnostics - Advanced performance diagnostics enabled	=	TRUE	-			
							No pending or confirmed DTCs	=	see sheet inhibit tables	-			
							Basic enabling conditions are met	=	see sheet enable tables	-			
Transmission Range Selector Y-Axis Position Sensor 2	P08A2	Monitoring of Gear Lever Y position sensor 2 for Out of Range Check- High	Raw PWM signal value from the shifter 2 of Gear Lever Y Position Sensor	>=	95.0147	%	(				0.5	sec	2 Trips
							System Power Mode	=	Run crank active calibration	-			
							OR						
							System Power Mode	=	Accessory On calibration	-			
							)			-			
							for time	>=	0.4	sec			
							No pending or confirmed DTCs	=	see sheet inhibit tables	-			
							Basic enabling conditions are met	=	see sheet enable tables	-			
	P08A1	Monitoring of Gear Lever Y position sensor 2 for Out of Range Check- Low	Raw PWM signal value from the shifter 2 of Gear Lever Y Position Sensor	<=	4.9853	%	(				0.5	sec	2 Trips
							System Power Mode	=	Run crank active calibration	-			
							OR						
							System Power Mode	=	Accessory On calibration	-			
							)			-			
							for time	>=	0.4	sec			
							No pending or confirmed DTCs	=	see sheet inhibit tables	-			
							Basic enabling conditions are met	=	see sheet enable tables	-			
	P08A0	**Path 1:** CAN Communication signaL for Shift Lever Diagnosis of Primary Gear Lever Y Position Sensor 2	CAN Communication signaL for Shift Lever Diagnosis of Primary Gear Lever Y Position Sensor 2	=	TRUE	-	(				0.5	sec	2 Trips
			OR				System Power Mode	=	Run crank active calibration	-			
			CAN Communication signaL for Shift Lever Diagnosis of Secondary Gear Lever Y Position Sensor 2	=	TRUE	-	OR						
							System Power Mode	=	Accessory On calibration	-			
							)			-			
							for time	>=	0.4	sec			
							ETRS Linear Shifter Beta 1 Sample Circuit Error is not set	=	TRUE	-			
							No pending or confirmed DTCs	=	see sheet inhibit tables	-			
							Basic enabling conditions are met	=	see sheet enable tables	-			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Path 2: ETRS LInear Shifter Both Combinations Using Beta 2 Outside of Field Of Play Flag	ETRS LInear Shifter Both Combinations Using Beta 2 Outside of Field Of Play Flag	= TRUE -	(		0.5 sec	2 Trips
					System Power Mode	= Run crank active calibration -		
					OR			
					System Power Mode	= Accessory On calibration -		
					)	-		
					for time	>= 0.4 sec		
					((			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	> 0.1131 -		
					OR			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	< -0.099 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	> 0.5091 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	< -0.5374 -		
					)			
					(			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	> 0.1131 -		
					OR			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	< -0.099 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	> 0.5091 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	< -0.5374 -		
					)			
					(			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	> 0.1131 -		
					OR			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 2 Combination	< -0.099 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	> 0.5091 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 2 Combination	< -0.5374 -		
					))			
					((			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	> 0.1131 -		
					OR			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	< -0.099 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	> 0.5091 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	< -0.5374 -		
					)			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	> 0.1131 -		
					OR			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	< -0.099 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	> 0.5091 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	< -0.5374 -		
					)			
					(			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	> 0.1131 -		
					OR			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 2 Combination	< -0.099 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	> 0.5091 -		
					OR			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 2 Combination	< -0.5374 -		
					))			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		
		Path 3: Monitoring signal variation between Shifter 1 and Shifter 2 and checking the validity of the combinations of Linear Shifters.	Absolute value of difference between Raw PWM signal from Shifter Beta 2 and Adjusted signal from Shifter Beta 2	>= 12.0235 %	(		0.5 sec	2 Trips
			ETRS Linear Shifter Both Combinations Using Beta 2 Outside of Field Of Play Flag	= FALSE -	System Power Mode	= Run crank active calibration -		
					OR			
					System Power Mode	= Accessory On calibration -		
					)	-		
					for time	>= 0.4 sec		
					((			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	>= -0.5374 -		
					)			
					OR			
					(			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	>= -0.5374 -		
					)			
					OR			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions			Time Required		MIL Illum.
					(						
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	<=	0.1131	-			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	>=	-0.099	-			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	<=	0.5091	-			
					ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	>=	-0.5374	-			
					))						
					((						
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	<=	0.1131	-			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	>=	-0.099	-			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	<=	0.5091	-			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	>=	-0.5374	-			
					)						
					OR						
					(						
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	<=	0.1131	-			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	>=	-0.099	-			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	<=	0.5091	-			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	>=	-0.5374	-			
					)						
					OR						
					(						
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	<=	0.1131	-			
					ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	>=	-0.099	-			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	<=	0.5091	-			
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	>=	-0.5374	-			
					))						
					No pending or confirmed DTCs	=	see sheet inhibit tables	-			
					Basic enabling conditions are met	=	see sheet enable tables	-			
		Path 4: Monitoring signal variation between Shifter 1 and Shifter 2	Absolute value of difference between Raw PWM signal from Shifter Beta 1 and Adjusted signal from Shifter Beta 2	>= 12.0235 %	(				0.5	sec	2 Trips
					System Power Mode	=	Run crank active calibration	-			
					OR						
					System Power Mode	=	Accessory On calibration	-			
					)			-			
					for time	>=	0.4	sec			
					No pending or confirmed DTCs	=	see sheet inhibit tables	-			
					Basic enabling conditions are met	=	see sheet enable tables	-			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required		MIL Illum.
		Path 5: Advanced performance diagnosis and monitoring signal variation between Shifter 1 and Shifter 2	Absolute value of difference between Raw PWM signal from Shifter Beta 1 and Adjusted signal from Shifter Beta 2	>=	12.0235	%	(				0.5	sec	2 Trips
							System Power Mode	=	Run crank active calibration	-			
							OR						
							System Power Mode	=	Accessory On calibration	-			
							)			-			
							for time	>=	0.4	sec			
							((						
							ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	<=	0.1131	-			
							ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	>=	-0.099	-			
							ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	<=	0.5091	-			
							ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	>=	-0.5374	-			
							)						
							OR						
							(						
							ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	<=	0.1131	-			
							ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	>=	-0.099	-			
							ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	<=	0.5091	-			
							ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	>=	-0.5374	-			
							)						
							OR						
							(						
							ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	<=	0.1131	-			
							ETRS Linear Shifter X Signal From Alpha 1 Beta 1 Combination	>=	-0.099	-			
							ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	<=	0.5091	-			
							ETRS Linear Shifter Y Signal From Alpha 1 Beta 1 Combination	>=	-0.5374	-			
							))						
							((						
							ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	<=	0.1131	-			
							ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	>=	-0.099	-			
							ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	<=	0.5091	-			
							ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	>=	-0.5374	-			
							)						
							OR						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	>= -0.5374 -		
					)			
					OR			
					(			
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	<= 0.1131 -		
					ETRS Linear Shifter X Signal From Alpha 2 Beta 1 Combination	>= -0.099 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	<= 0.5091 -		
					ETRS Linear Shifter Y Signal From Alpha 2 Beta 1 Combination	>= -0.5374 -		
					))			
					ETRS Diagnostics - Advanced performance diagnostics enabled	= TRUE -		
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		
Transmission Range Selector Shift Interlock Switch 1	P17A4	Monitoring of transmission range selector enable switch A	PRNDL display status indicates Transmission Range Selector Enable Switch A Circuit High	= TRUE -	Transmission Range Selector Enable Switch A Circuit High message received successfully through CAN	= TRUE -		2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	P17A3	Monitoring of transmission range selector enable switch A	PRNDL display status indicates Transmission Range Selector Enable Switch A Circuit Low	= TRUE -	Transmission Range Selector Enable Switch A Circuit Low message received successfully through CAN	= TRUE -		2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	P17A5	Monitoring of transmission range selector enable switch A	PRNDL display status indicates Transmission Range Selector Enable Switch A Circuit Performance	= TRUE -	Transmission Range Selector Enable Switch A Circuit Performance message received successfully through CAN	= TRUE -		2 Trips
					Basic enable conditions met	= see sheet enable tables -		
	P17A6	Transmission Range Selector Enable Switch A or B Correlation	ESDR (ETRS Shifter Decoder Ring) Interlock 1 Position is not equal to ESDR Interlock 2 Position	= TRUE -	Shifter diagnostics is enabled, which is the following conditions for time	>= 0.4 sec	600 sec	no MIL
					((			
					System Power Mode	= Run crank active calibration -		
					OR			
					System Power Mode	= Accessory On calibration -		
					)	-		
					ETRS linear shifter interlock 1 fault is active	= FALSE -		
					ETRS linear shifter interlock 2 fault is active	= FALSE -		
					)			
					No pending or confirmed DTCs	= see sheet inhibit tables -		
					Basic enabling conditions are met	= see sheet enable tables -		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	P17F4	Transmission Range Selector Enable Switch 1 or 2 Circuit Stuck On	ETRS linear shifter interlock 1 fault is active OR ETRS linear shifter interlock 2 fault is active OR ETRS linear shifter interlock 1 position is stuck OR ETRS linear shifter interlock 2 position is stuck	= TRUE - = TRUE - = TRUE - = TRUE -	(System Power Mode OR System Power Mode) for time No pending or confirmed DTCs Basic enabling conditions are met	 = Run crank active calibration - = Accessory On calibration - - >= 0.4 sec = see sheet inhibit tables - = see sheet enable tables -	600 sec	no MIL
Transmission Range Selector Shift Interlock Switch 2	P17A8	Monitoring of transmission range selector enable switch B	PRNDL display status indicates Transmission Range Selector Enable Switch B Circuit High	= TRUE -	Transmission Range Selector Enable Switch B Circuit High message received successfully through CAN Basic enable conditions met	= TRUE - = see sheet enable tables -		2 Trips
	P17A7	Monitoring of transmission range selector enable switch B	PRNDL display status indicates Transmission Range Selector Enable Switch B Circuit Low	= TRUE -	Transmission Range Selector Enable Switch B Circuit Low message received successfully through CAN Basic enable conditions met	= TRUE - = see sheet enable tables -		2 Trips
	P17A9	Monitoring of transmission range selector enable switch B	PRNDL display status indicates Transmission Range Selector Enable Switch B Circuit Performance	= TRUE -	Transmission Range Selector Enable Switch B Circuit Performance message received successfully through CAN Basic enable conditions met	= TRUE - = see sheet enable tables -		2 Trips
Transmission Range Selector Park Position Switch 1	P07B4	Monitoring of transmission Park Position Sensor/Switch A	PRNDL display status indicates Transmission Park Position Sensor/Switch A Circuit High	= TRUE -	Transmission Park Position Sensor/Switch A Circuit High message received successfully through CAN Basic enable conditions met	= TRUE - = see sheet enable tables -		1 Trip
	P07B3	Monitoring of transmission Park Position Sensor/Switch A	PRNDL display status indicates Transmission Park Position Sensor/Switch A Circuit Low	= TRUE -	Transmission Park Position Sensor/Switch A Circuit Low message received successfully through CAN Basic enable conditions met	= TRUE - = see sheet enable tables -		1 Trip
	P07B5	Monitoring of transmission Park Position Sensor/Switch A	PRNDL display status indicates Transmission Park Position Sensor/Switch A Circuit Performance	= TRUE -	Transmission Park Position Sensor/Switch A Circuit Performance message received successfully through CAN Basic enable conditions met	= TRUE - = see sheet enable tables -		2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	P17F3	Transmission Park Position Switch 1 or 2 Circuit Stuck On	ETRS(Engine Transmission System) linear shifter park input 1 primary fault active	= TRUE -	(		60 sec	no MIL
			OR		System Power Mode	= Run crank active calibration -		
			ETRS linear shifter park input 2 primary fault is active	= TRUE -	OR			
			OR		System Power Mode	= Accessory On calibration -		
			ETRS linear shifter park input 1 secondary fault is active	= TRUE -	)	-		
			OR		for time	>= 0.4 sec		
			ETRS linear shifter park input 2 secondary fault	= TRUE -	No pending or confirmed DTCs	= see sheet inhibit -		
					Basic enabling conditions are met	= see sheet enable tables -		
	P189D	Transmission Park Position Switch 1 or 2 Circuit Stuck Open	(The ratio between counts how many times the Switch 1 was open and counts how many times the park button has been pressed since the last evaluation of whether one switch is stuck open or not	>= 0.84375 -	Ignition is ON	= TRUE -	0.5 sec	2 Trips
			The ratio between counts how many times the Switch 1 was closed and counts how many times the park button has been pressed since the last evaluation of whether one switch is stuck open or not	<= 0.078125 -	Counts how many times the park button has been pressed since the last evaluation of whether one switch is stuck open or not	>= 8 -		
			The ratio between counts how many times the Switch 2 was closed and counts how many times the park button has been pressed since the last evaluation of whether one switch is stuck open or not	>= 0.84375 -	Park switch stuck open enable	= TRUE -		
			(The ratio between counts how many times the Switch 2 was open and counts how many times the park button has been pressed since the last evaluation of whether one switch is stuck open or not	<= 0.078125 -	Basic enable conditions met	= see sheet enable tables -		
			OR					
			The ratio between counts how many times the Switch 2 was open and counts how many times the park button has been pressed since the last evaluation of whether one switch is stuck open or not))	>= 0.84375 -				
			OR					
			(The ratio between counts how many times the Switch 2 was open and counts how many times the park button has been pressed since the last evaluation of whether one switch is stuck open or not	>= 0.84375 -				
			The ratio between counts how many times the Switch 2 was closed and counts how many times the park button has been pressed since the last evaluation of whether one switch is stuck open or not	<= 0.078125 -				
			The ratio between counts how many times the Switch 1 was closed and counts how many times the park button has been pressed since the last evaluation of whether one switch is stuck open or not	>= 0.84375 -				
			(The ratio between counts how many times the Switch 1 was open and counts how many times the park button has been pressed since the last evaluation of whether one switch is stuck open or not	<= 0.078125 -				
			OR					
			The ratio between counts how many times the Switch 1 was open and counts how many times the park button has been pressed since the last evaluation of whether one switch is stuck open or not))	>= 0.84375 -				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required		MIL Illum.
	P07BE	Transmission Park Position Sensor Switch A B Correlation	ESDR Park 1 Position is not equal to ESDR Park 2 Position	=	TRUE	-	Ignition is ON	=	TRUE	-	37.5	sec	1 Trip
							ESDR Park 1 Position Fault Active Flag	=	FALSE	-			
							ESDR Park 2 Position Fault Active Flag	=	FALSE	-			
							ESDR General Diag Enable Flag	=	TRUE	-			
							Basic enable conditions met	=	see sheet enable tables	-			
Transmission Range Selector Park Position Switch 2	P07BA	Monitoring of transmission Park Position Sensor/Switch B	PRNDL display status indicates Transmission Park Position Sensor/Switch B Circuit High	=	TRUE	-	Transmission Park Position Sensor/Switch B Circuit High message received successfully through CAN	=	TRUE	-			1 Trip
							Basic enable conditions met	=	see sheet enable tables	-			
	P07B9	Monitoring of transmission Park Position Sensor/Switch B	PRNDL display status indicates Transmission Park Position Sensor/Switch B Circuit Low	=	TRUE	-	Transmission Park Position Sensor/Switch B Circuit Low message received successfully through CAN	=	TRUE	-			1 Trip
							Basic enable conditions met	=	see sheet enable tables	-			
	P07BB	Monitoring of transmission Park Position Sensor/Switch B	PRNDL display status indicates Transmission Park Position Sensor/Switch B Circuit Performance	=	TRUE	-	Transmission Park Position Sensor/Switch B Circuit Performance message received successfully through CAN	=	TRUE	-			2 Trips
							Basic enable conditions met	=	see sheet enable tables	-			
Transmission Range Selector Control Module Internal	P17D8	Monitoring of transmission range selector control module memory checksum error	PRNDL display status indicates transmission range selector control module memory checksum error	=	TRUE	-	Transmission range selector control module memory checksum error message received successfully through CAN	=	TRUE	-			1 Trip
							Basic enable conditions met	=	see sheet enable tables	-			
	P17D9	Monitoring of transmission range selector control module read only memory error	PRNDL display status indicates transmission range selector control module read only memory error	=	TRUE	-	Transmission range selector control module read only memory error message received successfully through CAN	=	TRUE	-			1 Trip
							Basic enable conditions met	=	see sheet enable tables	-			
	P17DA	Monitoring of transmission range selector control module internal random access memory error	PRNDL display status indicates transmission range selector control module internal random access memory error	=	TRUE	-	Transmission range selector control module internal random access memory error message received successfully through CAN	=	TRUE	-			1 Trip
							Basic enable conditions met	=	see sheet enable tables	-			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required		MIL Illum.
	P17DB	**Path 1:** Monitoring of transmission range selector control module processor	PRNDL display status indicates transmission range selector control module processor error	=	TRUE	-	Transmission range selector control module processor message received successfully through CAN	=	TRUE	-			1 Trip
							Basic enable conditions met	=	see sheet enable tables	-			
		Path 2: Evaluation of the primary and secondary seed key pair (SKP) signal from the electronic transmission range select (ETRS) shifter for reversible errors.	Primary SKP error in function monitoring is set with the following conditions:	=	TRUE	-	Ignition is ON	=	TRUE	-	0.1	sec	1 Trip
			Received key match the expected key based on the received seed.	=	FALSE	-	Status of seed key pair primary communication is not equal to the value of primary SKP in previous calculation cycle in function monitoring	=	TRUE	-			
			for counts	>=	10	-	Status of seed key pair secondary communication is not equal to the value of secondary SKP in previous calculation cycle in function monitoring	=	TRUE	-			
			OR				Primary SKP signal communication error is set	=	FALSE	-			
			Secondary SKP error in function monitoring is set with the following conditions:	=	TRUE	-	Secondary SKP communication error is set	=	FALSE	-			
			Received key match the expected key based on the received seed.	=	FALSE	-	ECU is in state "drive"	=	TRUE	-			
			for counts	>=	10	-	Basic enable conditions are met	=	see sheet enable tables	-			
		Path 3: Monitoring the primary and secondary seed key pair (SKP) signal from the electronic transmission range select (ETRS) shifter for communication errors	Primary SKP signal communication error is set	=	TRUE	-	Ignition is ON	=	TRUE	-	0.1	sec	1 Trip
			for counts	>=	10	-	ECU is in state "drive"	=	TRUE	-			
							Basic enable conditions are met	=	see sheet enable tables	-			
			OR										
			Secondary SKP signal communication error is set	=	TRUE	-							
			for counts	>=	10	-							

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required		MIL Illum.
		Path 4: Evaluation of the primary and secondary seed key pair (SKP) signal from the electronic transmission range select (ETRS) shifter for irreversible errors.	Primary SKP error in function monitoring is set, with the following conditions:	=	TRUE	-	Ignition is ON	=	TRUE	-	0.1	sec	1 Trip
			Received key match the expected key based on the received seed.	=	FALSE	-	Status of seed key pair primary communication is not equal to the value of primary SKP in previous calculation cycle in function monitoring	=	TRUE	-			
			for counts	>=	A + B		Status of seed key pair secondary communication is not equal to the value of secondary SKP in previous calculation cycle in function monitoring	=	TRUE	-			
			(				Primary SKP signal communication error is set	=	FALSE	-			
			A: Threshold limit for primary SKP error counter based on current vehicle speed	=	100	-	Secondary SKP communication error is set	=	FALSE	-			
			B: Parameter for linear shifter seed key pair primary default value	=	10	-	ECU is in state "drive"	=	TRUE	-			
							Basic enable conditions are met	=	see sheet enable tables	-			
			) OR										
			Secondary SKP error in function monitoring is set, with the following conditions:	=	TRUE	-							
			Received key match the expected key based on the received seed.	=	FALSE	-							
			for counts	>=	A + B								
			(	=									
			A: Threshold limit for secondary SKP error counter based on current vehicle speed	=	100	-							
			B: Parameter for linear shifter seed key pair secondary default value	=	10	-							
			)										
TCM Processor Integrity	P06AF	Detection of TCM processor reset due to TCM processor integrity failure	(				Ignition is on	=	TRUE		0.1	sec	1 Trip
			Detection of "Unhealthy" State of Health Pattern				Basic enable conditions met	=	see sheet enable tables	-			
			(Received value of TCM CAN frame 0x3F5 Byte 5	=	11	-							
			OR Received value of TCM CAN frame 0x3F5 Byte 5	=	15	-							
			OR Received value of TCM CAN frame 0x3F5 Byte 5	=	3	-							
			OR Received value of TCM CAN frame 0x3F5 Byte 5	=	12	-							
			OR Received value of TCM CAN frame 0x3F5 Byte 5	=	14	-							
			OR Received value of TCM CAN frame 0x3F5 Byte 5	=	7	-							
			OR Received value of TCM CAN frame 0x3F5 Byte 5	=	13	-							
			) OR										

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Detection of Missing "Healthy" State of Health Pattern - Unrecognizable Pattern (					
			Received value of TCM CAN frame 0x3F5 Byte 5 OR	<> 8 -				
			Received value of TCM CAN frame 0x3F5 Byte 5 OR	<> 5 -				
			Received value of TCM CAN frame 0x3F5 Byte 5 OR	<> 1 -				
			Received value of TCM CAN frame 0x3F5 Byte 5 OR	<> 9 -				
			Received value of TCM CAN frame 0x3F5 Byte 5 OR	<> 10 -				
			Received value of TCM CAN frame 0x3F5 Byte 5 OR	<> 6 -				
			Received value of TCM CAN frame 0x3F5 Byte 5 OR	<> 4 -				
			Received value of TCM CAN frame 0x3F5 Byte 5 OR	<> 0 -				
			Received value of TCM CAN frame 0x3F5 Byte 5) OR **Detection of Frozen State of Health Pattern**	<> 2 -				
			Difference (a) - (b) (with (a) Received value of TCM CAN frame 0x3F5 Byte 5 and with (b) Previous received value of TCM CAN frame 0x3F5 Byte 5) AND	= 0 -				
			Above difference occuring on a total number of occassions (evaluated every 250 ms)) AND **Presence of Communication DTCs**	> 50 counts				
			ECM has U0101 DTC stored for loss of communication with TCM AND **Commanded ETRS Range Not in a Forward Driven Range** (	= TRUE -				
			Commanded ETRS Range OR	<> MANUAL -				
			Commanded ETRS Range OR	<> LOW -				
			Commanded ETRS Range)	<> DRIVE -				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Control Module Supply Voltage	P17DE	Monitoring of transmission range selector control module system voltage high	PRNDL display status indicates transmission range selector control module system voltage high	= TRUE -	Transmission range selector control module system voltage high message received successfully through CAN Basic enable conditions met	= TRUE - = see sheet enable tables -		no MIL
	P17DD	Monitoring of transmission range selector control module system voltage low	PRNDL display status indicates transmission range selector control module system voltage low	= TRUE -	Transmission range selector control module system voltage low message received successfully through CAN Basic enable conditions met	= TRUE - = see sheet enable tables -		1 Trip
	P17DF	Monitoring of transmission range selector control module system voltage performance	PRNDL display status indicates transmission range selector control module system voltage performance error	= TRUE -	Transmission range selector control module system voltage performance message received successfully through CAN Basic enable conditions met	= TRUE - = see sheet enable tables -		no MIL
Transmission Range Selector Control Module Ignition On/Start Switch	P17E1	Monitoring of transmission range selector control module ignition ON/start switch circuit high	PRNDL display status indicates transmission range selector control module ignition ON/start switch circuit high	= TRUE -	Transmission range selector control module ignition ON/start switch circuit high message received successfully through CAN Basic enable conditions met	= TRUE - = see sheet enable tables -		2 Trips
	P17E0	Monitoring of transmission range selector control module ignition ON/start switch circuit low	PRNDL display status indicates transmission range selector control module ignition ON/start switch circuit low	= TRUE -	Transmission range selector control module ignition ON/start switch circuit low message received successfully through CAN Basic enable conditions met	= TRUE - = see sheet enable tables -		2 Trips
Transmission Range Selector Control Module Ignition Accessory Input	P17E2	Monitoring of transmission range selector control module ignition accessory circuit low	PRNDL display status indicates transmission range selector control module ignition accessory circuit low	= TRUE -	Transmission range selector control module ignition accessory circuit low message received successfully through CAN Basic enable conditions met	= TRUE - = see sheet enable tables -		no MIL
Powertrain Expansion CAN Bus	U240D	Monitoring of transmission range selector control module powertrain expansion CAN bus OFF	PRNDL display status indicates transmission range selector control module powertrain expansion CAN bus OFF	= TRUE -	Transmission range selector control module powertrain expansion CAN bus OFF message received successfully through CAN Basic enable conditions met	= TRUE - = see sheet enable tables -		2 Trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required		MIL Illum.
Powertrain Sensor CAN Bus	U18C6	Monitoring of transmission range selector control module lost communication with ECM on powertrain sensor CAN bus	PRNDL display status indicates transmission range selector control module lost communication with ECM on powertrain sensor CAN bus	=	TRUE	-	Transmission range selector control module lost communication with ECM on powertrain sensor CAN bus message received successfully through CAN	=	TRUE	-			2 Trips
							Basic enable conditions met	=	see sheet enable tables	-			
	U240E	Monitoring of transmission range selector control module sensor CAN bus OFF	PRNDL display status indicates transmission range selector control module sensor CAN bus OFF	=	TRUE	-	Transmission range selector control module sensor CAN bus OFF message received successfully through CAN	=	TRUE	-			2 Trips
							Basic enable conditions met	=	see sheet enable tables	-			
Transmission Range Selection	P16F4	**Park Exit Monitor** Monitor for Driver Range Request Ring (DRRR) commands to exit Park which do not follow a direct driver command for R, N, D or M via the shift lever	Currently Commanding PARK or Commanding UNDEFINED w/ Single Park Indication, which is the following conditions:	=	TRUE	_	Ignition is ON	=	TRUE	-	0	sec	1 Trip
			(				No pending or confirmed DTCs	=	see sheet inhibit tables	-			
			Range Command	=	PARK Range	-	Basic enabling conditions are met	=	see sheet enable tables	-			
			OR										
			(										
			Range Command	=	UNDEFINED Range	-							
			Single park indication	=	TRUE	-							
			))										
			AND										
			Not commanded to leave PARK range, which is the following conditions and for time	>=	0.2	sec							
			(										
			Linear Shifter Current Position	=	PARK Range	-							
			OR										
			Linear Shifter Current Position	=	UNDEFINED Range	-							
			OR										
			Linear Shifter Current Position	=	NULL range	-							
			)										
			AND										
			[										
			Driver Range Request Ring (DRRR) commands a value OTHER than Park, Undefined or Null when it was previously commanding Park, Undefined or Null	=	TRUE	-							
			OR										
			(										
			Driver Range Request Ring (DRRR) commands a value OTHER than PARK, UNDEFINED or NULL	=	TRUE	-							
			AND										
			Currently Commanding PARK or Commanding UNDEFINED w/ Single Park Indication	=	TRUE	-							
			)										
			for time	>=	2.05	sec							
			]										

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required		MIL Illum.
		Park Acknowledgement Monitor Monitor Transmission Range Command Ring (TRCR) to ensure the acknowledgement of a command for Park within a calibratable time period	Range Command	not equal	PARK Range	-							
			Vehicle request for a range shift	=	PARK Range	-							
			for time	=	0.2	sec							
		Neutral Acknowledgement Monitor Monitor for the timely acknowledgement of a command for Neutral, provided the transmission is presently out of Park	(										
			Transmission Range Command Ring (TRCR) commands REVERSE, LOW, MANUAL or DRIVE range	=	TRUE	-							
			Linear Shifter Current Position is in NEUTRAL range	=	NEUTRAL range	-							
			)										
			for time	>=	0.2	sec							
			Range Command	not equal	NEUTRAL range	-							
			Range Command	not equal	PARK Range	-							
		Transition to Drive Monitor Monitor for commands to Drive which do not follow a direct request from the driver via the shift lever	Linear Shifter Current Position is NOT in DRIVE, LOW or MANUAL range for time	>=	0.2	sec							
			Vehicle request for a range shift is in DRIVE, LOW or MANUAL range	=	TRUE	-							
		Transition to Reverse Monitor Monitor for commands to Reverse which do not follow a direct request from the Reverser via the shift lever	Linear Shifter Current Position is NOT in REVERSE range for time	>=	0.2	sec							
			Vehicle request for a range shift	=	REVERSE range	-							
	P07E5	ETRS TRCR Diagnostics - Unable to Engage in Drive	Target Range fail in Gear Lever detected for Drive range	=	TRUE	-	Range Achieve failure reported	=	TRUE	-	0.5	sec	2 Trips
							(						
							Critical forward range fault	=	FASLE	-			
							OR						
							Range availability error from Gear Lever Diagnostics	=	TRUE	-			
							)						
							Basic enabling conditions are met	=	see sheet enable tables	-			
	P073D	ETRS TRCR Diagnostics - Unable to Engage Neutral	Target Range fail in Gear Lever detected for Neutral range	=	TRUE	-	Range Achieve failure reported	=	TRUE	-	0.5	sec	2 Trips
							(						
							Critical neutral fault	=	FALSE	-			
							OR						
							Range availability error from Gear Lever Diagnostics	=	TRUE	-			
							)						
							No pending or confirmed DTCs	=	see sheet inhibit tables	-			
							Basic enabling conditions are met	=	see sheet enable tables	-			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value			Secondary Parameters	Enable Conditions			Time Required		MIL Illum.
	P07E4	ETRS TRCR Diagnostics - Unable to Engage Parking	Target Range fail in Gear Lever detected for Parking range	=	TRUE	-	Range Achieve failure reported	=	TRUE	-	0.5	sec	2 Trips
							(						
							CAN signal Park Range Diagnostic Critical Fault from TRCM	=	FALSE	-			
							OR						
							Range availability error from Gear Lever Diagnostics	=	TRUE	-			
							)						
							No pending or confirmed DTCs	=	see sheet inhibit tables	-			
							Basic enabling conditions are met	=	see sheet enable tables	-			
	P073E	ETRS TRCR Diagnostics - Unable to Engage Reverse	Target Range fail in Gear Lever detected for Reverse range	=	TRUE	-	Range Achieve failure reported	=	TRUE	-	0.5	sec	2 Trips
							(						
							Critical reverse fault	=	FALSE	-			
							OR						
							Range availability error from Gear Lever Diagnostics	=	TRUE	-			
							)						
							Basic enabling conditions are met	=	see sheet enable tables	-			

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	P1787	ETRS TRCR Diagnostics - Unexpected Range Change Detected	Unexpected Range Change failure in Gear Lever reported	= TRUE -	Unexpected Range Change Fail Flag	= TRUE -	0.1 sec	2 Trips
					Supress Range Achievement is active	= FALSE -		
					OR			
					(			
					(			
					Translated Range Command is equal to Parking range	= FALSE -		
					OR			
					Last failed range is equal to Parking range	= FALSE -		
					OR			
					CAN signal indicating Park Range diagnostic critical fault from TRCM	= FALSE -		
					)			
					(			
					Translated Range Command is equal to Neutral Range	= FALSE -		
					OR			
					Last failed range is equal to Neutral range	= FALSE -		
					OR			
					Critical neutral fault	= FALSE -		
					)			
					(			
					Translated Range Command is equal to Reverse Range	= FALSE -		
					OR			
					Last failed range is equal to Reverse Range	= FALSE -		
					OR			
					Critical reverse fault	= FALSE -		
					)			
					(			
					Translated Range Command is equal to Drive Range	= FALSE -		
					OR			
					Last failed range is equal to Drive Range	= FALSE -		
					OR			
					Critical forward range fault	= FALSE -		
					)			
					)			
					Basic enabling conditions are met	= see sheet enable tables -		

End of Table

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			At EOL, software shall read the voltage on the IGN_MON pin 45 [P0_2/AN5]. This value is used to calculate voltage calibration value. If the IGN_MON voltage is outside of the allowed voltage limits, software shall set the VCC_CompensationEOL fault.	Acceptable upper and lower voltage thresholds are defined as IGN_MON at EOL +/- 7%.	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software performs BIST test provided by RENESAS. This fault qualifies when BIST test will fail.	Fault Detected	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
			On runtime, software perform CAN registers test. During this test software write test byte to the register and check if it was properly set. If test will fail, software should set should set CAN_RegFreezeFail error.	Fault Detected	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
			This fault qualifies when EEPROM read is not ok (EEPROM failed to accept the job) and also when checksum read is wrong. This fault is set for both cases of EEPROM read from original address and Image address of the stored data.	Fault Detected	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	N/A	Safety Non-MIL Emissions Neutral Diagnostic
			This fault qualifies when runtime of specific functions will exceed allowed time..	Fault Detected	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Electronic Failure The emissions neutral default action for all diagnotics under DTC C056D is to disable adaptive cruise control and/or Super Cruise	When the external clock stops oscillating, the system should detect the failure and switch to high speed on-chip oscillator. 1. Disable CAN communication. 2. Log the fault condition to EEPROM. 3. Continue to service watch dog. 4. When the external clock re-oscillates after oscillation stop, switch the external clock to the clock source of the CPU clock by performing a system reset. 5. Upon reset, the system shall do oscillation stop detection fault.	Fault Detected	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	On Crystal Failure	Safety Non-MIL Emissions Neutral Diagnostic
			This fault qualifies when RAM check fails	Fault Detected	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	< 0.5 s (During Initialization)	Safety Non-MIL Emissions Neutral Diagnostic
			Software should set SPI_timeout error when SPI transmission will exceed allowed time.	Fault Detected	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
			This fault qualifies when configuration read from EEPROM is not ok.: - EEPROM failed to accept the job, - checksum read is wrong.	EEPROM read or checksum error	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	< 0.5 s (During Initialization)	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Software performs stack and istack usage analysis. This fault qualifies when stack or istack will overflow.	Fault Detected	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
			At EOL, software shall read the voltage on the IGN_MON pin 45 [P0_2/AN5]. This value is used to calculate voltage calibration value. If the IGN_MON voltage is outside of the allowed voltage limits, software shall set the VCC_CompensationEOL fault.	Acceptable upper and lower voltage thresholds are defined as IGN_MON at EOL +/- 7%.	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
			On Runtime, software shall read the voltage on the VDD_MON pin 36 [P0_7/AN0]. If the VDD_MON voltage is within the allowable VDD_MON voltage limits stored in EEPROM. If the VDD_MON voltage is outside of the allowed voltage limits, software shall set the VDD_MON_Error fault.	Fault Detected	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
			This fault qualifies when Watchdog reset will be detected.	Fault Detected	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	On Watchdog Reset	Safety Non-MIL Emissions Neutral Diagnostic
			This fault qualifies when Watchdog test fails	Fault Detected	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	< 0.5 s (During Initialization)	Safety Non-MIL Emissions Neutral Diagnostic
			At EOL, software should collect Lateral data from the Murata sensor. If software won't be able to collect 30 data samples during EOL test or avarage measured value is outside range stored in EEPROM, error flag shall be set.	30 data samples	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
			At EOL, software should collect Longitudinal data from the Murata sensor. If software won't be able to collect 30 data samples during EOL test or avarage measured value is outside range stored in EEPROM, error flag shall be set.	31 data samples	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software should continuously monitor the PITCH_DIAG input pin of the microprocessor. If the gyro is performing correctly, the PITCH_DIAG will have a logic HIGH status. If a fault is detected within the gyro, the PITCH_DIAG will have a logic LOW status. During normal operation, when PITCH_DIAG has a logic LOW status for ten consecutive CAN cycles (0.1 s), the invalid Flag should be set. If the PITCH_DIAG pin transitions from LOW to HIGH, the error fault is to be dematured after 10.05 s.	Fault Detected	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.003 s	Safety Non-MIL Emissions Neutral Diagnostic
			At EOL, software should continuously monitor the PITCH_TEMP pin 38 [P0_5/AN2] input pin of the microprocessor. Software shall set error flag If average measured temperature value is outside range	1.788V to 4.029V.	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
			At EOL,Software should collect Pitch rate data on PITCH_RATE pin 24 [P1_3/~K13/AN11] input pin of the microprocessor. Software shall set error flag If average measured rate value is outside range	2.4V to 2.6V.	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Software is to monitor PITCH_RATE pin and PITCH_TEMP pin. If the value of PITCH_TEMP increases at least 171mV in less than 10ms and PITCH_RATE is below 1.5V for at least 0.05 s, it can be concluded that the rate sensor has an open ground pin and the validity bit for the rate sensor data should be set to invalid. The error flag should be dematured if PITCH_RATE increases above 1.5V for 0.1 s.	1.5V	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.009 s	Safety Non-MIL Emissions Neutral Diagnostic
			At EOL, software should collect PITCH_RATE data when PITCH_SELF_TEST pin have logic HIGH status. If avarage measured value is outside range, error flag shall be set.	3.011V to 3.887V	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software should set PitchST_Error when Pitch Sensor failed three times during self test procedure. Pitch sensor will fail self test when: - during startup, if the PITCH_DIAG transitions from logic LOW to logic HIGH, - measured PITCH_RATE during self test procedure will be higher than 4V, - difference between measured PITCH_RATE during self test and PITCH_RATE value before self test is not in range. Thresholds are stored in the EEPROM.	>4V	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software shall report a PitchTempRange invalid error whenever the voltage on PITCH_TEMP is outside the range of 1.225V to 3.835V for more than 0.1 s. The error flag shall be released when the PITCH_TEMP voltage is within the specified range for 0.05 s. PITCH_RATE data shall continue to be transmitted when the PITCH_TEMP out of range error flag is present.	1.225V to 3.835V	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.003 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software shall report a Pitch_High_Error when the voltage on PITCH_RATE is above 4.845V (threshold is configurable in EEPROM) for a period of 0.05 sec, the error shall be released when the voltage is below 4.845V for a period of 0.05 sec. The sensitivity for the yaw sensor should be 16mV/°/sec.	>4.85V	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.003 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software shall report a Pitch_Low_Error when the voltage on PITCH_RATE is below 0.155V (threshold is configurable in EEPROM) for a period of 0.05 sec, the error shall be released when the voltage is above 0.155V for a period of 0.05 sec. The sensitivity for the yaw sensor should be 16mV/°/sec.	<0.155V	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.003 s	Safety Non-MIL Emissions Neutral Diagnostic
Electronic Control Unit Hardware	C056D		Software should continuously monitor the ROLL_DIAG input pin of the microprocessor. If the gyro is performing correctly, the ROLL_DIAG will have a logic HIGH status. If a fault is detected within the gyro, the ROLL_DIAG will have a logic LOW status. During normal operation, when ROLL_DIAG has a logic LOW status for ten consecutive CAN cycles (0.1 s), the invalid Flag should be set. If the ROLL_DIAG pin transitions from LOW to HIGH, the error fault is to be dematured after 10.05 s.		Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.003 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			At EOL, software should continuously monitor the ROLL_TEMP pin 39 [P0_4/AN3] input pin of the microprocessor. Software shall set error flag If average measured temperature value is outside range	1.788V to 4.029V.	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
			At EOL,Software should collect Roll rate data on ROLL_RATE pin 28 [P1_2/~K12/AN10] input pin of the microprocessor. Software shall set error flag If average measured rate value is outside range.	2.4V to 2.6V.	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software is to monitor ROLL_RATE pin and ROLL_TEMP pin. If the value of ROLL_TEMP increases at least 171mV in less than 10ms and ROLL_RATE is below 1.5V for at least 0.05 s, it can be concluded that the rate sensor has an open ground pin and the validity bit for the rate sensor data should be set to invalid. The error flag should be dematured if ROLL_RATE increases above 1.5V for 0.1 s.	1.5V	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.009 s	Safety Non-MIL Emissions Neutral Diagnostic
			At EOL, software should collect ROLL_RATE data when ROLL_SELF_TEST pin have logic HIGH status. If avarage measured value is outside range, error flag shall be set.	3.011V to 3.887V	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Self Test Failed	Software should set RollST_Error when Roll Sensor failed three times during self test procedure. Roll sensor will fail self test when: - during startup, if the ROLL_DIAG transitions from logic LOW to logic HIGH, - measured ROLL_RATE during self test procedure will be higher than 4V, - difference between measured ROLL_RATE during self test and ROLL_RATE value before self test is not in range. Thresholds are stored in the EEPROM.	>4V	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software shall report a RollTempRange invalid error whenever the voltage on ROLL_TEMP is outside the range of 1.225V to 3.835V for more than 0.1 s. The error flag shall be released when the ROLL_TEMP voltage is within the specified range for 0.05 s. ROLL_RATE data shall continue to be transmitted when the ROLL_TEMP out of range error flag is present.	1.225V to 3.835V	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.003 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software shall report a Roll_High_Error when the voltage on ROLL_RATE is above 4.845V (threshold is configurable in EEPROM) for a period of 0.05 sec, the error shall be released when the voltage is below 4.845V for a period of 0.05 sec. The sensitivity for the yaw sensor should be 16mV/°/sec.	>4.85V	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.003 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software shall report a Roll_Low_Error when the voltage on ROLL_RATE is below 0.155V (threshold is configurable in EEPROM) for a period of 0.05 sec, the error shall be released when the voltage is above 0.155V for a period of 0.05 sec. The sensitivity for the yaw sensor should be 16mV/°/sec.	<0.155V	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.003 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Software should set VTI_CommErr when SPI will be busy during communication with Murata sensor for 100 consecutive transmissions.		Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software should set SENS_VTI_INIT when Murata sensor failed three times during self test procedure. Murata sensor will fail self test when: - software won't be able to send SPI commands on startup to Murata sensor - received response will be faulted.		Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software shall report a Yaw_High_Error when the voltage on YAW_RATE is above 4.845V (threshold is configurable in EEPROM) for a period of 0.05 sec, the error shall be released when the voltage is below 4.845V for a period of 0.05 sec. The sensitivity for the yaw sensor should be 16mV/°/sec.	>4.85V	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.003 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software should set VTI_ST_error when Murata sensor will return ST bit set in response message.	Fault Detected	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.003 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software should set VTI_SAT_Fault when Murata sensor will return SAT bit set in response message.	Fault Detected	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.003 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software should set VTI_FrameErr when Murata sensor will return FRME bit set in 10 consecutive messages.	Fault Detected	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.009 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software should set VTI_PORST_Fault when Murata sensor will return PORST bit set in response message.	Fault Detected	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.003 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software shall report a Yaw_Low_Error when the voltage on YAW_RATE is below 0.155V (threshold is configurable in EEPROM) for a period of 0.05 sec, the error shall be released when the voltage is above 0.155V for a period of 0.05 sec. The sensitivity for the yaw sensor should be 16mV/°/sec.	<0.155V	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.003 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software should continuously monitor the YAW_DIAG input pin of the microprocessor. If the gyro is performing correctly, the YAW_DIAG will have a logic HIGH status. If a fault is detected within the gyro, the YAW_DIAG will have a logic LOW status. During normal operation, when YAW_DIAG has a logic LOW status for ten consecutive CAN cycles (0.1 s), the invalid Flag should be set. If the YAW_DIAG pin transitions from LOW to HIGH, the error fault is to be dematured after 10.05 s.	Fault Detected	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.003 s	Safety Non-MIL Emissions Neutral Diagnostic
			At EOL, software should continuously monitor the YAW_TEMP pin 37 [P0_6/AN1] input pin of the microprocessor. Software shall set error flag If average measured temperature value is outside range.	1.788V to 4.029V.	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			At EOL,Software should collect Yaw rate data on YAW_RATE pin 30 [P1_0/~K10/AN8] input pin of the microprocessor. Software shall set error flag If average measured rate value is outside range.	2.4V to 2.6V.	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software is to monitor YAW_RATE pin and YAW_TEMP pin. If the value of YAW_TEMP increases at least 171mV in less than 10ms and YAW_RATE is below 1.5V for at least 0.05 s, it can be concluded that the rate sensor has an open ground pin and the validity bit for the rate sensor data should be set to invalid. The error flag should be dematured if YAW_RATE increases above 1.5V for 0.1 s.	1.5V	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.009 s	Safety Non-MIL Emissions Neutral Diagnostic
			At EOL, software should collect YAW_RATE data when YAW_SELF_TEST pin have logic HIGH status. If avarage measured value is outside range, error flag shall be set.	3.011V to 3.887V	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software should set YAWST_Error when YAW Sensor failed three times during self test procedure. Yaw sensor will fail self test when: - during startup, if the YAW_DIAG transitions from logic LOW to logic HIGH, - measured YAW_RATE during self test procedure will be higher than 4V, - difference between measured YAW_RATE during self test and YAW_RATE value before self test is not in range. Thresholds are stored in the EEPROM.	>4V	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software shall report a YawTempRange invalid error whenever the voltage on YAW_TEMP is outside the range of 1.225V to 3.835V for more than 0.1 s. The error flag shall be released when the YAW_TEMP voltage is within the specified range for 0.05 s. YAW_RATE data shall continue to be transmitted when the YAW_TEMP out of range error flag is present.	1.225V to 3.835V	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.003 s	Safety Non-MIL Emissions Neutral Diagnostic
			At EOL, software should collect Vertical data from the Murata sensor. If software won't be able to collect 30 data samples during EOL test or avarage measured value is outside range stored in EEPROM, error flag shall be set.	Fault Detected	Vehicle Power Mode: Supply Voltage C056D_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
Electronic Control Unit Software	C056E	Vehicle Configuration Not Programmed The emissions neutral default action for all diagnostics under DTC C056E is to disable adaptive cruise control and/or Super Cruise	Calibration for vehicle not provided	Fault Detected	Vehicle Power Mode: Supply Voltage C056E_ENABLE	= RUN = 9 – 16V ≠ disabled	< 0.5 s (During Initialization)	Safety Non-MIL Emissions Neutral Diagnostic
			This fault qualifies when EEPROM read of Peripheral Data section is not accepted or failed.	Fault Detected	EEPROM read or checksum error	when EEPROM read of Peripheral Data section is not accepted or failed	< 0.5 s (During Initialization)	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Checksum Error	This fault qualifies when EEPROM read of System Parameters section is not accepted or failed.	Fault Detected	EEPROM read or checksum error	when EEPROM read of System Parameters section is not accepted or failed.	< 0.5 s (During Initialization)	Safety Non-MIL Emissions Neutral Diagnostic
			This fault qualifies when ROM check fails	Fault Detected	ROM	When ROM check fails	< 0.5 s (During Initialization)	Safety Non-MIL Emissions Neutral Diagnostic
IMU Supply Power	C0800	Voltage Below Threshold The emissions neutral default action for all diagnostics under DTC C0800 is to disable adaptive cruise control and/or Super Cruise	An invalid okflag of "IGNLow" shall be set when the IGNITION voltage is below 8.0V (272 A/D counts on IGN_MON micro pin) but above 7.5V (256 A/D counts on IGN_MON micro pin) for a minimum of 1 sond or after 0.1 s if the IGNITION voltage is below 7.5V (256 A/D counts on IGN_MON micro pin). During an "IGNLow" condition, the error flag is reset when the IGNITION voltage rises above 8.0V (272 A/D counts on IGN_MON micro pin) for a minimum of 250 milliseconds or immediately if the IGNITION voltage is above 8.5V (288 A/D counts on IGN_MON micro pin).The voltage threshold values and time limits are stored in EEPROM and these values are configurable. The fault codes are stored in EEPROM. During this Ignition low fault the normal CAN communications are to continue while a voltage error flag is present.	<= 8V (1 s) <= 7.5V (0.1 s) Sets DTC < 6V Emissions neutral default action is enabled	Vehicle Power Mode: Supply Voltage C0800_ENABLE	= RUN < 9 ≠ disabled	<= 8V (1 s) <= 7.5V (0.1 s)	Safety Non-MIL Emissions Neutral Diagnostic
IMU Communications	U0077	Chassis Expansion CAN Bus Off - The emissions neutral default action for all diagnostics under DTC U0077 is to disable adaptive cruise control and/or Super Cruise	This fault qualifies when CAN Bus Off will be detected	Fault Detected	Vehicle Power Mode: Supply Voltage U0077_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
IMU Communications	U023A	Lost Communication with Active Safety Control Module. The host controller (EOCM2A) will provide the IMU with a message to sync CAN timing. If the message is lost, the IMU will revert to a default CAN timing. If the default CAN timing result in a major mis-sync, the	Software should set CAN_OverSync when IMU will get sync message faster than 4msec rate (i.e 0.001 s-0.003 s). Normally IMU will get sync message for every 10ms Note: The above mentioned criteria is valid only after 0.5 s from startup	Fault Detected	Vehicle Power Mode: Supply Voltage U023A_ENABLE	= RUN = 9 – 16V ≠ disabled	0.05 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software should set CAN_SyncDLCFail when sync message have bad DLC.	Fault Detected	Vehicle Power Mode: Supply Voltage U023A_ENABLE	= RUN = 9 – 16V ≠ disabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
			Software should set CAN_Sync_err when IMU will not receive sync message for known time. This time is set in EEPROM. Note: The above mentioned criteria is valid only after 0.5 s from startup	Fault Detected	Vehicle Power Mode: Supply Voltage U023A_ENABLE	= RUN = 9 – 16V ≠ disabled	0.05 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		host controller will take a emissions neutral default action and disable adaptive cruise control and/or Super Cruise. The EOCM2A will set DTC Code U250F, U250E, U1032 and/or U1033 (depending on which IMU has a mis-sync)	Software should set CAN_UnderSync when IMU will not receive sync message for known time. This time is set in EEPROM. Note: The above mentioned criteria is valid only after 0.5 s from startup	Fault Detected	Vehicle Power Mode: Supply Voltage U023A_ENABLE	= RUN = 9 – 16V ≠ disabled	0.05 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electronic Control Unit Hardware	B101D	RAM Failure - This test is run in its entirety or until a fault is detected. The RAM Test Algorithm will cycle through the RAM memory map and verify each bit within each byte of RAM is valid. This is accomplished by writing $AA, then reading the value back, if the value is not $AA the DTC will set. If the value is $AA the algorithm will write $55, then read the value back, if the value is not $55 the DTC will set. The emissions neutral default action for all diagnotics under DTC B101D is to disable adaptive cruise control and/or Super Cruise	For each memory map test if: Write $AA AND Write $55	 ≠$AA upon read ≠$55 upon read	Vehicle Power Mode: Supply Voltage Virtual Network condition B101D_34_ENABLE	= Any = 9 – 16V = Any Virtual Network that the ECU participates in is active. ≠ disabled	The RAM Test algorithm will RUN once on Power Up until it completes. Takes 0.02 s	Safety Non-MIL Emissions Neutral Diagnostic
		ROM Failure - The Flash Test Algorithm will cycle through the Flash memory map, byte by byte. The algorithm will sum each byte, this includes the checksum written by the GM CANflash 4.0 utility.	Checksum	≠0	Vehicle Power Mode: Supply Voltage Virtual Network condition B101D_35_ENABLE	= Any = 9 – 16V = Any Virtual Network that the ECU participates in is active. ≠ disabled	The Flash Test algorithm will run once at Power up until it completes. Takes 0.350 s	Safety Non-MIL Emissions Neutral Diagnostic
		EEPROM Failure - Each EEPROM block contains a checksum value, if the contents of the EEPROM Block do not evaluate to their corresponding checksum, three attempts to write to EEPROM and to read correct value written will occur before setting the DTC.	Evaluated Checksum for EEPROM Block	≠ Predefined Checksum Value	Vehicle Power Mode: Supply Voltage Virtual Network condition B101D_36_ENABLE	= Any = 9 – 16V = Any Virtual Network that the ECU participates in is active. ≠ disabled	The EEPROM Test algorithm will run once at Power up until it completes. Takes 0.02 s	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Electronic Failure - FLASH & RAM ECC check verifies correct operation of ECC functionality in memory, if check at power cycle fails or at some point in time during runtime an error is detected in FLASH & RAM ECC registers then the DTC is set. ALU check tests its integrity by performing several operations and verifying the result is correct, if at some point a result proves to be incorrect then the DTC is set. REGISTER check tests the registers integrity, verifying the success of the reading/writing process. If at any register the verification proves		Fault Detected	Vehicle Power Mode: Supply Voltage Virtual Network condition B101D_39_ENABLE	= RUN = 9 – 16V = Any Virtual Network that the ECU participates in is active. ≠ disabled	FLASH ECC check is tested at each power cycle and at runtime each 0.01 s RAM ECC check is tested at each power cycle and at runtime each 0.01 s ALU check is tested at each power cycle REGISTER	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Internal Communications Failure between micro processors	At startup VuC allows 50 seconds for iMx to begin communication, if no communication starts within 50 seconds then the DTC is set. This DTC can only be set during startup.	Fault Detected	Vehicle Power Mode: Supply Voltage Virtual Network condition B101D_3C_ENABLE	= RUN = 9 – 16V = Any Virtual Network that the ECU participates in is active. ≠ disabled	50 s	Safety Non-MIL Emissions Neutral Diagnostic
Electronic Control Unit Software	B101E	Calibration Data Set Not Programmed The emissions neutral default action for all diagnostics under DTC B101E is to disable adaptive cruise control and/or Super Cruise	Default Calibrations Stored. This is checked by verifying a specific signature is written at calibration section	Memory location is Set to 0xFF or Calibration signature is not present	Vehicle Power Mode: Supply Voltage Virtual Network condition B101E_42_ENABLE	= RUN = 9 – 16V = Any Virtual Network that the ECU participates in is active. ≠ disabled	Once at power-up	Safety Non-MIL Emissions Neutral Diagnostic
Map Data Programming	B126B	The map data is not up to date The emissions neutral default action for all diagnostics under DTC B126B is to disable adaptive cruise control and/or Super Cruise	(current date) - (last successful map update)	>= calibration attribute MaxMapAge (6 months)	Vehicle Power Mode: VN Activation Conditions: Supply Voltage Virtual Network condition B126B_ENABLE	= RUN COMM_ENABLE=HIGH = 9 – 16V = Any Virtual Network that the ECU participates in is active. ≠ disabled	The map age verification algorithm will RUN once on Power Up until it completes.	Safety Non-MIL Emissions Neutral Diagnostic
Control Module Power Circuit	B1325	Voltage Below Threshold The emissions neutral default action for all diagnostics under DTC B1325 is to disable adaptive cruise control and/or Super Cruise	V Supply (V Batt)	= 9.0V (+/- 0.5 V)	Vehicle Power Mode: Virtual Network condition B1325_03_ENABLE	= RUN = Any Virtual Network that the ECU participates in is active. ≠ disabled	After 10 ms of voltage transition to undervoltage	Safety Non-MIL Emissions Neutral Diagnostic
		Voltage Above Threshold	V Supply (V Batt)	= 16.0V (+/- 0.5 V)	Vehicle Power Mode: Virtual Network condition B1325_07_ENABLE	= RUN = Any Virtual Network that the ECU participates in is active. ≠ disabled	After 10 ms of voltage transition to overvoltage	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Object Detection CAN Bus Off	U0075	The following messages are not received on CAN Bus: $260 - PPS_ElevHdSpd_FO $261 - PPS_PosLat_FO $262 - PPS_PosLong_FO $263 - PPS_SigAcqTime_FO $264 - PPS_Time_FO $265 - PPS_QualMetrics_FO $308 - F_Vehicle_Path_Estimate $A1 - F_Master_Time_Sync The following message are not sent on CAN Bus: $604 - ADAS_Position_FO $605 - ADAS_Segment_FO $606 - ADAS_Stub_FO $607 - ADAS_Profile_Long_FO $608 - ADAS_Profile_Short_FO $609 - ADAS_Metadata_FO $60A - ADAS_Protection_FO $60B - ADAS_Profile_Long2_FO $60C - ADAS_Profile_Short2_FO The emissions neutral default action for all diagnostics under DTC U0075 is to disable adaptive cruise control and/or Super Cruise	Can bus off is detected on Can Bus	Fault Detected	Vehicle Power Mode: Virtual Network condition ECU_COMM_Active U0075_00_ENABLE DTC U023B	= OFF, RUN, ACCESSORY = Any Virtual Network that the ECU participates in is active. = enabled ≠ disabled = not active	CAN bus off condition is monitored each 1 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Active Safety Control Module 2	U023B	The following messages are not recieved from EOCM2A $260 - PPS_ElevHdSpd_FO $261 - PPS_PosLat_FO $262 - PPS_PosLong_FO $263 - PPS_SigAcqTime_FO $264 - PPS_Time_FO $265 - PPS_QualMetrics_FO $308 - F_Vehicle_Path_Estimate $A1 - F_Master_Time_Sync The emissions neutral default action for all diagnostics under DTC U023B is to disable adaptive cruise control and/or Super Cruise	There is a window of 250ms in which no PPS_ CAN message has been received by AMM or no PPS_ CAN message was received by AMM during 1st 5 seconds after boot up	Fault Detected	Non OBD Control Modules: Vehicle Power Mode condition: OBD Control Modules: Accessory Wake Up Virtual Network condition: Exceptions: • U023B_00_ENABLE = disabled; however, failsoft actions shall still be taken if failure conditions are met. • When the Bus Off events counter, used in the X of Y debounce strategy is > 0, • When a bus off condition (U0075) is current, these Lost Communications DTCs shall not set but the failsoft action shall occur if conditions to set the DTC are met. • The conditions listed in Inhibiting Storage of “Lost Communication with” DTCs section are not active	=RUN =Active =Any Module Active	After 0.250 s of AMM receiving last PPS_ CAN message	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Calibration Data Not Learned - Calibration Not Learned	B1008	At power on and also for every 50ms, the Camera Calibration is not yet finished either at EOL / Service Station or Camera is out of Alignment. The emissions neutral default action for all diagnostics under DTC B1008 is to disable adaptive cruise control and/or Super Cruise	System verification complete latch not set in nvm	Fault Detected	Supply Voltage: 9 – 16V B1008_4B_ENABLE = Enabled Virtual Network condition: Any Virtual Network that the ECU participates in is active. Manufacturer Enable Counter(MEC) shall be ZERO	Vehicle Power Mode: RUN	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
System Disabled Information Stored	B1011	When the feature is enabled. Feature Diagnostics will only be performed if the FCM has determine there are no major faults with the system such as memory failures, VIN miss-match, Vehicle Specific Calibrations are not flashed. The DTC will be set when there is any disabled information available. The emissions neutral default action for all diagnostics under DTC B1011 is to disable adaptive cruise control and/or Super Cruise	1) FCM is in FAULT state 2) Fail safe condition for LKA is exists 3) EyeQ CRC Failed 4) Old Ego data fault present 5) Thermal Shutdown 6) Camera Blockage detected 7) Battery voltage out of operating range	Fault Detected	Supply Voltage: 9 – 16V B1011_00_ENABLE = Enabled Virtual Network condition: Any Virtual Network that the ECU participates in is active.	Vehicle Power Mode: RUN	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
Vehicle Identification Number Information -	B1015	Once at power up, any digit of the programmed VIN does not match the digits of the VIN transmitted over the GMLAN. In addition, the VIN numbers programmed in EEPROM are NOT all 0xFF's. The emissions neutral default action for all diagnostics under DTC B1015 is to disable adaptive cruise control and/or Super Cruise	VIN Mismatch	5 times from the poweron out of first 5 receptions	Supply Voltage: 9 – 16V B1015_00_ENABLE = Enabled Virtual Network condition: Any Virtual Network that the ECU participates in is active.	Vehicle Power Mode: RUN	1.3 s	Safety Non-MIL Emissions Neutral Diagnostic
Electronic Control Unit Hardware	B101D	RAM Failure - The RAM Test Algorithm will cycle through the RAM memory map and verify each bit within each byte of RAM is valid. This is accomplished by writing $AA, then reading the value back, if the value is not $AA the DTC will set. If the value is $AA the algorithm will write $55, then read the value back, if the value is not $55 the DTC will set. The emissions neutral default action for all diagnostics under DTC B101D is to disable adaptive cruise control and/or Super Cruise	At power-on all of the MCUs RAM is tested. After this initialization test a continuous RAM diagnostic check is done periodically	Fault Detected	Supply Voltage: 9 – 16V B101D_34_ENABLE = Enabled Virtual Network condition: Any Virtual Network that the ECU participates in is active.	Vehicle Power Mode: Any	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		ROM Failure - The Flash Test Algorithm will cycle through the Flash memory map, byte by byte. The algorithm will sum each byte, this includes the checksum written by the GM CANflash 4.0 utility. If the sum is not (0) then the DTC is set.	Computed CRC of Application flash memory segement does not matches prestored application CRC	Fault Detected	Supply Voltage: 9 – 16V B101D_35_ENABLE = Enabled Virtual Network condition: Any Virtual Network that the ECU participates in is active.	Vehicle Power Mode: Any	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
		EEPROM Failure - Each EEPROM block contains a checksum value, if the contents of the EEPROM Block do not evaluate to the corresponding checksum, three attempts to write to EEPROM will occur before setting the DTC.	CRC check of calibration info stored in NVM failed	Fault Detected	Supply Voltage: 9 – 16V B101D_36_ENABLE = Enabled Virtual Network condition: Any Virtual Network that the ECU participates in is active.	Vehicle Power Mode: Any	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Electronic Failure - If the Camera Fails: No I2C communication between the Imager and Vision Processing Engine then the DTC is set. If there is HW or SW issues in the ECU.	I2C Communication is tested in Powerup. Memory Diagnostics are run on Powerup. VPE running reset at every 0.1 s. FCM running reset at every 0.1 s.	Fault Detected	Supply Voltage: 9 – 16V B101D_39_ENABLE = Enabled Virtual Network condition: Any Virtual Network that the ECU participates in is active.	Vehicle Power Mode: Any	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Communications Failure - No interprocessor communication.	At startup allow 50 seconds for communication to begin, if no communication starts after 50 seconds set this DTC. Periodic messages are monitored throughout the ignition cycle and if messages stop for longer than 50s this DTC is set.	Fault Detected	Supply Voltage: 9 – 16V B101D_3C_ENABLE = Enabled Virtual Network condition: Any Virtual Network that the ECU participates in is active.	Vehicle Power Mode: Any	50 s	Safety Non-MIL Emissions Neutral Diagnostic
Electronic Control Unit Software	B101E	Calibration Data Set Not Programmed The emissions neutral default action for all diagnostics under DTC B101E is to disable adaptive cruise control and/or Super Cruise	Default calibrations are still stored. System verification complete latch not set in nvmand	Fault Detected	Supply Voltage: 9 – 16V B101E_42_ENABLE = Enabled Virtual Network condition: Any Virtual Network that the ECU participates in is active. Manufacturer Enable Counter(MEC) shall be ZERO	Vehicle Power Mode: RUN	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
		VIN Not Programmed	VIN stored in EEPROM contains all bytes with 0xFF.	Once at Power up. Fault Detected	Supply Voltage: 9 – 16V B101E_47_ENABLE = Enabled Virtual Network condition: Any Virtual Network that the ECU participates in is active. Manufacturing Defaults Calibrations: NOT present Manufacturer Enable Counter(MEC) shall be ZERO	Vehicle Power Mode: RUN	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
Electronic Control Unit Supply Voltage	B1325	Voltage Below Threshold - The Supply Voltage is below the Normal Operating threshold value, more than 1s. The emissions neutral default action for all diagnostics under DTC B1325 is to disable adaptive cruise control and/or Super Cruise	The Voltage Monitoring algorithm runs every 10ms. Power Supply. Under Specified Voltage Range	Vbatt <9.0V (+/- 0.5 V)	B1325_03_ENABLE = Enabled Virtual Network condition: Any Virtual Network that the ECU participates in is active.	Vehicle Power Mode: RUN	1.1 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Voltage Above Threshold - The Supply Voltage is Above the Normal Operating threshold value, more than 1s.	The Voltage Monitoring algorithm runs every 10ms. Power Supply. Over Specified Voltage Range	Vbatt >16.0V (+/- 0.5 V)	B1325_07_ENABLE = Enabled Virtual Network condition: Any Virtual Network that the ECU participates in is active.	Vehicle Power Mode: RUN	0.25 s	Safety Non-MIL Emissions Neutral Diagnostic
Object Detection CAN Bus Off -	U0075	When the Transmit Error Counter (TEC) exceeds 255 , the GMLAN handler notifies the application of a bus off condition by using a callback function. This callback function is launched by the handler whenever a bus off condition is reported by the CAN-controller. A routine checks every 1000ms if a Bus Off condition is present. If the number of Bus Off events exceeds a calibratable threshold of a calibratable number of consecutive tests, i.e. an X (=5) of Y (=5) algorithm, then the Bus Off fault code is set. The emissions neutral default action for all diagnostics under DTC U0075 is to disable adaptive cruise control and/or Super Cruise	Monitored continuously while GMLAN frames are being transmitted. Upon notification of bus off condition (passed up to the application from the handler), the algorithm checks for this condition every 1000ms.	Fault Detected	Virtual Network condition: Any Virtual Network that the module participates in is active ECU Operational condition: While in the ECU_COMM_Active state U0075_00_ENABLE = Enabled Exception: The conditions listed in Inhibiting Storage of “Lost Communication with” DTCs section are not active.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN	0.16 s	Safety Non-MIL Emissions Neutral Diagnostic
Control Module Communication FlexRay Bus Off	U007E	The FlexRay handler detects whether the FelxRay bus exhibits any of the following failures: - Short to ground - Short to Vbatt - Short of Bus lines The emissions neutral default action for all diagnostics under DTC U007E is to disable adaptive cruise control and/or Super Cruise	Fault passed through by handler	Fault Detected	Supply Voltage: 9 – 16V FlexRay bus is synchronized and camera is communicating on FlexRay bus. No FlexRay bus errors are present. U007E_00_ENABLE = Enabled	Vehicle Power Mode: RUN	0.16 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Active Safety Control Module 1	U023A	Upon notification by the handler that associated supervised signal has failed supervision. A calibrateable debounce time, i.e. X (=5) of Y (=5) strategy, is permitted at the time that notification of failed supervision has been received by the application to delay storing of DTC The emissions neutral default action for all diagnostics under DTC U023A is to disable adaptive cruise control and/or Super Cruise	Monitored continuously while GMLAN frames are being transmitted. Upon notification of supervision timeout (passed up to the application from the handler).	Fault Detected	Exceptions: • There shall be an enable/disable flag for each DTC listed in the table below that the module supports. DTC setting for that DTC # shall be disabled if its flag, U023A_00_ENABLE = disabled; however, failsoft actions shall still be taken if failure conditions are met. • When the Bus Off events counter, used in the X of Y debounce strategy is > 0, • When a bus off condition U0075 is current, these Lost Communications DTCs shall not set but the failsoft action shall occur if conditions to set the DTC are met. • The conditions listed in Inhibiting Storage of “Lost Communication with” DTCs section are not active	Non OBD Control Modules: Vehicle Power Mode condition: RUN OBD Control Modules: Accessory Wake Up: Active Virtual Network condition: Any Virtual Network that the module participates in is active.	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
		Invalid Serial Data Received	When VIS2 module receives any of the message which is transmitted by Active safety control module as invalid for 0.1 s.	Fault Detected	Exceptions: • There shall be an enable/disable flag for each DTC listed in the table below that the module supports. DTC setting for that DTC # shall be disabled if its flag, U023A_71_ENABLE = disabled; however, failsoft actions shall still be taken if failure conditions are met. • When the Bus Off events counter, used in the X of Y debounce strategy is > 0, • When a bus off condition U0075 is current, these Lost Communications DTCs shall not set but the failsoft action shall occur if conditions to set the DTC are met. • The conditions listed in Inhibiting Storage of “Lost Communication with” DTCs section are not active	Non OBD Control Modules: Vehicle Power Mode condition: RUN OBD Control Modules: Accessory Wake Up: Active Virtual Network condition: Any Virtual Network that the module participates in is active.	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Alive Counter Incorrect / Not Updated	When VIS2 module receives invalid rolling count in any of the message which is transmitted by Active safety control module consecutively for 2 times.	Fault Detected	Exceptions: • There shall be an enable/disable flag for each DTC listed in the table below that the module supports. DTC setting for that DTC # shall be disabled if its flag, U023A_72_ENABLE = disabled; however, failsoft actions shall still be taken if failure conditions are met. • When the Bus Off events counter, used in the X of Y debounce strategy is > 0, • When a bus off condition U0075 is current, these Lost Communications DTCs shall not set but the failsoft action shall occur if conditions to set the DTC are met. • The conditions listed in Inhibiting Storage of “Lost Communication with” DTCs section are not active	Non OBD Control Modules: Vehicle Power Mode condition: RUN OBD Control Modules: Accessory Wake Up: Active Virtual Network condition: Any Virtual Network that the module participates in is active.	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
		Value of Signal Protection Calculation Incorrect	When VIS2 module receives invalid checksum value in any of the message which is transmitted by Active safety control module consecutively for 2 times.	Fault Detected	Exceptions: • There shall be an enable/disable flag for each DTC listed in the table below that the module supports. DTC setting for that DTC # shall be disabled if its flag, U023A_74_ENABLE = disabled; however, failsoft actions shall still be taken if failure conditions are met. • When the Bus Off events counter, used in the X of Y debounce strategy is > 0, • When a bus off condition U0075 is current, these Lost Communications DTCs shall not set but the failsoft action shall occur if conditions to set the DTC are met. • The conditions listed in Inhibiting Storage of “Lost Communication with” DTCs section are not active	Non OBD Control Modules: Vehicle Power Mode condition: RUN OBD Control Modules: Accessory Wake Up: Active Virtual Network condition: Any Virtual Network that the module participates in is active.	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Active Safety Control Module 1	U053B	The FlexRay handler detects any out-of-range value of a received signal in a PDU. The emissions neutral default action for all diagnostics under DTC U053B is to disable adaptive cruise control and/or Super Cruise	Out of Range PDU Messages Diagnoised by FlexRay Handler	Fault Detected	Supply Voltage: 9 – 16V U053B_00_ENABLE = Enabled	Vehicle Power Mode: RUN FlexRay bus is synchronized and camera is communicating on FlexRay bus No FlexRay bus errors are present	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
		Alive Counter Incorrect / Not Updated	When a rolling count signal within a given PDU fails to comply with the expect sequence within a window as explained below: In the X out of Y sliding error window for rolling count, Y shall be maximum value of 16 and X shall be a calibratible with default value as 3. A failure is set when X/Y rolling count mismatches are present within the current window.	Fault Detected	Supply Voltage: 9 – 16V U053B_72_ENABLE = Enabled	Vehicle Power Mode: RUN FlexRay bus is synchronized and camera is communicating on FlexRay bus No FlexRay bus errors are present	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
		Value of Signal Protection Calculation Incorrect	When the received checksum within a given PDU fails to match the calculated checksum within a given window as explained below: In the X out of Y sliding error window for checksum, Y shall be maximum value of 16 and X shall be a calibratible with default value as 3. A failure is set when X/Y checksum mismatches are present within the current window.	Fault Detected	Supply Voltage: 9 – 16V U053B_74_ENABLE = Enabled	Vehicle Power Mode: RUN FlexRay bus is synchronized and camera is communicating on FlexRay bus No FlexRay bus errors are present	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
Invalid Data Received From Active Safety Control Module 2	U053C	The FlexRay handler detects any out-of-range value of a received signal in a PDU. The emissions neutral default action for all diagnostics under DTC U053C is to disable adaptive cruise control and/or Super Cruise	Out of Range PDU Messages Diagnoised by FlexRay Handler	Fault Detected	Supply Voltage: 9 – 16V U053C_00_ENABLE = Enabled	Vehicle Power Mode: RUN FlexRay bus is synchronized and camera is communicating on FlexRay bus No FlexRay bus errors are present	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
		Alive Counter Incorrect / Not Updated	When a rolling count signal within a given PDU fails to comply with the expect sequence within a window as explained below: In the X out of Y sliding error window for rolling count, Y shall be maximum value of 16 and X shall be a calibratible with default value as 3. A failure is set when X/Y rolling count mismatches are present within the current window.	Fault Detected	Supply Voltage: 9 – 16V U053C_72_ENABLE = Enabled	Vehicle Power Mode: RUN FlexRay bus is synchronized and camera is communicating on FlexRay bus No FlexRay bus errors are present	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Value of Signal Protection Calculation Incorrect	When the received checksum within a given PDU fails to match the calculated checksum within a given window as explained below: In the X out of Y sliding error window for checksum, Y shall be maximum value of 16 and X shall be a calibratible with default value as 3. A failure is set when X/Y checksum mismatches are present within the current window.	Fault Detected	Supply Voltage: 9 – 16V U053C_74_ENABLE = Enabled	Vehicle Power Mode: RUN FlexRay bus is synchronized and camera is communicating on FlexRay bus No FlexRay bus errors are present	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
Lost Communication with Active Safety Control Module 1 on Flexray Bus	U18CA	The FlexRay handler detects whether a PDU from the EOCM node has been received within 2.5 * FlexRay frame periodic rate. When Signal Supervision Failure occurs for a PDU, the FlexRay handler will notify the module application code of the PDUfailure via callback. The emissions neutral default action for all diagnostics under DTC U18CA is to disable adaptive cruise control and/or Super Cruise	Missing PDU Messages Diagnoised by FlexRay Handler	Fault Detected	Supply Voltage: 9 – 16V U18CA_00_ENABLE = Enabed	Vehicle Power Mode: RUN FlexRay bus is synchronized and camera is communicating on FlexRay bus No FlexRay bus errors are present	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
Lost Communication with Active Safety Control Module 2 on Flexray Bus	U18CB	The FlexRay handler detects whether a PDU from the EOCM node has been received within 2.5 * FlexRay frame periodic rate. When Signal Supervision Failure occurs for a PDU, the FlexRay handler will notify the module application code of the PDUfailure via callback. The emissions neutral default action for all diagnostics under DTC U18CB is to disable adaptive cruise control and/or Super Cruise	Missing PDU Messages Diagnoised by FlexRay Handler	Fault Detected	Supply Voltage: 9 – 16V U18CB_00_ENABLE = Enabled	Vehicle Power Mode: RUN FlexRay bus is synchronized and camera is communicating on FlexRay bus No FlexRay bus errors are present	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.

ECU Hardware Performance - Internal Malfunction	B101D	This diagnoistic monitors the internal power supply from the IMX6 processor to ensure they ar within acceptable range of operation. The voltage level is read by ADC and available through a HWIO interface.
		
		The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise
			IMX6 processor is fed multiple voltages by an onboard power supply. DTC is set if these power supplies are out of range for a predefined sliding window.
			
			Fault set if:
			
			0.75 V Suply
			
			1.3 V Supply
			
			3.3 V Supply
			
			1.425 V Supply
				
				Min. Threshold = 0.70879V, Max. Threshold = 0.79079V
				
				Min. Threshold = 1.25V, Max. Threshold = 1.35V
				
				Min. Threshold = 3.07V, Max. Threshold = 3.43V
				
				Min. Threshold = 1.32V, Max. Threshold = 1.48V
					Diganoistic is Enabled
					
					If (Configuration for Low Voltage Enablement is FALSE), diagnoistic will not consider low voltage condition and run regardless of battery monitor voltage.
					
					If (Configuration for Low Voltage Enablement is TRUE), then the diagnoistic will NOT run when the battery monitor votlage is < 5.5 voltage
					
					Diagnoistic System is not in State of Reset. This includes:
					-Code Clear in Process
					-End of Trip Processing
					-Diagnoistic Re-enable in Process
						= TRUE	0.1 seconds out of a 0.2 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Front Camera System Status Message Counter Incorrect	B2B19	Monitor Indicates invalid or out of date data was received from the Front Camera System on the FlexRay Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise	Monitors the Front Camera Stauts Message for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter. Monitored for "Lane_Det_Header" message	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage Burst ARC Check Diagnostic Enabled Signal Relivent protocol data unit (PDU) mask is Complete Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = TRUE = TRUE	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Front Camera Lane Marker Data Message Counter Incorrect	B2B1A	Monitor indicates invalid or out of date lane marking data was received from the Front Camera System on the FlexRay Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors the Front Camera Lane Marking Data Message for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter. Monitored for "System_Header" message	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage Burst ARC Check Diagnostic Enabled Signal Relivent protocol data unit (PDU) mask is Complete Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = TRUE = TRUE	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Front Camera Object Data Message Counter Incorrect	B2B1B	Monitor indicates invalid or out of date Object data was received from the Front Camera System on the FlexRay Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors the Front Camera Object Message for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter. Monitored for "Obj_Det_Header" message	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage Burst ARC Check Diagnostic Enabled Signal Relivent protocol data unit (PDU) mask is Complete Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = TRUE = TRUE	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Long Range Radar Object Data Message Counter Incorrect	B2B1C	Monitor indicates invalid or out of date Object data was received from the Long Range Radar on the FlexRay Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors the Long Range Radar Object Message for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter. Monitored for "F_LRR_Object_Header" message	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage Burst ARC Check Diagnostic Enabled Signal Relivent protocol data unit (PDU) mask is Complete Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = TRUE = TRUE	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Left Front Short Range Radar Object Data Message Counter Incorrect	B2B1D	Monitor indicates invalid or out of date Object data was received from the Long Left Front Short Range Radar on the FlexRay Bus. The emissions neutral default action is stop consuming radar information into the control systems.	Monitors the Left Front Short Range Radar Object Message for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter. Monitored for "LF_LRR_Object_Header " message	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage Burst ARC Check Diagnostic Enabled Signal Relivent protocol data unit (PDU) mask is Complete Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = TRUE = TRUE	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Right Front Short Radar Object Data Message Counter Incorrect	B2B1E	Monitor indicates invalid or out of date Object data was received from the Right Front Short Range Radar on the FlexRay Bus. The emissions neutral default action is stop consuming radar information into the control systems	Monitors the Left Front Short Range Radar Object Message for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter. Monitored for "RF_LRR_Object_Header " message	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage Burst ARC Check Diagnostic Enabled Signal Relivent protocol data unit (PDU) mask is Complete Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = TRUE = TRUE	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Left Rear Short Radar Object Data Message Counter Incorrect	B2B1F	Monitor indicates invalid or out of date Object data was received from the Left Rear Short Range Radar on the FlexRay Bus. The emissions neutral default action is stop consuming radar information into the control systems.	Monitors the Left Front Short Range Radar Object Message for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter. Monitored for "LR_LRR_Object_Header " message	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage Burst ARC Check Diagnostic Enabled Signal Relivent protocol data unit (PDU) mask is Complete Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = TRUE = TRUE	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Right Rear Short Radar Object Data Message Counter Incorrect	B2B20	Monitor indicates invalid or out of date Object data was received from the Right Rear Short Range Radar on the FlexRay Bus. The emissions neutral default action is stop consuming radar information into the control systems.	Monitors the Left Front Short Range Radar Object Message for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter. Monitored for "RR_LRR_Object_Header "message	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage Burst ARC Check Diagnostic Enabled Signal Relivent protocol data unit (PDU) mask is Complete Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = TRUE = TRUE	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Center Rear Short Radar Object Data Message Counter Incorrect	B2B21	Monitor indicates invalid or out of date Object data was received from the Center Rear Short Range Radar on the FlexRay Bus. The emissions neutral default action is stop consuming radar information into the control systems.	Monitors the Left Front Short Range Radar Object Message for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter. Monitored for "R_LRR_Object_Header" message	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage Burst ARC Check Diagnostic Enabled Signal Relivent protocol data unit (PDU) mask is Complete Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = TRUE = TRUE	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Read Only Memory Performance	P0601	Monitors the performance of the Read Only Memory. This includes the non-volatile boot, code, or calibration memory. A Cyclic redundancy check, and Sinlg Bit ROM check is used. This diagnostic detects if the Compressor HV Voltage sensor has an out of range high circuit fault. If the enable conditions are met and compressor has detected an instantaneous out of range high fault on the sensor, the fail counter will increment. If the calibrated fail count threshold is met before the calibrated sample count, the diagnostic will report a FAIL and if not it will report a PASS. The diagnostic will continue to report as long as the enablement conditions are met. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When the cyclical redundancy check is invalid, the fault flag is set to TRUE and the fail counter increments	Fail Counter > 5		The CRC diagnostic will run anytime there is sufficient processor throughput to allow execution of background task		Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			For Single Bit ROM Errors, the fault fault is to TRUE and the fail counter is increased	Fail Counter > 5	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	Diagnoistic System is not in State of Reset.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Not Programmed	P0602	Indicates the EOCM needs to be programmed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	This DTC is set via calibration, when KeIDND_b_NoStartCal	=TRUE	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	Diagnoistic System is not in State of Reset.	1 second	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Long Term Memory Reset	P0603	Data was lost from Non-Volatile Memory. Could be due to failure of flash, NVM memory failure, first time power up if the shut down was interrupted. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Non-volatile memory (static or dynamic) checksum failure at Powerup	= TRUE	Controller Initialize	= Complete	Once during start-up	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Random Access Memory Performance	P0604	If there is a failure in these types in RAM: Secondary, System, Cache, eTUP The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Indicates that control module is unable to correctly write and read data to and from: - RAM - Cached RAM - TPU RAM	Detects data read does not match data written >= = 3 counts = 3 counts = 3 counts	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	Diagnoistic System is not in State of Reset.	= 2,000.00 mseconds	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	= 0.175 seconds				
			Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	= 65,534 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Processor Performance	P0606	Indicates that the EOCM has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	If any of the following fault occurs: - ROM completion fault (reported to PISR from MPMR) - ALU fault - Configuration Registers fault - Stack fault - Analog to Digital Converter fault - Secondary processor detected Main processor CPU State of Health fault - DMA transfer fault - Missing T0 task's motor control related duty cycle event fault - Lockstep fault - Secondary processor not running Seed/Key test - Secondary processor fails to take remedial action - Secondary processor received incorrect keys - Main processor detected Seed/Key timeout - Main processor detected seeds received in wrong order		Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process And the Run/Crank Voltages are not low.	Diagnoistic System is not in State of Reset. > 10.0 V	The diagnoistic operates every 12.5 msec	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Long Term Memory Performance	P062F	This diagnostic runs test for non-volatile memory performance diagnostic. Checks if Assembly Cals are defaulted or non-volatile memory Handler is unable to commit to flash in the future due to memory errors. Typically this means that the controller has run out of flash blocks for storing the data (the total erase/write cycles for each block has been exceeded. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When BINVDM region needs to be copied but cannot be VeMEMR_b_BINVDM_CannotCopy	= TRUE		To be run during NVM Handler control task	Runs every 100 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			When there is an assembly calibration failure reported by HWIO at initialization. Ve MEMD_b_AsyCalFail	= TRUE		To be run during NVM Handler control task	Runs every 100 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Monitor Control Module Serial Peripheral Interface Bus 2	P16E9	This diagnoistic monitors for Interprocessor communications (Between K1, K2, IMX Processor) The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When it detects SPI communication fault as indicated between any two micros (K1,K2,IMX) in EOCM2	A fault is detected for 8 out of 16 samples	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process AND No error parsing Serial Perpheral Interface Data		0.04 seconds out of a 0.08 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Monitor Control Module Serial Peripheral Interface Bus 1	P16F0	This diagnoistic monitors for Interprocessor communications (Between K1, K2, IMX Processor) The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When it detects SPI communication fault as indicated between any two micros (K1,K2,IMX) in EOCM2	A fault is detected for 8 out of 16 samples	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process AND No error parsing Serial Perpheral Interface Data		0.04 seconds out of a 0.08 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Engine Control Module "A"	U0100	This DTC is set by the EOCM when signal supervision by the EOCM on the Engine Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $0C9 Message $1CF Message $3E9 Message $3F9	 > 0.5 seconds > 5.0 seconds > 5.0 seconds > 12.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Transmission Control Module	U0101	This DTC is set by the EOCM when signal supervision by the EOCM on the Tramission Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $1F5	> 1.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Body Control Module	U0140	This DTC is set by the EOCM when signal supervision by the EOCM on the Body Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $135 Message $120 Message $12A Message $139 Message $140 Message $1F1 Message $4E1 Message $514	 > 5.0 seconds > 200.0 seconds > 5.0 seconds > 5.0 seconds > 40.0 seconds > 5.0 seconds > 40.0 seconds > 40.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Telematic Control Module	U0198	This DTC is set by the EOCM when signal supervision by the EOCM on the Telematic Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $260 Message $261 Message $262 Message $263 Message $264 Message $265	 > 10.0 seconds > 10.0 seconds > 10.0 seconds > 10.0 seconds > 10.0 seconds > 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Frontview Camera Module	U026A	This DTC is set by the EOCM when signal supervision by the EOCM on Frontview Camera Module failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $350 Message $351 Message $352 Message $353 Message $354 Message $355 Message $356	 > 3.0 seconds > 3.0 seconds > 3.0 seconds > 3.0 seconds > 3.0 seconds > 3.0 seconds > 3.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_FOCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Telematics Communication Interface Control Module	U0499	Indicates invalid or out dated data was received from the Telematics Communication Interface Control module The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on HE CAN Bus any of the following messages: $260, $261, $262, $263, $264, or $265.	6 out of 10 failures of ARC or Checksum on any frame	HE Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.6 seconds out of a 1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Frontview Camera Module	U056B	Indicates invalid or out dated data was received from the Frontview Camera Module. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on Front Object CAN Bus any of the following messages: $350, $351, $352, $353, $354, $355 or $356.	6 out of 10 failures of ARC or Checksum on any frame	FO Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.36 seconds out of a 0.6 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Digital Map Module	U1067	This DTC is set by the EOCM when signal supervision by the EOCM on Digital Map Module failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $604 Message $605 Message $606 Message $607 Message $608 Message $609 Message $60A Message $60B Message $60C	 > 1.0 seconds > 1.0 seconds > 1.0 seconds > 1.0 seconds > 1.0 seconds > 1.0 seconds > 1.0 seconds > 1.0 seconds > 1.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_FOCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Video Processing Control Module on High Speed CAN Bus	U18C3	This DTC is set by the EOCM when signal supervision by the EOCM on Video Processing Module has failied. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $345 Message $346 Message $347	 > 5.0 seconds > 5.0 seconds > 5.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Digital Map Control Module	U2511	Indicates invalid or out dated data was received from the Digital Map Control Module. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Alive Rolling Counter or Checksum error on Front Object CAN Bus on messages: $604, $605, $606, $607, $608, $609, $60A, $60B, or $60C	6 out of 10 failures of ARC or Checksum on any frame	FO Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.12 seconds out of a 0.2 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Video Processing Control Module	U2512	Indicates invalid or out dated data was received from the Video Processing Control Module. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Alive Rolling Counter or Checksum error on High Speed Object CAN Bus on messages: $345, $346, or $347.	6 out of 10 failures of ARC or Checksum on any frame	FO Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.6 seconds out of a 1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Moduel - Data Memory Failure	U3000	RAM Image Corruption Test: this diagnostic performs a CRC check of the application software and calibration images located in ECU RAM. The images are copied from ECU ROM into RAM during initialization. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When the running RAM image Cyclic Redundancy Check checksum does not match the Cyclic Redundancy Check checksum stored in RAM	RAM Checksum ≠ Calculated Checksum	Diagnostic will run anytime there is sufficient processor throughput to allow execution of background tasks. Diagnoistic Enabled	= 1.0 (1 = TRUE)	Immediately Upon Fault Detection	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			When the running RAM image Cyclic Redundancy Check checksum does not match the Cyclic Redundancy Check checksum stored in ROM	ROM Checksum ≠ Calculated Checksum	Diagnostic will run anytime there is sufficient processor throughput to allow execution of background tasks. Diagnoistic Enabled	= 1.0 (1 = TRUE)	Immediately Upon Fault Detection	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.

ECU Hardware Performance - Interal Malfunction	B101D	This diagnoistic monitors the internal power supply from the IMX6 processor to ensure they ar within acceptable range of operation. The voltage level is read by ADC and available through a HWIO interface.
		
		The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.
			IMX6 processor is fed multiple voltages by an onboard power supply. DTC is set if these power supplies are out of range for a predefined sliding window.
			
			Fault set if:
			
			0.75 V Suply
			
			1.3 V Supply
			
			3.3 V Supply
			
			1.425 V Supply
				
				Min. Threshold = 0.70879V, Max. Threshold = 0.79079V
				
				Min. Threshold = 1.25V, Max. Threshold = 1.35V
				
				Min. Threshold = 3.07V, Max. Threshold = 3.43V
				
				Min. Threshold = 1.32V, Max. Threshold = 1.48V
					Diganoistic is Enabled
					
					If (Configuration for Low Voltage Enablement is FALSE), diagnoistic will not consider low voltage condition and run regardless of battery monitor voltage.
					
					If (Configuration for Low Voltage Enablement is TRUE), then the diagnoistic will NOT run when the battery monitor votlage is < 5.5 voltage
					
					Diagnoistic System is not in State of Reset. This includes:
					-Code Clear in Process
					-End of Trip Processing
					-Diagnoistic Re-enable in Process
						= TRUE	0.1 seconds out of a 0.2 seconds window	. Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Front Camera System Status Message Counter Incorrect	B2B19	Monitor Indicates invalid or out of date data was received from the Front Camera System on the FlexRay Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors the Front Camera Stauts Message for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter. Monitored for "Lane_Det_Header" message	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage Burst ARC Check Diagnostic Enabled Signal Relivent protocol data unit (PDU) mask is Complete Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = TRUE = TRUE	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Front Camera Lane Marker Data Message Counter Incorrect	B2B1A	Monitor indicates invalid or out of date lane marking data was received from the Front Camera System on the FlexRay Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors the Front Camera Lane Marking Data Message for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter. Monitored for "System_Header" message	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage Burst ARC Check Diagnostic Enabled Signal Relivent protocol data unit (PDU) mask is Complete Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = TRUE = TRUE	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Front Camera Object Data Message Counter Incorrect	B2B1B	Monitor indicates invalid or out of date Object data was received from the Front Camera System on the FlexRay Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors the Front Camera Object Message for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter. Monitored for "Obj_Det_Header" message	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage Burst ARC Check Diagnostic Enabled Signal Relivent protocol data unit (PDU) mask is Complete Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = TRUE = TRUE	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Long Range Radar Object Data Message Counter Incorrect	B2B1C	Monitor indicates invalid or out of date Object data was received from the Long Range Radar on the FlexRay Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors the Long Range Radar Object Message for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter. Monitored for "F_LRR_Object_Header" message	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage Burst ARC Check Diagnostic Enabled Signal Relivent protocol data unit (PDU) mask is Complete Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = TRUE = TRUE	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Left Front Short Range Radar Object Data Message Counter Incorrect	B2B1D	Monitor indicates invalid or out of date Object data was received from the Long Left Front Short Range Radar on the FlexRay Bus. The emissions neutral default action is stop consuming radar information into the control systems	Monitors the Left Front Short Range Radar Object Message for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter. Monitored for “LF_SRR_Object_Header ” message	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage Burst ARC Check Diagnostic Enabled Signal Relivent protocol data unit (PDU) mask is Complete Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = TRUE = TRUE	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Right Front Short Radar Object Data Message Counter Incorrect	B2B1E	Monitor indicates invalid or out of date Object data was received from the Right Front Short Range Radar on the FlexRay Bus. The emissions neutral default action is stop consuming radar information into the control systems.	Monitors the Left Front Short Range Radar Object Message for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter. Monitored for “RF_SRR_Object_Header ” message	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage Burst ARC Check Diagnostic Enabled Signal Relivent protocol data unit (PDU) mask is Complete Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = TRUE = TRUE	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Left Rear Short Radar Object Data Message Counter Incorrect	B2B1F	Monitor indicates invalid or out of date Object data was received from the Left Rear Short Range Radar on the FlexRay Bus. The emissions neutral default action is stop consuming radar information into the control systems	Monitors the Left Front Short Range Radar Object Message for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter. Monitored for "LR_SRR_Object_Header" message	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage Burst ARC Check Diagnostic Enabled Signal Relivent protocol data unit (PDU) mask is Complete Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = TRUE = TRUE	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Right Rear Short Radar Object Data Message Counter Incorrect	B2B20	Monitor indicates invalid or out of date Object data was received from the Right Rear Short Range Radar on the FlexRay Bus. The emissions neutral default action is stop consuming radar information into the control systems.	Monitors the Left Front Short Range Radar Object Message for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter. Monitored for "RR_SRR_Object_Header" message	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage Burst ARC Check Diagnostic Enabled Signal Relivent protocol data unit (PDU) mask is Complete Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = TRUE = TRUE	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Center Rear Short Radar Object Data Message Counter Incorrect	B2B21	Monitor indicates invalid or out of date Object data was received from the Center Rear Short Range Radar on the FlexRay Bus. The emissions neutral default action is stop consuming radar information into the control systems	Monitors the Left Front Short Range Radar Object Message for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter. Monitored for “R_SRR_Object_Header” message	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage Burst ARC Check Diagnostic Enabled Signal Relivent protocol data unit (PDU) mask is Complete Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = TRUE = TRUE	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Read Only Memory Performance	P0601	Monitors the performance of the Read Only Memory. This includes the non-volatile boot, code, or calibration memory. A Cyclic redundancy check, and Sinlg Bit ROM check is used. This diagnostic detects if the Compressor HV Voltage sensor has an out of range high circuit fault. If the enable conditions are met and compressor has detected an instantaneous out of range high fault on the sensor, the fail counter will increment. If the calibrated fail count threshold is met before the calibrated sample count, the diagnostic will report a FAIL and if not it will report a PASS. The diagnostic will continue to report as long as the enablement conditions are met. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When the cyclical redundancy check is invalid, the fault flag is set to TRUE and the fail counter increments	Fail Counter > 5		The CRC diagnostic will run anytime there is sufficient processor throughput to allow execution of background task		Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			For Single Bit ROM Errors, the fault fault is to TRUE and the fail counter is increased	Fail Counter >5	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	Diagnoistic System is not in State of Reset.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Not Programmed	P0602	Indicates the EOCM needs to be programmed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	This DTC is set via calibration, when KeIDND_b_NoStartCal	=TRUE	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	Diagnoistic System is not in State of Reset.	1 second	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Long Term Memory Reset	P0603	Data was lost from Non-Volatile Memory. Could be due to failure of flash, NVM memory failure, first time power up if the shut down was interrupted. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Non-volatile memory (static or dynamic) checksum failure at Powerup	= TRUE	Controller Initialize	= Complete	Once during start-up	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Random Access Memory Performance	P0604	If there is a failure in these types in RAM: Secondary, System, Cache, eTUP. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Indicates that control module is unable to correctly write and read data to and from: - RAM - Cached RAM - TPU RAM	Detects data read does not match data written >= = 3 counts = 3 counts = 3 counts	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	Diagnoistic System is not in State of Reset.	= 2,000.00 mseconds	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	= 0.175 seconds				
			Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	= 65,534 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Processor Performance	P0606	Indicates that the EOCM has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	If any of the following fault occurs: - ROM completion fault (reported to PISR from MPMR) - ALU fault - Configuration Registers fault - Stack fault - Analog to Digital Converter fault - Secondary processor detected Main processor CPU State of Health fault - DMA transfer fault - Missing T0 task's motor control related duty cycle event fault - Lockstep fault - Secondary processor not running Seed/Key test - Secondary processor fails to take remedial action - Secondary processor received incorrect keys - Main processor detected Seed/Key timeout - Main processor detected seeds received in wrong order		Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process And the Run/Crank Voltages	Diagnoistic System is not in State of Reset. > 10.0 V	The diagnoistic operates every 12.5 msec	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Long Term Memory Performance	P062F	This diagnostic runs test for non-volatile memory performance diagnostic. Checks if Assembly Cals are defaulted or non-volatile memory Handler is unable to commit to flash in the future due to memory errors. Typically this means that the controller has run out of flash blocks for storing the data (the total erase/write cycles for each block has been exceeded. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When BINVDM region needs to be copied but cannot be VeMEMR_b_BINVDM_CannotCopy	= TRUE		To be run during NVM Handler control task	Runs every 100 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			When there is an assembly calibration failure reported by HWIO at initialization. Ve MEMD_b_AsyCalFail	= TRUE		To be run during NVM Handler control task	Runs every 100 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Monitor Control Module Serial Peripheral Interface Bus 2	P16E9	This diagnoistic monitors for Interprocessor communications (Between K1, K2, IMX Processor). The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When it detects SPI communication fault as indicated between any two micros (K1,K2,IMX) in EOCM2	A fault is detected for 8 out of 16 samples	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process AND No error parsing Serial Perpheral Interface Data		0.8 seconds out of a 1.6 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Monitor Control Module Serial Peripheral Interface Bus 1	P16F0	This diagnoistic monitors for Interprocessor communications (Between K1, K2, IMX Processor). The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When it detects SPI communication fault as indicated between any two micros (K1,K2,IMX) in EOCM2	A fault is detected for 8 out of 16 samples	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process AND No error parsing Serial Perpheral Interface Data		0.8 seconds out of a 1.6 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Engine Control Module "A"	U0100	This DTC is set by the EOCM when signal supervision by the EOCM on the Engine Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $0C9 Message $1CF Message $3E9 Message $3F9	 > 0.5 seconds > 5.0 seconds > 5.0 seconds > 12.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Transmission Control Module	U0101	This DTC is set by the EOCM when signal supervision by the EOCM on the Tramission Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $1F5	 > 1.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Body Control Module	U0140	This DTC is set by the EOCM when signal supervision by the EOCM on the Body Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $135 Message $120 Message $12A Message $139 Message $140 Message $1F1 Message $4E1 Message $514	 > 5.0 seconds > 200.0 seconds > 5.0 seconds > 5.0 seconds > 40.0 seconds > 5.0 seconds > 40.0 seconds > 40.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Telematic Control Module	U0198	This DTC is set by the EOCM when signal supervision by the EOCM on the Telematic Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $260 Message $261 Message $262 Message $263 Message $264 Message $265	 > 10.0 seconds > 10.0 seconds > 10.0 seconds > 10.0 seconds > 10.0 seconds > 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Frontview Camera Module	U026A	This DTC is set by the EOCM when signal supervision by the EOCM on Frontview Camera Module failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $350 Message $351 Message $352 Message $353 Message $354 Message $355 Message $356	 > 3.0 seconds > 3.0 seconds > 3.0 seconds > 3.0 seconds > 3.0 seconds > 3.0 seconds > 3.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_FOCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Telematics Communication Interface Control Module (ONSTAR)	U0499	Indicates invalid or out dated data was received from the Telematics Communication Interface Control module. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on HE CAN Bus any of the following messages: $260, $261, $262, $263, $264, or $265.	6 out of 10 failures of ARC or Checksum on any frame	HE Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.6 seconds out of a 1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Frontview Camera Module	U056B	Indicates invalid or out dated data was received from the Frontview Camera Module. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on Front Object CAN Bus any of the following messages: $350, $351, $352, $353, $354, $355 or $356. $260, $261, $262, $263, $264, or $265.	6 out of 10 failures of ARC or Checksum on any frame	FO Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.36 seconds out of a 0.6 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Digital Map Module	U1067	This DTC is set by the EOCM when signal supervision by the EOCM on Digital Map Module failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $604 Message $605 Message $606 Message $607 Message $608 Message $609 Message $60A Message $60B Message $60C	 > 1.0 seconds > 1.0 seconds > 1.0 seconds > 1.0 seconds > 1.0 seconds > 1.0 seconds > 1.0 seconds > 1.0 seconds > 1.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_FOCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Video Processing Control Module	U18C3	This DTC is set by the EOCM when signal supervision by the EOCM on Video Processing Module has failied. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $345 Message $346 Message $347	 > 5.0 seconds > 5.0 seconds > 5.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Digital Map Control Module	U2511	Indicates invalid or out dated data was received from the Digital Map Control Module. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Alive Rolling Counter or Checksum error on Front Object CAN Bus on messages: $604, $605, $606, $607, $608, $609, $60A, $60B, or $60C	6 out of 10 failures of ARC or Checksum on any frame	FO Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.12 seconds out of a 0.2 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Video Processing Control Module	U2512	Indicates invalid or out dated data was received from the Video Processing Control Module. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Alive Rolling Counter or Checksum error on High Speed Object CAN Bus on messages: $345, $346, or $347.	6 out of 10 failures of ARC or Checksum on any frame	FO Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.6 seconds out of a 1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Moduel - Data Memory Failure	U3000	RAM Image Corruption Test: this diagnostic performs a CRC check of the application software and calibration images located in ECU RAM. The images are copied from ECU ROM into RAM during initialization. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When the running RAM image Cyclic Redundancy Check checksum does not match the Cyclic Redundancy Check checksum stored in RAM	RAM Checksum ≠ Calculated Checksum	Diagnostic will run anytime there is sufficient processor throughput to allow execution of background tasks. Diagnoistic Enabled	 = 1.0 (1 = TRUE)	Immediately Upon Fault Detection	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			When the running RAM image Cyclic Redundancy Check checksum does not match the Cyclic Redundancy Check checksum stored in ROM	ROM Checksum ≠ Calculated Checksum	Diagnostic will run anytime there is sufficient processor throughput to allow execution of background tasks. Diagnoistic Enabled	 = 1.0 (1 = TRUE)	Immediately Upon Fault Detection	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.

ECU Hardware Performance - Interal Malfunction	B101D	This diagnoistic monitors the internal power supply from the IMX6 processor to ensure they ar within acceptable range of operation. The voltage level is read by ADC and available through a HWIO interface.
		
		The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.
			Processor is fed multiple voltages by an onboard power supply. DTC is set if these power supplies are out of range for a predefined sliding window.
			
			Fault set if:
			
			0.75 V Suply
			
			1.3 V Supply
			
			3.3 V Supply
			
			1.425 V Supply
				Min. Threshold = 0.70879V, Max. Threshold = 0.79079V
				
				Min. Threshold = 1.25V, Max. Threshold = 1.35V
				
				Min. Threshold = 3.07V, Max. Threshold = 3.43V
				
				Min. Threshold = 1.32V, Max. Threshold = 1.48V
					Diganoistic is Enabled
					
					If (Configuration for Low Voltage Enablement is FALSE), diagnoistic will not consider low voltage condition and run regardless of battery monitor voltage.
					
					If (Configuration for Low Voltage Enablement is TRUE), then the diagnoistic will NOT run when the battery monitor votlage is < 6.0 V
					
					Diagnoistic System is not in State of Reset. This includes:
					-Code Clear in Process
					-End of Trip Processing
					-Diagnoistic Re-enable in Process
						= TRUE	0.15 seconds out of a 0.2 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pressure Signal Protection Value Rolling Count or Validity Bit Error	C0561	Monitor indicates invalid or out of date brake pressure information was received from the brake controller on High Speed Expansion Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors the brake pressure from the brake system on High Speed Expansion Bus (GM HE $214) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	10 Fail Counters within 16 Samples	Diagnoistic is Enabled HE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.5 seconds out of a 0.8 seconds window Diagnostic runs every 50 msec	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pedal Inital Travel Achieved Message Counter Incorrect	C1206	Monitor indicates invalid or out of date Brake Pedal Inital Travel Achieved Message was received on High Speed Expansion Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors brake pedal travel on High Speed Expansion Bus (GM HE $0F1) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled HE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.06 seconds out of a 0.1 seconds window Diagnoistic runs every 10 msec	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Steering Wheel Angle Sensor Signal Message Counter Incorrect	C1211	Monitor indicates invalid or out of date Steering Angle Sensor Message was received on High Speed and Chassis Expansion Bus. This include both the electronic power steering system, and the secondary column mounted steering angle sensor. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors steering angle signal from the electronic power steering sensor on High Speed Expansion Bus (GM HE $1E5) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled HE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.06 seconds out of a 0.1 seconds window Diagnoistic runs every 10 msec	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			Monitors steering angle signal from the secondary steering angle sensor on Chassis Expansion High Speed Bus (GM CE $1E5) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled CE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.06 seconds out of a 0.1 seconds window Diagnoistic runs every 10 msec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Steering Torque Delivered Status Message Counter Incorrect on High Speed CAN Bus	C2A05	Monitor indicates invalid or out of date Steering Torque Message was received on High Speed Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors steering torque on High Speed Bus (GM HS $164) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled HS CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.06 seconds out of a 0.1 seconds window Diagnoistic runs every 10 msec	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Steering Torque Delivered Status Message Counter Incorrect on Chassis High Speed CAN Bus	C2A06	Monitor indicates invalid or out of date Steering Torque Message was received on Chassis High Speed CAN Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors steering torque on Chassis High Speed Bus (GM CE $164) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled CE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.06 seconds out of a 0.1 seconds window Diagnoistic runs every 10 msec	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
System Voltage Low	P0562	Detects a low 12V system. This diagnostic reports the DTC when battery voltage is low. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	System voltage low	Battery Voltage <= 10.0 Volts	Run/Crank Starter motor status Diagnostic Engine RPM	= Active = Not Engaged = Enabled >= 1,200.0 RPM	0.075 seconds out of a 0.075 seconds window Diagnoistic runs every 100 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Read Only Memory Performance	P0601	Monitors the performance of the Read Only Memory. This includes the non-volatile boot, code, or calibration memory. A Cyclic redundancy check, and Sinlg Bit ROM check is used. This diagnostic detects if the Compressor HV Voltage sensor has an out of range high circuit fault. If the enable conditions are met and compressor has detected an instantaneous out of range high fault on the sensor, the fail counter will increment. If the calibrated fail count threshold is met before the calibrated sample count, the diagnostic will report a FAIL and if not it will report a PASS. The diagnostic will continue to report as long as the enablement conditions are met. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When the cyclical redundancy check is invalid, the fault flag is set to TRUE and the fail counter increments	Fail Counter > 5		The CRC diagnostic will run anytime there is sufficient processor throughput to allow execution of background task	See enable conditions	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			For Single Bit ROM Errors, the fault fault is to TRUE and the fail counter is increased	Fail Counter > 5	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	Diagnoistic System is not in State of Reset.	See enable conditions	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Not Programmed	P0602	Indicates the EOCM needs to be programmed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	This DTC is set via calibration, when KeIDND_b_NoStartCal	=TRUE	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	Diagnoistic System is not in State of Reset.	1 second	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C".

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Long Term Memory Reset	P0603	Data was lost from Non-Volatile Memory. Could be due to failure of flash, NVM memory failure, first time power up if the shut down was interrupted. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Non-volatile memory (static or dynamic) checksum failure at Powerup	= TRUE	Controller Initialize	= Complete	Once during start-up	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Random Access Memory Performance	P0604	If there is a failure in these types in RAM: Secondary, System, Cache, eTUP The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Indicates that control module is unable to correctly write and read data to and from: - RAM - Cached RAM - TPU RAM	Detects data read does not match data written >= = 3 counts = 3 counts = 3 counts	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	Diagnoistic System is not in State of Reset.	= 2,000.00 mseconds	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	= 0.175 seconds				
			Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	= 65,534 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Processor Performance	P0606	Indicates that the EOCM has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	If any of the following fault occurs: - ROM completion fault (reported to PISR from MPMR) - ALU fault - Configuration Registers fault - Stack fault - Analog to Digital Converter fault - Secondary processor detected Main processor CPU State of Health fault - DMA transfer fault - Missing T0 task's motor control related duty cycle event fault - Lockstep fault - Secondary processor not running Seed/Key test - Secondary processor fails to take remedial action - Secondary processor received incorrect keys - Main processor detected Seed/Key timeout - Main processor detected seeds received in wrong order		Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process And the Run/Crank Voltages are not low.	Diagnoistic System is not in State of Reset. > 10.0 V	The diagnoistic operates every 12.5 msec	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Long Term Memory Performance	P062F	This diagnostic runs test for non-volatile memory performance diagnostic. Checks if Assembly Cals are defaulted or non-volatile memory Handler is unable to commit to flash in the future due to memory errors. Typically this means that the controller has run out of flash blocks for storing the data (the total erase/write cycles for each block has been exceeded. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When BINVDM region needs to be copied but cannot be VeMEMR_b_BINVDM_CannotCopy	= TRUE		To be run during NVM Handler control task	Runs every 100 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			When there is an assembly calibration failure reported by HWIO at initialization. Ve MEMD_b_AsyCalFail	= TRUE		To be run during NVM Handler control task	Runs every 100 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position Signal Message Counter Incorrect	P100E	Monitor indicates invalid or out of date data accelerator pedal position was received from the engine controller on High Speed Expansion Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors the accelerator pedal position signal from the engine on High Speed Expansion Bus (GM HE $1C4) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage HE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = Active	0.15 seconds out of a 0.25 seconds window Diagnoistic Runs every 25 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Distance Sensing Cruise Control Driver Requested Torque Signal Message Counter Incorrect	P157B	Monitor indicates invalid or out of date EOCM torque feedback was received from the engine controller on High Speed Expansion Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors the EOCM torque feedback from the engine on High Speed Expansion Bus (GM HE $1C4) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage HE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = Active	0.15 seconds out of a 0.25 seconds window Diagnoistic Runs every 25 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Monitor Control Module Serial Peripheral Interface Bus 2	P16E9	This diagnoistic monitors for Interprocessor communications (Between K1, K2, IMX Processor). The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When it detects SPI communication fault as indicated between any two micros (K1,K2,IMX) in EOCM2		Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process AND No error parsing Serial Perpheral Interface Data		0.04 seconds out of a 0.08 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Monitor Control Module Serial Peripheral Interface Bus 1	P16F0	This diagnoistic monitors for Interprocessor communications (Between K1, K2, IMX Processor). The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When it detects SPI communication fault as indicated between any two micros (K1,K2,IMX) in EOCM2		Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process AND No error parsing Serial Perpheral Interface Data		0.04 seconds out of a 0.08 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication on High Speed CAN Bus Off	U0073	A bus off condition has been detected for the High Speed CAN Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	This DTC monitors for a BUS off condition on GM HS CAN Bus	A failure is detected for 3 counts for 1000 ms	Vehicle Power Mode EOCM Operational Condition Diagnoistic Enabled Supply Voltage	= RUN = EOCM Comm Active State = True 9 > V > 16V	3 seconds out of a 5 seconds window Diagnoistic runs every 1000 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication on Object High Speed CAN Bus Off	U0075	A bus off condition has been detected for the Front Object High Speed CAN Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	This DTC monitors for a BUS off condition on Front Object High Speed CAN BUs	A failure is detected for 3 counts for 1000 ms	Vehicle Power Mode EOCM Operational Condition Diagnoistic Enabled Supply Voltage	= RUN = EOCM Comm Active State = True 9 > V > 16V	3 seconds out of a 5 seconds window Diagnoistic runs every 1000 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication on FlexRay 1A Bus Off	U007E	A bus off condition has been detected for the FlexRay 1A Network. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	This DTC monitors for a FlexRay 1A Bus Off Contition: 1. Active Star internal faults (ex. Short, under-voltage, over-temperature, bus clamp) 2. Active Star branch faults (short circuits and bus clamping) 3. FlexRay driver detected faults (time/clock, startup, wakeup, out sync, and other syntax errors caused by external host) 4. PDU length mismatch, length zero and compare failures		Vehicle Power Mode EOCM Operational Condition Diagnoistic Enabled Supply Voltage	= RUN = EOCM Comm Active State = True 9 > V > 16V	0.2 seconds out of a 20 seconds window Diagnoistic runs every 20 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Engine Control Module "A"	U0100	This DTC is set by the EOCM when signal supervision by the EOCM on the Engine Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $0C9 Message $0D3 Message $1C3 Message $1C4 Message $1C5 Message $1CA Message $3E9 Message $3FC Message $4F1	 > 0.5 seconds > 0.5 seconds > 1.0 seconds > 1.0 seconds > 1.0 seconds > 1.0 seconds > 5.0 seconds > 10.0 seconds > 40.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Transmission Control Module	U0101	This DTC is set by the EOCM when signal supervision by the EOCM on the Tramission Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $1F5	> 1.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Steering Angle Sensor Module	U0126	This DTC is set by the EOCM when signal supervision by the EOCM on the steering angle sensor has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $1E5	> 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_CHASCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Body Control Module	U0140	This DTC is set by the EOCM when signal supervision by the EOCM on the Body Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $0F1 Message $1F1 Message $1E1	 > 0.5 seconds > 1.5 seconds > 5.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Restrains Control Module	U0151	This DTC is set by the EOCM when signal supervision by the EOCM on the Restrains Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $130 Message $140	 > 0.5 seconds > 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_LSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Telematic Control Module	U0198	This DTC is set by the EOCM when signal supervision by the EOCM on the Telematic Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $260 Message $261 Message $262 Message $263 Message $264 Message $265	 > 10.0 seconds > 10.0 seconds > 10.0 seconds > 10.0 seconds > 10.0 seconds > 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Anti-Lock Brake System Control Module	U0415	Indicates invalid or out dated data was received from the Brake Control Module. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on Chassis Expanson CAN Bus any of the following messages: $17D, $0C1, or $0C5.	6 out of 10 failures of ARC or Checksum on any frame	CE Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Restraints Control Module	U0452	Indicates invalid or out dated data was received from the Restrain Control Module. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on Chassis Expanson CAN Bus any of the following messages: $130 OR $140	6 out of 10 failures of ARC or Checksum on any frame	CE Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Telematics Communication Interface Control Module (ONSTAR)	U0499	Indicates invalid or out dated data was received from the Telematics Communication Interface Control module. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on HE CAN Bus any of the following messages: $260, $261, $262, $263, $264, or $265.	6 out of 10 failures of ARC or Checksum on any frame	Front Object Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Active Safety Control Module 2	U053C	Indicates invalid or out dated data was received from From Active Safety Control Module 2 (EOCM2B). The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on the following signals: - High Speed Expansion CAN Bus $320 - Chassis Expansion Can Bus $154 - "EOCM2B_Operational_Status" frame on FlexRay channel A and B.	6 out of 10 failures of ARC or Checksum on any frame	Front Object CAN, Chassis Expansion CAN and FlexRay Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Vehicle Dynamics Sensor 1	U1032	This DTC is set by the EOCM when signal supervision by the EOCM on the Vehicle Dynamics Sensor 1 has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $130 Message $132 Message $134	 > 0.5 seconds > 0.5 seconds > 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_FOCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Vehicle Dynamics Sensor 2	U1033	This DTC is set by the EOCM when signal supervision by the EOCM on the Vehicle Dynamics Sensor 2 has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $136 Message $138 Message $140	 > 0.5 seconds > 0.5 seconds > 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_FOCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Electronic Brake Control Module on Chassis Expansion CAN Bus	U1833	This DTC is set by the EOCM when signal supervision by the EOCM on the Electronic Brake Control Module on Chassis Expansion CAN Bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $0C0 Message $0C1 Message $0C5 Message $170 Message $17D Message $348 Message $34A	 > 0.5 seconds > 0.5 seconds > 0.5 seconds > 0.5 seconds > 5.0 seconds > 2.0 seconds > 2.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_CECOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Body Control Module on Low Speed CAN Bus	U184A	This DTC is set by the EOCM when signal supervision by the EOCM on the Body Control Module has failed on Low Speed CAN Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Vectra Specific Network Management Data from the BCM is missing	Signal not recieved for 6 out of 10 counts	System Power Mode Battery Voltage Manufacturing Enable Counter K_LSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	0.6 seconds out of a 1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Power Steering Control Module on High Speed CAN Bus	U18BA	This DTC is set by the EOCM when signal supervision by the EOCM on the Electronic Power Steering System on High Speed CAN Bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $164 Message $1E5	 > 0.5 seconds > 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_CECOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Power Steering Control Module on Chassis Expansion High Speed CAN Bus	U18BB	This DTC is set by the EOCM when signal supervision by the EOCM on the Electronic Power Steering System on Chassis Expansion Speed CAN Bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $164	> 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_CECOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Frontview Camera Module on Flexray Bus	U18C2	This DTC is set by the EOCM when signal supervision by the EOCM for the Front Camera on the Flexray bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for Flexray Message: F_Vision_GFHB_Data Freespace_Conf Lane_Boundary_1 Lane_Boundary_2 Lane_Boundary_3 Lane_Boundary_4 Lane_Boundary_5 Lane_Boundary_6 Lane_Boundary_7 Lane_Boundary_8 Lane_Boundary_9_LeftBarrier Lane_Boundary_10_Right Barrier Lane_Boundary_Conf Lane_Boundary_HPP Lane_Det_Header Lane_Transition_Points Lane_Transition_Points_Alt LGT_ControlHighBeamGlare LGT_ObjectDetect_Info_1 LGT_ObjectDetect_Info_2 LGT_ObjectDetect_Info_3 LGT_ObjectDetect_Info_4 LGT_ObjectDetect_Info_5 LGT_ObjectDetect_Info_6 LGT_ObjectDetect_Info_7 LGT_ObjectDetect_Info_8 Obj_Track_1 Obj_Track_2 Obj_Track_3 Obj_Track_4 Obj_Track_5 Obj_Track_6 Obj_Track_7	For all Signals: > 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter FlexRay Diagnostics	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Obj_Track_8 Obj_Track_9 Obj_Track_10 Obj_Track_11 Obj_Track_12 Obj_Track_13 Obj_Track_14 Obj_Track_15 Scene_Info_1 Scene_Info_2 LHT_CameraObjConfirmation Obj_Det_Header Ped_Alrt_Brk Road_Bank_SuperElevation Road_Elevation Road_Shoulder System_Header					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Electronic Brake Control Module on High Speed CAN Bus	U18C5	This DTC is set by the EOCM when signal supervision by the EOCM on the Electronic Brake Control Module on High Speed CAN Bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $1C7 Message $1E9 Message $214 Message $2F9	 > 1.0 seconds > 1.0 seconds > 2.0 seconds > 2.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Active Safety Control Module 1 on Flexray Bus	U18CB	This DTC is set by the EOCM when signal supervision by the EOCM2A for the EOCM2B on the Flexray bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for Flexray Message: Secondary_System_Op_Stat	> 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter FlexRay Diagnostics	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Active Safety Control Module 1 on High Speed CAN Bus	U18D0	This DTC is set by the EOCM when signal supervision by the EOCM2A for the EOCM2B on the High Speed CAN bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for Flexray Message: Secondary_System_Op_Stat	> 5.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter HSCOM Diagnostics	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received from Vehicle Dynamic Sensor 1	U250E	This DTC is set by the EOCM when signal supervision by the EOCM on the Vehicle Dynamics Sensor 1 has failed on Front Object CAN Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on Front Object Expanson CAN Bus any of the following messages: $130, $132, or $134	6 out of 10 failures of ARC or Checksum on any frame	FO Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received from Vehicle Dynamic Sensor 1	U250F	This DTC is set by the EOCM when signal supervision by the EOCM on the Vehicle Dynamics Sensor 2 has failed on Front Object CAN Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on Front Object Expanson CAN Bus any of the following messages: $136, $138, or $140	6 out of 10 failures of ARC or Checksum on any frame	FO Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module - Internal Electronic Failure	U3000	This diagnoistic monitors the calculated results from each Komodos processor to ensure they all match. The specific calculations monitored are within LXCR (Lane Change and Centering Control) variables, LMFR (Lane Mapping Fusion) variables, or TSTR (Target Object Selection and Threat Assessment) variables. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	A mismatch is key varables within software rings LXCR, LMFR & TSTR, operating in parallel on other Komodos processors (K1P, K2P, K1R, K2P).	20 mismatches out of 20 counts	Diagnostic will run anytime there is sufficient processor throughput to allow execution of background tasks. Diagnoistic Enabled for each software componet (LXCR, LMFR, TSTR)	= Enabled for all software componet	0.2 seconds out of a 0.2 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.

ECU Hardware Performance - Interal Malfunction	B101D	This diagnoistic monitors the internal power supply from the processor to ensure they ar within acceptable range of operation. The voltage level is read by ADC and available through a HWIO interface.
		
		The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise
			Processor is fed multiple voltages by an onboard power supply. DTC is set if these power supplies are out of range for a predefined sliding window.
			
			Fault set if:
			
			0.75 V Suply
			
			1.3 V Supply
			
			3.3 V Supply
			
			1.425 V Supply
				Min. Threshold = 0.70879V, Max. Threshold = 0.79079V
				
				Min. Threshold = 1.25V, Max. Threshold = 1.35V
				
				Min. Threshold = 3.07V, Max. Threshold = 3.43V
				
				Min. Threshold = 1.32V, Max. Threshold = 1.48V
					Diganoistic is Enabled
					
					If (Configuration for Low Voltage Enablement is FALSE), diagnoistic will not consider low voltage condition and run regardless of battery monitor voltage.
					
					If (Configuration for Low Voltage Enablement is TRUE), then the diagnoistic will NOT run when the battery monitor votlage is < 6.0 V
					
					Diagnoistic System is not in State of Reset. This includes:
					-Code Clear in Process
					-End of Trip Processing
					-Diagnoistic Re-enable in Process
						= TRUE	0.15 seconds out of a 0.2 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pressure Signal Protection Value Rolling Count or Validity Bit Error	C0561	Monitor indicates invalid or out of date brake pressure information was received from the brake controller on High Speed Expansion Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors the brake pressure from the brake system on High Speed Expansion Bus (GM HE $214) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	10 Fail Counters within 16 Samples	Diagnoistic is Enabled HE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.5 seconds out of a 0.8 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pedal Inital Travel Achieved Message Counter Incorrect	C1206	Monitor indicates invalid or out of date Brake Pedal Inital Travel Achieved Message was received on High Speed Expansion Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors brake pedal travel on High Speed Expansion Bus (GM HE $0F1) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled HE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Steering Wheel Angle Sensor Signal Message Counter Incorrect	C1211	Monitor indicates invalid or out of date Steering Angle Sensor Message was received on High Speed and Chassis Expansion Bus. This include both the electronic power steering system, and the secondary column mounted steering angle sensor. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors steering angle signal from the electronic power steering sensor on High Speed Expansion Bus (GM HE $1F5) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled HE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			Monitors steering angle signal from the secondary steering angle sensor on Chassis Expansion High Speed Bus (GM CE $1E5) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled CE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.06 seconds out of a 0.1 seconds window	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Steering Torque Delivered Status Message Counter Incorrect on High Speed CAN Bus	C2A05	Monitor indicates invalid or out of date Steering Torque Message was received on High Speed Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors steering torque on High Speed Bus (GM HS $164) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled HS CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.06 seconds out of a 0.1 seconds window Diagnoistic runs every 10 msec	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Steering Torque Delivered Status Message Counter Incorrect on Chassis High Speed CAN Bus	C2A06	Monitor indicates invalid or out of date Steering Torque Message was received on Chassis High Speed CAN Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors steering torque on Chassis High Speed Bus (GM CE $164) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled CE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.06 seconds out of a 0.1 seconds window Diagnoistic runs every 10 msec	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
System Voltage Low	P0562	Detects a low 12V system. This diagnostic reports the DTC when battery voltage is low. Monitoring occurs when the engine speed is above a calibrated value. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	System voltage high	Battery Voltage <= 10.0 Volts	Run/Crank Diagnostic Engine RPM	= Active = Enabled >= 1,200.0 RPM	0.075 seconds out of a 0.075 seconds window Diagnoistic runs every 12.5 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Read Only Memory Performance	P0601	Monitors the performance of the Read Only Memory. This includes the non-volatile boot, code, or calibration memory. A Cyclic redundancy check, and Sinlg Bit ROM check is used. This diagnostic detects if the Compressor HV Voltage sensor has an out of range high circuit fault. If the enable conditions are met and compressor has detected an instantaneous out of range high fault on the sensor, the fail counter will increment. If the calibrated fail count threshold is met before the calibrated sample count, the diagnostic will report a FAIL and if not it will report a PASS. The diagnostic will continue to report as long as the enablement conditions are met. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When the cyclical redundancy check is invalid, the fault flag is set to TRUE and the fail counter increments	Fail Counter > 5		The CRC diagnostic will run anytime there is sufficient processor throughput to allow execution of background task		Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			For Single Bit ROM Errors, the fault fault is to TRUE and the fail counter is increased	Fail Counter > 5	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	Diagnoistic System is not in State of Reset.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Not Programmed	P0602	Indicates the EOCM needs to be programmed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	This DTC is set via calibration, when KeIDND_b_NoStartCal	=TRUE	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	Diagnoistic System is not in State of Reset.	1 second	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Long Term Memory Reset	P0603	Data was lost from Non-Volatile Memory. Could be due to failure of flash, NVM memory failure, first time power up if the shut down was interrupted. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Non-volatile memory (static or dynamic) checksum failure at Powerup	= TRUE	Controller Initialize	= Complete	Once during start-up	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Random Access Memory Performance	P0604	If there is a failure in these types in RAM: Secondary, System, Cache, eTUP. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Indicates that control module is unable to correctly write and read data to and from: - RAM - Cached RAM - TPU RAM	Detects data read does not match data written >= = 3 counts = 3 counts = 3 counts	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	Diagnoistic System is not in State of Reset.	= 2,000.00 mseconds	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	= 0.175 seconds			Refer to Threshold Value	
			Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	= 65,534 counts			Refer to Thresdhold Value	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Processor Performance	P0606	Indicates that the EOCM has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	If any of the following fault occurs: - ROM completion fault (reported to PISR from MPMR) - ALU fault - Configuration Registers fault - Stack fault - Analog to Digital Converter fault - Secondary processor detected Main processor CPU State of Health fault - DMA transfer fault - Missing T0 task's motor control related duty cycle event fault - Lockstep fault - Secondary processor not running Seed/Key test - Secondary processor fails to take remedial action - Secondary processor received incorrect keys - Main processor detected Seed/Key timeout - Main processor detected seeds received in wrong order		Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process And the Run/Crank Voltages are not low.	Diagnoistic System is not in State of Reset. > 10.0 V	The diagnoistic operates every 12.5 msec	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Long Term Memory Performance	P062F	This diagnostic runs test for non-volatile memory performance diagnostic. Checks if Assembly Cals are defaulted or non-volatile memory Handler is unable to commit to flash in the future due to memory errors. Typically this means that the controller has run out of flash blocks for storing the data (the total erase/write cycles for each block has been exceeded. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When BINVDM region needs to be copied but cannot be VeMEMR_b_BINVDM_CannotCopy	= TRUE		To be run during NVM Handler control task	Runs every 100 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			When there is an assembly calibration failure reported by HWIO at initialization. Ve MEMD_b_AsyCalFail	= TRUE		To be run during NVM Handler control task	Runs every 100 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position Signal Message Counter Incorrect	P100E	Monitor indicates invalid or out of date data acceleator pedal position was received from the engine controller on High Speed Expansion Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors the accelerator pedal position signal from the engine on High Speed Expansion Bus (GM HE $1C4) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage HE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = Active	0.15 seconds out of a 0.25 seconds window Diagnoistic Runs every 25 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Distance Sensing Cruise Control Driver Requested Torque Signal Message Counter Incorrect	P157B	Monitor indicates invalid or out of date EOCM torque feedback was received from the engine controller on High Speed Expansion Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors the EOCM torque feedback from the engine on High Speed Expansion Bus (GM HE $1C4) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage HE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = Active	0.15 seconds out of a 0.25 seconds window Diagnoistic Runs every 25 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Monitor Control Module Serial Peripheral Interface Bus 2	P16E9	This diagnoistic monitors for Interprocessor communications (Between K1, K2, IMX Processor). The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When it detects SPI communication fault as indicated between any two micros (K1,K2,IMX) in EOCM2		Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process AND No error parsing Serial Perpheral Interface Data	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process AND No error in parsing SPI data	0.04 seconds out of a 0.08 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Monitor Control Module Serial Peripheral Interface Bus 1	P16F0	This diagnoistic monitors for Interprocessor communications (Between K1, K2, IMX Processor). The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When it detects SPI communication fault as indicated between any two micros (K1,K2,IMX) in EOCM2		Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process AND No error parsing Serial Perpheral Interface Data	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process AND No error in parsing SPI data	0.04 seconds out of a 0.08 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication on High Speed CAN Bus Off	U0073	A bus off condition has been detected for the Chassis Expansion CAN Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	A bus off condition has been detected for the High Speed CAN Bus.	A failure is detected for 3 counts for 1000 ms	Vehicle Power Mode EOCM Operational Condition Diagnoistic Enabled Supply Voltage	= RUN = EOCM Comm Active State = True 9 > V > 16V	3 seconds out of a 5 seconds window Diagnoistic runs every 1000 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication on FlexRay 1B Bus Off	U007E	A bus off condition has been detected for the FlexRay 1B Network. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	This DTC monitors for a FlexRay 1B Bus Off Contition	A failure is detected for 6 counts for 1000 ms	Vehicle Power Mode EOCM Operational Condition Diagnoistic Enabled Supply Voltage	= RUN = EOCM Comm Active State = True 9 > V > 16V	0.2 seconds out of a 20 seconds window Diagnoistic runs every 20 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Engine Control Module "A"	U0100	This DTC is set by the EOCM when signal supervision by the EOCM on the Engine Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $0C9 Message $0D3 Message $1C3 Message $1C4 Message $1C5 Message $1CA Message $3E9 Message $4F1	 > 0.5 seconds > 0.5 seconds > 1.0 seconds > 1.0 seconds > 1.0 seconds > 1.0 seconds > 5.0 seconds > 40.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Transmission Control Module	U0101	This DTC is set by the EOCM when signal supervision by the EOCM on the Tramission Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $1F5	> 1.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Steering Angle Sensor Module	U0126	This DTC is set by the EOCM when signal supervision by the EOCM on the steering angle sensor has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $1E5	> 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_CHASCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Body Control Module	U0140	This DTC is set by the EOCM when signal supervision by the EOCM on the Body Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $0F1 Message $1F1 Message $1E1	 > 0.5 seconds > 1.5 seconds > 5.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Restrains Control Module	U0151	This DTC is set by the EOCM when signal supervision by the EOCM on the Restrains Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $130 Message $140	 > 0.5 seconds > 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_LSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Telematic Control Module	U0198	This DTC is set by the EOCM when signal supervision by the EOCM on the Telematic Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $260 Message $261 Message $262 Message $263 Message $264 Message $265	 > 10.0 seconds > 10.0 seconds > 10.0 seconds > 10.0 seconds > 10.0 seconds > 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Anti-Lock Brake System Control Module	U0415	Indicates invalid or out dated data was received from the Brake Control Module. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on Chassis Expanson CAN Bus any of the following messages: $17D, $0C1, or $0C5.	6 out of 10 failures of ARC or Checksum on any frame	CE Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Restraints Control Module	U0452	Indicates invalid or out dated data was received from the Restrain Control Module. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on Chassis Expanson CAN Bus any of the following messages: $130 OR $140	6 out of 10 failures of ARC or Checksum on any frame	CE Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Telematics Communication Interface Control Module (ONSTAR)	U0499	Indicates invalid or out dated data was received from the Telematics Communication Interface Control module. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on HE CAN Bus any of the following messages: $260, $261, $262, $263, $264, or $265.	6 out of 10 failures of ARC or Checksum on any frame	Front Object Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Active Safety Control Module 1	U053B	Indicates invalid or out dated data was received from From Active Safety Control Module 1 (EOCM2A). The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on the following signals: - High Speed Expansion CAN Bus $320 - Chassis Expansion Can Bus $154 - EOCM2A_Operational_Status frame on FlexRay channel A and B	6 out of 10 failures of ARC or Checksum on any frame	Front Object CAN, Chassis Expansion CAN and FlexRay Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Vehicle Dynamics Sensor 1	U1032	This DTC is set by the EOCM when signal supervision by the EOCM on the Vehicle Dynamics Sensor 1 has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $130 Message $132 Message $134	 > 0.5 seconds > 0.5 seconds > 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_FOCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Vehicle Dynamics Sensor 2	U1033	This DTC is set by the EOCM when signal supervision by the EOCM on the Vehicle Dynamics Sensor 2 has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $136 Message $138 Message $140	 > 0.5 seconds > 0.5 seconds > 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_FOCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Electronic Brake Control Module on Chassis Expansion CAN Bus	U1833	This DTC is set by the EOCM when signal supervision by the EOCM on the Electronic Brake Control Module on Chassis Expansion CAN Bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $0C0 Message $0C1 Message $0C5 Message $170 Message $17D Message $348 Message $34A	 > 0.5 seconds > 0.5 seconds > 0.5 seconds > 0.5 seconds > 5.0 seconds > 2.0 seconds > 2.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_CECOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Body Control Module on Low Speed CAN Bus	U184A	This DTC is set by the EOCM when signal supervision by the EOCM on the Body Control Module has failed on Low Speed CAN Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Vectra Specific Network Management Data from the BCM is missing	Signal not recieved for 6 out of 10 counts	System Power Mode Battery Voltage Manufacturing Enable Counter K_LSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	0.6 seconds out of a 1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Power Steering Control Module on High Speed CAN Bus	U18BA	This DTC is set by the EOCM when signal supervision by the EOCM on the Electronic Power Steering System on High Speed CAN Bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $164 Message $1E5	 > 0.5 seconds > 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_CECOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Power Steering Control Module on Chassis Expansion High Speed CAN Bus	U18BB	This DTC is set by the EOCM when signal supervision by the EOCM on the Electronic Power Steering System on Chassis Expansion Speed CAN Bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $164	> 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_CECOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Frontview Camera Module on Flexray Bus	U18C2	This DTC is set by the EOCM when signal supervision by the EOCM for the Front Camera on the Flexray bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for Flexray Message: F_Vision_GFHB_Data Freespace_Conf Lane_Boundary_1 Lane_Boundary_2 Lane_Boundary_3 Lane_Boundary_4 Lane_Boundary_5 Lane_Boundary_6 Lane_Boundary_7 Lane_Boundary_8 Lane_Boundary_9_LeftBarrier Lane_Boundary_10_RightBarrier Lane_Boundary_Conf Lane_Boundary_HPP Lane_Det_Header Lane_Transition_Points Lane_Transition_Points_Alt LGT_ControlHighBeamGlare LGT_ObjectDetect_Info_1 LGT_ObjectDetect_Info_2 LGT_ObjectDetect_Info_3 LGT_ObjectDetect_Info_4 LGT_ObjectDetect_Info_5 LGT_ObjectDetect_Info_6 LGT_ObjectDetect_Info_7 LGT_ObjectDetect_Info_8 Obj_Track_1 Obj_Track_2 Obj_Track_3 Obj_Track_4 Obj_Track_5 Obj_Track_6 Obj_Track_7	For all Signals: > 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter FlexRay Diagnostics	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Obj_Track_8 Obj_Track_9 Obj_Track_10 Obj_Track_11 Obj_Track_12 Obj_Track_13 Obj_Track_14 Obj_Track_15 Scene_Info_1 Scene_Info_2 LHT_CameraObjConfirma tion Obj_Det_Header Ped_Alrt_Brk Road_Bank_SuperElevati on Road_Elevation Road_Shoulder System_Header					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Electronic Brake Control Module on High Speed CAN Bus	U18C5	This DTC is set by the EOCM when signal supervision by the EOCM on the Electronic Brake Control Module on High Speed CAN Bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $1C7 Message $1E9 Message $214 Message $2F9	 > 1.0 seconds > 1.0 seconds > 2.0 seconds > 2.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Active Safety Control Module 1 on Flexray Bus	U18CA	This DTC is set by the EOCM when signal supervision by the EOCM2A for the EOCM2B on the Flexray bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for Flexray Message: Secondary_System_Op_Stat	> 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter FlexRay Diagnostics	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received from Vehicle Dynamic Sensor 1	U250E	This DTC is set by the EOCM when signal supervision by the EOCM on the Vehicle Dynamics Sensor 1 has failed on Front Object CAN Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on Front Object Expanson CAN Bus any of the following messages: $130, $132, or $134	6 out of 10 failures of ARC or Checksum on any frame	FO Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received from Vehicle Dynamic Sensor 1	U250F	This DTC is set by the EOCM when signal supervision by the EOCM on the Vehicle Dynamics Sensor 2 has failed on Front Object CAN Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on Front Object Expanson CAN Bus any of the following messages: $136, $138, or $140	6 out of 10 failures of ARC or Checksum on any frame	FO Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module - Internal Electronic Failure	U3000	This diagnoistic monitors the calculated results from each Komodos processor to ensure they all match. The specific calculations monitored are within LXCR (Lane Change and Centering Control) variables, LMFR (Lane Mapping Fusion) variables, or TSTR (Target Object Selection and Threat Assessment) variables. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	A mismatch is key varables within software rings LXCR, LMFR & TSTR, operating in parallel on other Komodos processors (K1P, K2P, K1R, K2P).	20 mismatches out of 20 counts	Diagnostic will run anytime there is sufficient processor throughput to allow execution of background tasks. Diagnoistic Enabled for each software componet (LXCR, LMFR, TSTR)	= Enabled for all software componet	0.2 seconds out of a 0.2 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.

ECU Hardware Performance - Interal Malfunction	B101D	This diagnoistic monitors the internal power supply from the processor to ensure they ar within acceptable range of operation. The voltage level is read by ADC and available through a HWIO interface.
		
		The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.
			Processor is fed multiple voltages by an onboard power supply. DTC is set if these power supplies are out of range for a predefined sliding window.
			
			Fault set if:
			
			0.75 V Suply
			
			1.3 V Supply
			
			3.3 V Supply
			
			1.425 V Supply
				Min. Threshold = 0.70879V, Max. Threshold = 0.79079V
				
				Min. Threshold = 1.25V, Max. Threshold = 1.35V
				
				Min. Threshold = 3.07V, Max. Threshold = 3.43V
				
				Min. Threshold = 1.32V, Max. Threshold = 1.48V
					Diganoistic is Enabled
					
					If (Configuration for Low Voltage Enablement is FALSE), diagnoistic will not consider low voltage condition and run regardless of battery monitor voltage.
					
					If (Configuration for Low Voltage Enablement is TRUE), then the diagnoistic will NOT run when the battery monitor votlage is < 5.5 voltage
					
					Diagnoistic System is not in State of Reset. This includes:
					-Code Clear in Process
					-End of Trip Processing
					-Diagnoistic Re-enable in Process
						= TRUE	0.15 seconds out of a 0.2 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

			Voltage difference between processors exceeds thresholds	Absolute Difference in Processor Voltage is Greater Than 3.0 V	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process Diganoistic is Enabled	= TRUE	3 seconds out of a 6 seconds window	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pressure Signal Protection Value Rolling Count or Validity Bit Error	C0561	Monitor indicates invalid or out of date brake pressure information was received from the brake controller on High Speed Expansion Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors the brake pressure from the brake system on High Speed Expansion Bus (GM HE $214) for Alive Rolling Counter (ARC) OR Cyclic Redundant;Checksum (CRC) Failure. A failure of either will increase the fail counter.	10 Fail Counters within 16 Samples	Diagnoistic is Enabled HE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.5 seconds out of a 0.8 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pedal Inital Travel Achieved Message Counter Incorrect	C1206	Monitor indicates invalid or out of date Brake Pedal Inital Travel Achieved Message was received on High Speed Expansion Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors brake pedal travel on High Speed Expansion Bus (GM HE $0F1) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled HE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Steering Wheel Angle Sensor Signal Message Counter Incorrect	C1211	Monitor indicates invalid or out of date Steering Angle Sensor Message was received on High Speed and Chassis Expansion Bus. This include both the electronic power steering system, and the secondary column mounted steering angle sensor. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors steering angle signal from the electronic power steering sensor on High Speed Expansion Bus (GM HE $1F5) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled HE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			Monitors steering angle signal from the secondary steering angle sensor on Chassis Expansion High Speed Bus (GM CE $1E5) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled CE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.06 seconds out of a 0.1 seconds window	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Steering Torque Delivered Status Message Counter Incorrect on High Speed CAN Bus	C2A05	Monitor indicates invalid or out of date Steering Torque Message was received on High Speed Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors steering torque on High Speed Bus (GM HS $164) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled HS CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.06 seconds out of a 0.1 seconds window Diagnoistic runs every 10 msec	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Steering Torque Delivered Status Message Counter Incorrect on Chassis High Speed CAN Bus	C2A06	Monitor indicates invalid or out of date Steering Torque Message was received on Chassis High Speed CAN Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors steering torque on Chassis High Speed Bus (GM CE $164) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled CE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.06 seconds out of a 0.1 seconds window Diagnoistic runs every 10 msec	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
System Voltage Low	P0562	Detects a low 12V system. This diagnostic reports the DTC when battery voltage is low. Monitoring occurs when the engine speed is above a calibrated value. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	System voltage low	Battery Voltage <= 9.0 Volts	Run/Crank Diagnostic Engine Speed	= Active = Enabled >= 1,200.0 RPM	0.075 seconds out of a 0.075 seconds window Diagnoistic runs every 100 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Read Only Memory Performance	P0601	Monitors the performance of the Read Only Memory. This includes the non-volatile boot, code, or calibration memory. A Cyclic redundancy check, and Sinlg Bit ROM check is used. This diagnostic detects if the Compressor HV Voltage sensor has an out of range high circuit fault. If the enable conditions are met and compressor has detected an instantaneous out of range high fault on the sensor, the fail counter will increment. If the calibrated fail count threshold is met before the calibrated sample count, the diagnostic will report a FAIL and if not it will report a PASS. The diagnostic will continue to report as long as the enablement conditions are met. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When the cyclical redundancy check is invalid, the fault flag is set to TRUE and the fail counter increments	Fail Counter > 5		The CRC diagnostic will run anytime there is sufficient processor throughput to allow execution of background task		Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			For Single Bit ROM Errors, the fault fault is to TRUE and the fail counter is increased	Fail Counter >5	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	Diagnoistic System is not in State of Reset.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Not Programmed	P0602	Indicates the EOCM needs to be programmed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	This DTC is set via calibration, when KeIDND_b_NoStartCal	 =TRUE	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	Diagnoistic System is not in State of Reset.	1 second	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Long Term Memory Reset	P0603	Data was lost from Non-Volatile Memory. Could be due to failure of flash, NVM memory failure, first time power up if the shut down was interrupted. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Non-volatile memory (static or dynamic) checksum failure at Powerup	= TRUE	Controller Initialize	= Complete	Once during start-up	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Random Access Memory Performance	P0604	If there is a failure in these types in RAM: Secondary, System, Cache, eTUP. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Indicates that control module is unable to correctly write and read data to and from: - RAM - Cached RAM - TPU RAM	Detects data read does not match data written >= = 3 counts = 3 counts = 3 counts	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	Diagnoistic System is not in State of Reset.	= 2,000.00 mseconds	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	= 0.175 seconds				
			Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	= 65,534 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Processor Performance	P0606	Indicates that the EOCM has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	If any of the following fault occurs: - ROM completion fault (reported to PISR from MPMR) - ALU fault - Configuration Registers fault - Stack fault - Analog to Digital Converter fault - Secondary processor detected Main processor CPU State of Health fault - DMA transfer fault - Missing T0 task's motor control related duty cycle event fault - Lockstep fault - Secondary processor not running Seed/Key test - Secondary processor fails to take remedial action - Secondary processor received incorrect keys - Main processor detected Seed/Key timeout - Main processor detected seeds received in wrong order		Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process And the Run/Crank Voltages are not low.	Diagnoistic System is not in State of Reset. > 10.0 V	The diagnoistic operates every 12.5 msec	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Long Term Memory Performance	P062F	This diagnostic runs test for non-volatile memory performance diagnostic. Checks if Assembly Cals are defaulted or non-volatile memory Handler is unable to commit to flash in the future due to memory errors. Typically this means that the controller has run out of flash blocks for storing the data (the total erase/write cycles for each block has been exceeded. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When BINVDM region needs to be copied but cannot be VeMEMR_b_BINVDM_CannotCopy	= TRUE		To be run during NVM Handler control task	Runs every 100 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			When there is an assembly calibration failure reported by HWIO at initialization. Ve MEMD_b_AsyCalFail	= TRUE		To be run during NVM Handler control task	Runs every 100 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position Signal Message Counter Incorrect	P100E	Monitor indicates invalid or out of date data acceleator pedal position was received from the engine controller on High Speed Expansion Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors the accelerator pedal position signal from the engine on High Speed Expansion Bus (GM HE $1C4) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage HE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = Active	0.15 seconds out of a 0.25 seconds window Diagnoistic Runs every 25 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Distance Sensing Cruise Control Driver Requested Torque Signal Message Counter Incorrect	P157B	Monitor indicates invalid or out of date EOCM torque feedback was received from the engine controller on High Speed Expansion Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors the EOCM torque feedback from the engine on High Speed Expansion Bus (GM HE $1C4) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage HE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = Active	0.15 seconds out of a 0.25 seconds window Diagnoistic Runs every 25 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Monitor Control Module Serial Peripheral Interface Bus 2	P16E9	This diagnoistic monitors for Interprocessor communications (Between K1, K2, IMX Processor). The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When it detects SPI communication fault as indicated between any two micros (K1,K2,IMX) in EOCM2		Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process AND No error parsing Serial Perpheral Interface Data			Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Monitor Control Module Serial Peripheral Interface Bus 1	P16F0	This diagnoistic monitors for Interprocessor communications (Between K1, K2, IMX Processor). The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When it detects SPI communication fault as indicated between any two micros (K1,K2,IMX) in EOCM2		Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process AND No error parsing Serial Perpheral Interface Data			Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication on Object High Speed CAN Bus Off	U0075	A bus off condition has been detected for the Front Object High Speed CAN Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	This DTC monitors for a BUS off condition on Front Object High Speed CAN BUs	A failure is detected for 3 counts for 1000 ms	Vehicle Power Mode EOCM Operational Condition Diagnoistic Enabled Supply Voltage	= RUN = EOCM Comm Active State = True 9 > V > 16V	3 seconds out of a 5 seconds window Diagnoistic runs every 1000 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Bus E Off	U0077	A bus off condition has been detected for the GM High Speed CAN Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	This DTC monitors for a BUS off condition on GM High Speed CAN BUS	A failure is detected for 3 counts for 1000 ms	Vehicle Power Mode EOCM Operational Condition Diagnoistic Enabled Supply Voltage	= RUN = EOCM Comm Active State = True 9 > V > 16V	3 seconds out of a 5 seconds window Diagnoistic runs every 1000 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication on Low Speed CAN Bus Off	U0078	A bus off condition has been detected for the Low Speed CAN Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	This DTC monitors for a low speed Bus off condition	A failure is detected for 6 counts for 1000 ms	Vehicle Power Mode EOCM Operational Condition Diagnoistic Enabled Supply Voltage	= RUN = EOCM Comm Active State = True 9 > V > 16V	6 seconds out of a 10 seconds window Diagnoistic runs every 1000 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication FlexRay 1A Bus Off	U007F	A bus off condition has been detected for the FlexRay 1A Network. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	This DTC monitors for a FlexRay 1A Bus Off Contition	A failure is detected for 6 counts for 1000 ms	Vehicle Power Mode EOCM Operational Condition Diagnoistic Enabled Supply Voltage	= RUN = EOCM Comm Active State = True 9 > V > 16V	0.2 seconds out of a 20 seconds window Diagnoistic runs every 20 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Engine Control Module "A"	U0100	This DTC is set by the EOCM when signal supervision by the EOCM on the Engine Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $0C9 Message $0D3 Message $1C3 Message $1C4 Message $1C5 Message $1CA Message $3E9 Message $4F1	 > 0.5 seconds > 0.5 seconds > 1.0 seconds > 1.0 seconds > 1.0 seconds > 1.0 seconds > 5.0 seconds > 40.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Transmission Control Module	U0101	This DTC is set by the EOCM when signal supervision by the EOCM on the Tramission Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $1F5	 > 1.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Steering Angle Sensor Module	U0126	This DTC is set by the EOCM when signal supervision by the EOCM on the steering angle sensor has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $1E5	> 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_CHASCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Body Control Module	U0140	This DTC is set by the EOCM when signal supervision by the EOCM on the Body Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $0F1 Message $1F1 Message $1E1	 > 0.5 seconds > 1.5 seconds > 5.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Restrains Control Module	U0151	This DTC is set by the EOCM when signal supervision by the EOCM on the Restrains Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $130 Message $140	 > 0.5 seconds > 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_LSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Telematic Control Module	U0198	This DTC is set by the EOCM when signal supervision by the EOCM on the Telematic Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $260 Message $261 Message $262 Message $263 Message $264 Message $265	> 10.0 seconds > 10.0 seconds > 10.0 seconds > 10.0 seconds > 10.0 seconds > 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Left Front Short Range Radar Sensor Module	U0265	This DTC is set by the EOCM when signal supervision by the EOCM on Left Front Short Range Radar Sensor Module has failed. The emissions neutral default action is stop consuming radar information into the control systems	Message is not received from controller for Flexray Message: Barrier_1 Barrier_2 Barrier_3 Barrier_4 Object_Header Object_Track1 Object_Track2 Object_Track3 Object_Track4 Object_Track5 Object_Track6 Stationary_Track1 Stationary_Track2 Stationary_Track3 Stationary_Track4 Stationary_Track5 Stationary_Track6 Stationary_Track7 Stationary_Track8 Stationary_Track9 Stationary_Track10 Stationary_Track11 Stationary_Track12 Stationary_Track13 Stationary_Track14 Stationary_Track15 Stationary_Track16	For all Signals: > 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter Flexray Diagnoistics	= RUN > 9V = 0 = 1 (True)	See threshold value	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Right Front Short Range Radar Sensor Module	U0268	This DTC is set by the EOCM when signal supervision by the EOCM on Right Front Short Range Radar Sensor Module has failed. The emissions neutral default action is stop consuming radar information into the control systems	Message is not received from controller for Flexray Message: Barrier_1 Barrier_2 Barrier_3 Barrier_4 Object_Header Object_Track1 Object_Track2 Object_Track3 Object_Track4 Object_Track5 Object_Track6 Stationary_Track1 Stationary_Track2 Stationary_Track3 Stationary_Track4 Stationary_Track5 Stationary_Track6 Stationary_Track7 Stationary_Track8 Stationary_Track9 Stationary_Track10 Stationary_Track11 Stationary_Track12 Stationary_Track13 Stationary_Track14 Stationary_Track15 Stationary_Track16	For all Signals: > 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter Flexray Diagnoistics	= RUN > 9V = 0 = 1 (True)	See threshold value	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Front Long Range Radar Sensor Module	U0269	This DTC is set by the EOCM when signal supervision by the EOCM on Front Long Range Radar Sensor Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for Flexray Message: Barrier_1 Barrier_2 Barrier_3 Barrier_4 Object_Header Object_Track1 Object_Track2 Object_Track3 Object_Track4 Object_Track5 Object_Track6 Stationary_Track1 Stationary_Track2 Stationary_Track3 Stationary_Track4 Stationary_Track5 Stationary_Track6 Stationary_Track7 Stationary_Track8 Stationary_Track9 Stationary_Track10 Stationary_Track11 Stationary_Track12 Stationary_Track13 Stationary_Track14 Stationary_Track15 Stationary_Track16	For all Signals: > 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter Flexray Diagnoistics	= RUN > 9V = 0 = 1 (True)	See threshold value	Type C, No SVS v

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Left Rear Short Range Radar Sensor Module	U026B	This DTC is set by the EOCM when signal supervision by the EOCM on Left Rear Short Range Radar Sensor Module has failed. The emissions neutral default action is stop consuming radar information into the control systems.	Message is not received from controller for Flexray Message: Barrier_1 Barrier_2 Barrier_3 Barrier_4 Object_Header Object_Track1 Object_Track2 Object_Track3 Object_Track4 Object_Track5 Object_Track6 Stationary_Track1 Stationary_Track2 Stationary_Track3 Stationary_Track4 Stationary_Track5 Stationary_Track6 Stationary_Track7 Stationary_Track8 Stationary_Track9 Stationary_Track10 Stationary_Track11 Stationary_Track12 Stationary_Track13 Stationary_Track14 Stationary_Track15 Stationary_Track16	For all Signals: > 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter Flexray Diagnoistics	= RUN > 9V = 0 = 1 (True)	See threshold value	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Right Rear Short Range Radar Sensor Module	U026C	This DTC is set by the EOCM when signal supervision by the EOCM on Right Rear Short Range Radar Sensor Module has failed. The emissions neutral default action is stop consuming radar information into the control systems	Message is not received from controller for Flexray Message: Barrier_1 Barrier_2 Barrier_3 Barrier_4 Object_Header Object_Track1 Object_Track2 Object_Track3 Object_Track4 Object_Track5 Object_Track6 Stationary_Track1 Stationary_Track2 Stationary_Track3 Stationary_Track4 Stationary_Track5 Stationary_Track6 Stationary_Track7 Stationary_Track8 Stationary_Track9 Stationary_Track10 Stationary_Track11 Stationary_Track12 Stationary_Track13 Stationary_Track14 Stationary_Track15 Stationary_Track16	For all Signals: > 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter Flexray Diagnoistics	= RUN > 9V = 0 = 1 (True)	See threshold value	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Center Rear Short Range Radar Sensor Module	U026D	This DTC is set by the EOCM when signal supervision by the EOCM on Center Rear Short Range Radar Sensor Module has failed. The emissions neutral default action is stop consuming radar information into the control systems	Message is not received from controller for Flexray Message: Barrier_1 Barrier_2 Barrier_3 Barrier_4 Object_Header Object_Track1 Object_Track2 Object_Track3 Object_Track4 Object_Track5 Object_Track6 Stationary_Track1 Stationary_Track2 Stationary_Track3 Stationary_Track4 Stationary_Track5 Stationary_Track6 Stationary_Track7 Stationary_Track8 Stationary_Track9 Stationary_Track10 Stationary_Track11 Stationary_Track12 Stationary_Track13 Stationary_Track14 Stationary_Track15 Stationary_Track16	For all Signals: > 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter Flexray Diagnoistics	= RUN > 9V = 0 = 1 (True)	See threshold value	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Anti-Lock Brake System Control Module	U0415	Indicates invalid or out dated data was received from the Brake Control Module. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on Chassis Expanson CAN Bus any of the following messages: $17D, $0C1, or $0C5.	6 out of 10 failures of ARC or Checksum on any frame	CE Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Restraints Control Module	U0452	Indicates invalid or out dated data was received from the Restrain Control Module. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on Chassis Expanson CAN Bus any of the following messages: $130 OR $140	6 out of 10 failures of ARC or Checksum on any frame	CE Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Active Safety Control Module 2	U053C	Indicates invalid or out dated data was received from From Active Safety Control Module 2 (EOCM2B). The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on the following signals: - High Speed Expansion CAN Bus $320 - Chassis Expansion Can Bus $154 - "EOCM2B_Operational_Status" frame on FlexRay channel A and B	6 out of failures of 10 ARC or Checksum on any frame	Front Object CAN, Chassis Expansion CAN and FlexRay Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Vehicle Dynamics Sensor 1	U1032	This DTC is set by the EOCM when signal supervision by the EOCM on the Vehicle Dynamics Sensor 1 has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $130 Message $132 Message $134	 > 0.5 seconds > 0.5 seconds > 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_FOCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Vehicle Dynamics Sensor 2	U1033	This DTC is set by the EOCM when signal supervision by the EOCM on the Vehicle Dynamics Sensor 2 has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $136 Message $138 Message $140	 > 0.5 seconds > 0.5 seconds > 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_FOCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Electronic Brake Control Module on Chassis Expansion CAN Bus	U1833	This DTC is set by the EOCM when signal supervision by the EOCM on the Electronic Brake Control Module on Chassis Expansion CAN Bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $0C0 Message $0C1 Message $0C5 Message $170 Message $17D Message $348 Message $34A	 > 0.5 seconds > 0.5 seconds > 0.5 seconds > 0.5 seconds > 5.0 seconds > 2.0 seconds > 2.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_CECOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Body Control Module on Low Speed CAN Bus	U184A	This DTC is set by the EOCM when signal supervision by the EOCM on the Body Control Module has failed on Low Speed CAN Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Vectra Specific Network Management Data from the BCM is missing	Signal not recieved for 6 out of 10 counts	System Power Mode Battery Voltage Manufacturing Enable Counter K_LSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	0.6 seconds out of a 1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Active Safety Control Module 2 on Chassis Expansion CAN Bus	U18B7	This DTC is set by the EOCM when signal supervision by the EOCM for the Active Safety Control Module 2 on Chassis Expansion CAN Bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $154	 > 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_CECOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Power Steering Control Module on High Speed CAN Bus	U18BA	This DTC is set by the EOCM when signal supervision by the EOCM on the Electronic Power Steering System on High Speed CAN Bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $164 Message $1E5	 > 0.5 seconds > 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_CECOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Power Steering Control Module on Chassis Expansion High Speed CAN Bus	U18BB	This DTC is set by the EOCM when signal supervision by the EOCM on the Electronic Power Steering System on Chassis Expansion Speed CAN Bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $164	> 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_CECOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Electronic Brake Control Module on High Speed CAN Bus	U18C5	This DTC is set by the EOCM when signal supervision by the EOCM on the Electronic Brake Control Module on High Speed CAN Bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $1C7 Message $1E9 Message $214 Message $2F9	 > 1.0 seconds > 1.0 seconds > 2.0 seconds > 2.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Active Safety Control Module 1 on Flexray Bus	U18CB	This DTC is set by the EOCM when signal supervision by the EOCM2A for the EOCM2B on the Flexray bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Secondary_System_Op_Stat	> 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter FlexRay Diagnostics	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type X, No MIL "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received from Vehicle Dynamic Sensor 1	U250E	This DTC is set by the EOCM when signal supervision by the EOCM on the Vehicle Dynamics Sensor 1 has failed on Front Object CAN Bus The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on Front Object Expanson CAN Bus any of the following messages: $130, $132, or $134	6 out of 10 failures of ARC or Checksum on any frame	FO Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received from Vehicle Dynamic Sensor 1	U250F	This DTC is set by the EOCM when signal supervision by the EOCM on the Vehicle Dynamics Sensor 2 has failed on Front Object CAN Bus The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on Front Object Expanson CAN Bus any of the following messages: $136, $138, or $140	6 out of 10 failures of ARC or Checksum on any frame	FO Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module - Internal Electronic Failure	U3000	This diagnoistic monitors the calculated results from each Komodos processor to ensure they all match. The specific calculations monitored are within LXCR (Lane Change and Centering Control) variables, LMFR (Lane Mapping Fusion) variables, or TSTR (Target Object Selection and Threat Assessment) variables. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	A mismatch is key varables within software rings LXCR, LMFR & TSTR, operating in parallel on other Komodos processors (K1P, K2P, K1R, K2P).	20 mismatches out of 20 counts	Diagnostic will run anytime there is sufficient processor throughput to allow execution of background tasks. Diagnoistic Enabled for each software componet (LXCR, LMFR, TSTR)	 = Enabled for all software componet	0.2 seconds out of a 0.2 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.

ECU Hardware Performance - Interal Malfunction	B101D	This diagnoistic monitors the internal power supply from the processor to ensure they ar within acceptable range of operation. The voltage level is read by ADC and available through a HWIO interface.
		
		The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise
			Komotdo 1 processor is fed multiple voltages by an onboard power supply. DTC is set if these power supplies are out of range for a predefined sliding window.
			
			Fault set if:
			
			0.75 V Suply
			
			1.3 V Supply
			
			3.3 V Supply
			
			1.425 V Supply
				Min. Threshold = 0.70879V, Max. Threshold = 0.79079V
				
				Min. Threshold = 1.25V, Max. Threshold = 1.35V
				
				Min. Threshold = 3.07V, Max. Threshold = 3.43V
				
				Min. Threshold = 1.32V, Max. Threshold = 1.48V
					Diganoistic is Enabled
					
					If (Configuration for Low Voltage Enablement is FALSE), diagnoistic will not consider low voltage condition and run regardless of battery monitor voltage.
					
					If (Configuration for Low Voltage Enablement is TRUE), then the diagnoistic will NOT run when the battery monitor votlage is < 5.5 V
					
					Diagnoistic System is not in State of Reset. This includes:
					-Code Clear in Process
					-End of Trip Processing
					-Diagnoistic Re-enable in Process
						= TRUE	0.15 seconds out of a 0.2 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

			Voltage difference between processors exceeds thresholds	Absolute Difference in Processor Voltage is Greater Than 3.0 V	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process Diganoistic is Enabled	= TRUE	3 seconds out of a 6 seconds window	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pressure Signal Protection Value Rolling Count or Validity Bit Error	C0561	Monitor indicates invalid or out of date brake pressure information was received from the brake controller on High Speed Expansion Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise	Monitors the brake pressure from the brake system on High Speed Expansion Bus (GM HE $214) for Alive Rolling Counter (ARC) OR Cyclic Redundant;Checksum (CRC) Failure. A failure of either will increase the fail counter.	10 Fail Counters within 16 Samples	Diagnoistic is Enabled HE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.5 seconds out of a 0.8 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pedal Inital Travel Achieved Message Counter Incorrect	C1206	Monitor indicates invalid or out of date Brake Pedal Inital Travel Achieved Message was received on High Speed Expansion Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise	Monitors brake pedal travel on High Speed Expansion Bus (GM HE $0F1) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled HE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Steering Wheel Angle Sensor Signal Message Counter Incorrect	C1211	Monitor indicates invalid or out of date Steering Angle Sensor Message was received on High Speed and Chassis Expansion Bus. This include both the electronic power steering system, and the secondary column mounted steering angle sensor. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors steering angle signal from the electronic power steering sensor on High Speed Expansion Bus (GM HE $1F5) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled HE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			Monitors steering angle signal from the secondary steering angle sensor on Chassis Expansion High Speed Bus (GM CE $1E5) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled CE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.06 seconds out of a 0.1 seconds window	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Steering Torque Delivered Status Message Counter Incorrect on High Speed CAN Bus	C2A05	Monitor indicates invalid or out of date Steering Torque Message was received on High Speed Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors steering torque on High Speed Bus (GM HS $164) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled HS CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.06 seconds out of a 0.1 seconds window Diagnoistic runs every 10 msec	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Steering Torque Delivered Status Message Counter Incorrect on Chassis High Speed CAN Bus	C2A06	Monitor indicates invalid or out of date Steering Torque Message was received on Chassis High Speed CAN Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors steering torque on Chassis High Speed Bus (GM CE $164) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled CE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE = Active	0.06 seconds out of a 0.1 seconds window Diagnoistic runs every 10 msec	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
System Voltage Low	P0562	Detects a low 12V system. This diagnostic reports the DTC when battery voltage is low. Monitoring occurs when the engine speed is above a calibrated value. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	System voltage high	Battery Voltage <= 9.0 Volts	Run/Crank Diagnostic Engine RPM	= Active = Enabled >= 1,200.0 RPM	0.075 seconds out of a 0.075 seconds window Diagnoistic runs every 100 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Read Only Memory Performance	P0601	Monitors the performance of the Read Only Memory. This includes the non-volatile boot, code, or calibration memory. A Cyclic redundancy check, and Sinlg Bit ROM check is used. This diagnostic detects if the Compressor HV Voltage sensor has an out of range high circuit fault. If the enable conditions are met and compressor has detected an instantaneous out of range high fault on the sensor, the fail counter will increment. If the calibrated fail count threshold is met before the calibrated sample count, the diagnostic will report a FAIL and if not it will report a PASS. The diagnostic will continue to report as long as the enablement conditions are met. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When the cyclical redundancy check is invalid, the fault flag is set to TRUE and the fail counter increments	Fail Counter > 5		The CRC diagnostic will run anytime there is sufficient processor throughput to allow execution of background task		Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			For Single Bit ROM Errors, the fault fault is to TRUE and the fail counter is increased	Fail Counter > 5	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	Diagnoistic System is not in State of Reset.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Not Programmed	P0602	Indicates the EOCM needs to be programmed The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	This DTC is set via calibration, when KeIDND_b_NoStartCal	 =TRUE	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	Diagnoistic System is not in State of Reset.	1 second	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Long Term Memory Reset	P0603	Data was lost from Non-Volatile Memory. Could be due to failure of flash, NVM memory failure, first time power up if the shut down was interrupted. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Non-volatile memory (static or dynamic) checksum failure at Powerup	= TRUE	Controller Initialize	= Complete	Once during start-up	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Random Access Memory Performance	P0604	If there is a failure in these types in RAM: Secondary, System, Cache, eTUP The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Indicates that control module is unable to correctly write and read data to and from: - RAM - Cached RAM - TPU RAM	Detects data read does not match data written >= = 3 counts = 3 counts = 3 counts	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	Diagnoistic System is not in State of Reset.	= 2,000.00 mseconds	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	= 0.175 seconds				
			Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	= 65,534 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Processor Performance	P0606	Indicates that the EOCM has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	If any of the following fault occurs: - ROM completion fault (reported to PISR from MPMR) - ALU fault - Configuration Registers fault - Stack fault - Analog to Digital Converter fault - Secondary processor detected Main processor CPU State of Health fault - DMA transfer fault - Missing T0 task's motor control related duty cycle event fault - Lockstep fault - Secondary processor not running Seed/Key test - Secondary processor fails to take remedial action - Secondary processor received incorrect keys - Main processor detected Seed/Key timeout - Main processor detected seeds received in wrong order		Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process And the Run/Crank Voltages are not low.	Diagnoistic System is not in State of Reset. > 10.0 V	The diagnoistic operates every 12.5 msec	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Long Term Memory Performance	P062F	This diagnostic runs test for non-volatile memory performance diagnostic. Checks if Assembly Cals are defaulted or non-volatile memory Handler is unable to commit to flash in the future due to memory errors. Typically this means that the controller has run out of flash blocks for storing the data (the total erase/write cycles for each block has been exceeded. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When BINVDM region needs to be copied but cannot be VeMEMR_b_BINVDM_CannotCopy	= TRUE		To be run during NVM Handler control task	Runs every 100 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"
			When there is an assembly calibration failure reported by HWIO at initialization. Ve MEMD_b_AsyCalFail	= TRUE		To be run during NVM Handler control task	Runs every 100 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position Signal Message Counter Incorrect	P100E	Monitor indicates invalid or out of date data acceleator pedal position was received from the engine controller on High Speed Expansion Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors the accelerator pedal position signal from the engine on High Speed Expansion Bus (GM HE $1C4) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage HE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = Active	0.15 seconds out of a 0.25 seconds window Diagnoistic Runs every 25 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Distance Sensing Cruise Control Driver Requested Torque Signal Message Counter Incorrect	P157B	Monitor indicates invalid or out of date EOCM torque feedback was received from the engine controller on High Speed Expansion Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Monitors the EOCM torque feedback from the engine on High Speed Expansion Bus (GM HE $1C4) for Alive Rolling Counter (ARC) OR Cyclic Redundant Checksum (CRC) Failure. A failure of either will increase the fail counter.	6 Fail Counters within 10 Samples	Diagnoistic is Enabled EOCM2 Supply Voltage HE CAN Communication Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	= TRUE > 9.0 V for > 3 seconds = Active	0.15 seconds out of a 0.25 seconds window Diagnoistic Runs every 25 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Monitor Control Module Serial Peripheral Interface Bus 2	P16E9	This diagnoistic monitors for Interprocessor communications (Between K1, K2, IMX Processor) The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When it detects SPI communication fault as indicated between any two micros (K1,K2,IMX) in EOCM2		Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process AND No error parsing Serial Perpheral Interface Data			Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Monitor Control Module Serial Peripheral Interface Bus 1	P16F0	This diagnoistic monitors for Interprocessor communications (Between K1, K2, IMX Processor) The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	When it detects SPI communication fault as indicated between any two micros (K1,K2,IMX) in EOCM2		Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process AND No error parsing Serial Perpheral Interface Data			Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication on Chassis Expansion CAN Bus Off	U0077	A bus off condition has been detected for the Chassis Expansion CAN Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	This DTC monitors for a BUS off condition on Chassis Expansion High Speed CAN BUs	A failure is detected for 3 counts for 1000 ms	Vehicle Power Mode EOCM Operational Condition Diagnoistic Enabled Supply Voltage	= RUN = EOCM Comm Active State = True 9 > V > 16V	3 seconds out of a 5 seconds window Diagnoistic runs every 1000 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication on Low Speed CAN Bus Off	U0078	A bus off condition has been detected for the Low Speed CAN Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	This DTC monitors for a low speed Bus off condition	A failure is detected for 6 counts for 1000 ms	Vehicle Power Mode EOCM Operational Condition Diagnoistic Enabled Supply Voltage	= RUN = EOCM Comm Active State = True 9 > V > 16V	6 seconds out of a 10 seconds window Diagnoistic runs every 1000 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication FlexRay 1B Bus Off	U007F	A bus off condition has been detected for the FlexRay 1B Network The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	This DTC monitors for a FlexRay 1B Bus Off Contition	A failure is detected for 6 counts for 1000 ms	Vehicle Power Mode EOCM Operational Condition Diagnoistic Enabled Supply Voltage	= RUN = EOCM Comm Active State = True 9 > V > 16V	0.2 seconds out of a 20 seconds window Diagnoistic runs every 20 ms	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Engine Control Module "A"	U0100	This DTC is set by the EOCM when signal supervision by the EOCM on the Engine Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $0C9 Message $0D3 Message $1C3 Message $1C4 Message $1C5 Message $1CA Message $3E9 Message $4F1	 > 0.5 seconds > 0.5 seconds > 1.0 seconds > 1.0 seconds > 1.0 seconds > 1.0 seconds > 5.0 seconds > 40.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Transmission Control Module	U0101	This DTC is set by the EOCM when signal supervision by the EOCM on the Tramission Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $1F5	 > 1.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Steering Angle Sensor Module	U0126	This DTC is set by the EOCM when signal supervision by the EOCM on the steering angle sensor has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $1E5	> 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_CHASCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Body Control Module	U0140	This DTC is set by the EOCM when signal supervision by the EOCM on the Body Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $0F1 Message $1F1 Message $1E1	 > 0.5 seconds > 1.5 seconds > 5.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Restrains Control Module	U0151	This DTC is set by the EOCM when signal supervision by the EOCM on the Restrains Control Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $130 Message $140	 > 0.5 seconds > 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_LSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Left Front Short Range Radar Sensor Module	U0265	This DTC is set by the EOCM when signal supervision by the EOCM on Left Front Short Range Radar Sensor Module has failed. The emissions neutral default action is stop consuming radar information into the control systems.	Message is not received from controller for Flexray Message: Barrier_1 Barrier_2 Barrier_3 Barrier_4 Object_Header Object_Track1 Object_Track2 Object_Track3 Object_Track4 Object_Track5 Object_Track6 Stationary_Track1 Stationary_Track2 Stationary_Track3 Stationary_Track4 Stationary_Track5 Stationary_Track6 Stationary_Track7 Stationary_Track8 Stationary_Track9 Stationary_Track10 Stationary_Track11 Stationary_Track12 Stationary_Track13 Stationary_Track14 Stationary_Track15 Stationary_Track16	For all Signals: > 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter Flexray Diagnoistics	= RUN > 9V = 0 = 1 (True)	See threshold value	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Right Front Short Range Radar Sensor Module	U0268	This DTC is set by the EOCM when signal supervision by the EOCM on Right Front Short Range Radar Sensor Module has failed. The emissions neutral default action is stop consuming radar information into the control systems.	Message is not received from controller for Flexray Message: Barrier_1 Barrier_2 Barrier_3 Barrier_4 Object_Header Object_Track1 Object_Track2 Object_Track3 Object_Track4 Object_Track5 Object_Track6 Stationary_Track1 Stationary_Track2 Stationary_Track3 Stationary_Track4 Stationary_Track5 Stationary_Track6 Stationary_Track7 Stationary_Track8 Stationary_Track9 Stationary_Track10 Stationary_Track11 Stationary_Track12 Stationary_Track13 Stationary_Track14 Stationary_Track15 Stationary_Track16	For all Signals: > 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter Flexray Diagnoistics	= RUN > 9V = 0 = 1 (True)	See threshold value	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Front Long Range Radar Sensor Module	U0269	This DTC is set by the EOCM when signal supervision by the EOCM on Front Long Range Radar Sensor Module has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for Flexray Message: Barrier_1 Barrier_2 Barrier_3 Barrier_4 Object_Header Object_Track1 Object_Track2 Object_Track3 Object_Track4 Object_Track5 Object_Track6 Stationary_Track1 Stationary_Track2 Stationary_Track3 Stationary_Track4 Stationary_Track5 Stationary_Track6 Stationary_Track7 Stationary_Track8 Stationary_Track9 Stationary_Track10 Stationary_Track11 Stationary_Track12 Stationary_Track13 Stationary_Track14 Stationary_Track15 Stationary_Track16	For all Signals: > 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter Flexray Diagnoistics	= RUN > 9V = 0 = 1 (True)	See threshold value	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Left Rear Short Range Radar Sensor Module	U026B	This DTC is set by the EOCM when signal supervision by the EOCM on Left Rear Short Range Radar Sensor Module has failed. The emissions neutral default action is stop consuming radar information into the control systems.	Message is not received from controller for Flexray Message: Barrier_1 Barrier_2 Barrier_3 Barrier_4 Object_Header Object_Track1 Object_Track2 Object_Track3 Object_Track4 Object_Track5 Object_Track6 Stationary_Track1 Stationary_Track2 Stationary_Track3 Stationary_Track4 Stationary_Track5 Stationary_Track6 Stationary_Track7 Stationary_Track8 Stationary_Track9 Stationary_Track10 Stationary_Track11 Stationary_Track12 Stationary_Track13 Stationary_Track14 Stationary_Track15 Stationary_Track16	For all Signals: > 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter Flexray Diagnoistics	= RUN > 9V = 0 = 1 (True)	See threshold value	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Right Rear Short Range Radar Sensor Module	U026C	This DTC is set by the EOCM when signal supervision by the EOCM on Right Rear Short Range Radar Sensor Module has failed. The emissions neutral default action is stop consuming radar information into the control systems.	Message is not received from controller for Flexray Message: Barrier_1 Barrier_2 Barrier_3 Barrier_4 Object_Header Object_Track1 Object_Track2 Object_Track3 Object_Track4 Object_Track5 Object_Track6 Stationary_Track1 Stationary_Track2 Stationary_Track3 Stationary_Track4 Stationary_Track5 Stationary_Track6 Stationary_Track7 Stationary_Track8 Stationary_Track9 Stationary_Track10 Stationary_Track11 Stationary_Track12 Stationary_Track13 Stationary_Track14 Stationary_Track15 Stationary_Track16	For all Signals: > 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter Flexray Diagnoistics	= RUN > 9V = 0 = 1 (True)	See threshold value	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Center Rear Short Range Radar Sensor Module	U026D	This DTC is set by the EOCM when signal supervision by the EOCM on Center Rear Short Range Radar Sensor Module has failed. The emissions neutral default action is stop consuming radar information into the control systems.	Message is not received from controller for Flexray Message: Barrier_1 Barrier_2 Barrier_3 Barrier_4 Object_Header Object_Track1 Object_Track2 Object_Track3 Object_Track4 Object_Track5 Object_Track6 Stationary_Track1 Stationary_Track2 Stationary_Track3 Stationary_Track4 Stationary_Track5 Stationary_Track6 Stationary_Track7 Stationary_Track8 Stationary_Track9 Stationary_Track10 Stationary_Track11 Stationary_Track12 Stationary_Track13 Stationary_Track14 Stationary_Track15 Stationary_Track16	For all Signals: > 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter Flexray Diagnoistics	= RUN > 9V = 0 = 1 (True)	See threshold value	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Anti-Lock Brake System Control Module	U0415	Indicates invalid or out dated data was received from the Brake Control Module. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on Chassis Expanson CAN Bus any of the following messages: $17D, $0C1, or $0C5.	6 out of 10 failures of ARC or Checksum on any frame	CE Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Restraints Control Module	U0452	Indicates invalid or out dated data was received from the Restrain Control Module. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on Chassis Expanson CAN Bus any of the following messages: $130 OR $140	6 out of 10 failures of ARC or Checksum on any frame	CE Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Active Safety Control Module 1	U053B	Indicates invalid or out dated data was received from From Active Safety Control Module 2 (EOCM2A). The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on the following signals: - High Speed Expansion CAN Bus $320 - Chassis Expansion Can Bus $154 - EOCM2B_Operational_Status" frame on FlexRay channel A and B	6 out of failures of 10 ARC or Checksum on any frame	Front Object CAN, Chassis Expansion CAN and FlexRay Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Vehicle Dynamics Sensor 1	U1032	This DTC is set by the EOCM when signal supervision by the EOCM on the Vehicle Dynamics Sensor 1 has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $130 Message $132 Message $134	 > 0.5 seconds > 0.5 seconds > 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_FOCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Vehicle Dynamics Sensor 2	U1033	This DTC is set by the EOCM when signal supervision by the EOCM on the Vehicle Dynamics Sensor 2 has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $136 Message $138 Message $140	 > 0.5 seconds > 0.5 seconds > 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_FOCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Electronic Brake Control Module on Chassis Expansion CAN Bus	U1833	This DTC is set by the EOCM when signal supervision by the EOCM on the Electronic Brake Control Module on Chassis Expansion CAN Bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $0C0 Message $0C1 Message $0C5 Message $170 Message $17D Message $348 Message $34A	 > 0.5 seconds > 0.5 seconds > 0.5 seconds > 0.5 seconds > 5.0 seconds > 2.0 seconds > 2.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_CECOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Body Control Module on Low Speed CAN Bus	U184A	This DTC is set by the EOCM when signal supervision by the EOCM on the Body Control Module has failed on Low Speed CAN Bus. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Vectra Specific Network Management Data from the BCM is missing	Signal not recieved for 6 out of 10 counts	System Power Mode Battery Voltage Manufacturing Enable Counter K_LSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	0.6 seconds out of a 1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Active Safety Control Module 1 on Chassis Expansion CAN Bus	U18B6	This DTC is set by the EOCM when signal supervision by the EOCM on the Electronic Power Steering System on High Speed CAN Bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $152 Message $315	 > 10.0 seconds > 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_CECOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Power Steering Control Module on High Speed CAN Bus	U18BA	This DTC is set by the EOCM when signal supervision by the EOCM on the Electronic Power Steering System on High Speed CAN Bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $164 Message $1E5	 > 0.5 seconds > 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_CECOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Power Steering Control Module on Chassis Expansion High Speed CAN Bus	U18BB	This DTC is set by the EOCM when signal supervision by the EOCM on the Electronic Power Steering System on Chassis Expansion Speed CAN Bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $164	 > 0.5 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_CECOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Electronic Brake Control Module on High Speed CAN Bus	U18C5	This DTC is set by the EOCM when signal supervision by the EOCM on the Electronic Brake Control Module on High Speed CAN Bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for: Message $1C7 Message $1E9 Message $214 Message $2F9	 > 1.0 seconds > 1.0 seconds > 2.0 seconds > 2.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter K_HSCOM_DIAG_ENABLE	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Active Safety Control Module 1 on Flexray Bus	U18CA	This DTC is set by the EOCM when signal supervision by the EOCM2A for the EOCM2B on the Flexray bus has failed. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	Message is not received from controller for Flexray Message: Secondary_System_Op_Stat	> 10.0 seconds	System Power Mode Battery Voltage Manufacturing Enable Counter FlexRay Diagnostics	= RUN > 9V = 0 = 1 (True)	See threshold value.	Type X, No MIL "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received from Vehicle Dynamic Sensor 1	U250E	This DTC is set by the EOCM when signal supervision by the EOCM on the Vehicle Dynamics Sensor 1 has failed on Front Object CAN Bus The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on Front Object Expanson CAN Bus any of the following messages: $130, $132, or $134	6 out of 10 failures of ARC or Checksum on any frame	FO Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received from Vehicle Dynamic Sensor 2	U250F	This DTC is set by the EOCM when signal supervision by the EOCM on the Vehicle Dynamics Sensor 2 has failed on Front Object CAN Bus The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	ARC or Checksum error on Front Object Expanson CAN Bus any of the following messages: $136, $138, or $140	6 out of 10 failures of ARC or Checksum on any frame	FO Can Communication Bus Voltage The Diagnostic system is not in a short term/state of reset (Code clear in progress, diagnostic reenable in progress, or end of trip processing in progress)	= Active = 9V < Voltage < 16V	0.06 seconds out of a 0.1 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module - Internal Electronic Failure	U3000	This diagnoistic monitors the calculated results from each Komodos processor to ensure they all match. The specific calculations monitored are within LXCR (Lane Change and Centering Control) variables, LMFR (Lane Mapping Fusion) variables, or TSTR (Target Object Selection and Threat Assessment) variables. The emissions neutral default action is to disable adaptive cruise control and/or Super Cruise.	A mismatch is key varables within software rings LXCR, LMFR & TSTR, operating in parallel on other Komodos processors (K1P, K2P, K1R, K2P).	20 mismatches out of 20 counts	Diagnostic will run anytime there is sufficient processor throughput to allow execution of background tasks. Diagnoistic Enabled for each software componet (LXCR, LMFR, TSTR)	= Enabled for all software componet	0.2 seconds out of a 0.2 seconds window	Type C, No SVS "Safety Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
System Thermal Error	C0176	Internal Electronic Failure The emissions neutral default action for all diagnotics under DTC C0176 is to disable adaptive cruise control and/or Super Cruise	An internal electronics failure within the EPS as been detected	Fault Detected	Exception: Algorithm shall not run if C017654_ENABLE = disabled	Vehicle Power Mode Condition: RUN ECU Operational Condition: None Vehicle Operating Conditions: 6.0V < Vbat < 16V, Engine is running.	0.02 s	Safety Non-MIL Emissions Neutral Diagnostic
		Temperature High	When the system gets hot enough that there is a noticeable drop in performance (e.g.: a drop to 80% of nominal or below) The capability of the ECU is reduced due to temperature.	> 180°C	Exception: Algorithm shall not run if C017654_ENABLE = disabled	Vehicle Power Mode Condition: RUN ECU Operational Condition: None Vehicle Operating Conditions: 6.0V < Vbat < 16V, Engine is running.	0.02 s	Safety Non-MIL Emissions Neutral Diagnostic
Steering Wheel Angle Sensor	C0460	Angle Measurement Errors The emissions neutral default action for all diagnotics under DTC C0460 is to disable adaptive cruise control and/or Super Cruise	Handwheel angle value outside mechanical limitation OR Motor position and angle sensor position mismatched by	> ±540° >±15°	Exception: Algorithm shall not run if C046000_ENABLE = disabled	Vehicle Power Mode Condition: RUN (do not run during CRANK) ECU Operational Condition: None Vehicle Operating Conditions: 6.0V < Vbat < 16V, Engine is running.	0.06 s	Safety Non-MIL Emissions Neutral Diagnostic
		Calibration Not Learned	Check of flag in NVM to confirm that sensor calibration has taken place	Fault Detected	Exception: Algorithm shall not run if C046058_ENABLE = disabled	Vehicle Power Mode Condition: RUN (do not run during CRANK) ECU Operational Condition: None Vehicle Operating Conditions: 6.0V < Vbat < 16V, Engine is running.	0.004 s	Safety Non-MIL Emissions Neutral Diagnostic
		Incorrect Reaction After Event	PWM Duty Cycle OR PWM Period < 776 us or > 1304 us OR Difference between the fine and coarse signals > 51 deg	< 5% or > 95% < 776 us or > 1304 us > 51 deg	Exception: Algorithm shall not run if C046058_ENABLE = disabled	Vehicle Power Mode Condition: RUN (do not run during CRANK) ECU Operational Condition: None Vehicle Operating Conditions: 6.0V < Vbat < 16V, Engine is running.	0.02 s	Safety Non-MIL Emissions Neutral Diagnostic
		Plausibility Failure	difference between the calibrated straight ahead angle and the calculated road-wheel straight ahead value	> 30 deg	Exception: Algorithm shall not run if C04605A_ENABLE = disabled	Vehicle Power Mode Condition: RUN (do not run during CRANK) ECU Operational Condition: None Vehicle Operating Conditions: Engine is running.	0.06 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric Steering Motor Circuit	C0475	ECU Microfault The emissions neutral default action for all diagnostics under DTC C0475 is to disable adaptive cruise control and/or Super Cruise	ECU C micro has tripped with a B level diagnostic.	Fault Detected	Exception: Algorithm shall not run if C047500_ENABLE = disabled	Vehicle Power Mode Condition: RUN ECU Operational Condition: None Vehicle Operating Conditions: 6.0V < Vbat < 16V, Engine is running.	Continuously Monitored; Fault Detected	Safety Non-MIL Emissions Neutral Diagnostic
Steering Wheel Torque Input Sensor	C0545	Torque Sensor diagnostics The emissions neutral default action for all diagnostics under DTC C0545 is to disable adaptive cruise control and/or Super Cruise	The faults are raised if Torque Sensor diagnostics detect that the PWM period for channel 1 or 2 is continuously below and above the threshold of 384uSec and 640uSec respectively for 20ms OR The faults are raised if Torque Sensor diagnostics detect that the PWM duty for channel 1 or 2 is continuously above and below a threshold of 95% and 5% respectively for 20ms OR This fault is raised if the difference between the torque calculated in both channels is greater than a fixed error threshold of 2.5Nm continuously for 20ms OR This fault is raised if there is at least one confirmed fault detected on each channel with respect to PWM duty and frequency continuously for 20ms the following torque sensor fault codes are raised at power up	Threshold for Torque Cross Check = 2.5 Nm	Exception: Algorithm shall not run if C054500_ENABLE = disabled	Vehicle Power Mode Condition: RUN ECU Operational Condition: None Vehicle Operating Conditions: 6.0V < Vbat < 16V, Engine is running.	0.02 s	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Self Test Failed	Torque crosscheck fault - Difference in torque measurement between both sensors.	Fault Detected	Exception: Algorithm shall not run if C05453B_ENABLE = disabled	Vehicle Power Mode Condition: RUN ECU Operational Condition: None Vehicle Operating Conditions: 6.0V < Vbat < 16V, Engine is running.	0.02 s	Safety Non-MIL Emissions Neutral Diagnostic
Steering Gear Performance	C055C	High Steering Rack Friction The emissions neutral default action for all diagnostics under DTC C055C is to disable adaptive cruise control and/or Super Cruise	Software determines the level of steering rack friction and determines if there has been an increased levels of friction of the steering gear over the life of the product.	High Friction Fault Detected	None	ECU Operational Condition: Power up, Normal Operation Vehicle Operating Conditions: Ignition ON	0.02 s	Safety Non-MIL Emissions Neutral Diagnostic
		General Checksum Failure The emissions neutral default action for all diagnostics under DTC C0569 is to disable adaptive cruise control and/or Super Cruise	This fault is raised if the Gearing tune block has a CRC fault.	Fault Detected	None	ECU Operational Condition: Power UP Vehicle Operating Conditions: Ignition ON.	Once at Power-up	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
System Configuration	C0569	Internal Self Test Failed	This fault will be set during powerup on observing the presence of unlock software.	Manufacturing Engineering Counter ≠ 0	None	ECU Operational Condition: Power UP Vehicle Operating Conditions: Ignition ON.	Once at Power-up	Safety Non-MIL Emissions Neutral Diagnostic
		Calibration Data Set Not Programmed	This fault is raised if the tune loaded does not match the application software loaded. OR This fault is raised if Gear Polarity is set to 0. OR Tune Selection indicates an invalid Gear Tune selection. OR This fault is raised when MEC =0 and the Vehicle tune selected is not Default Vehicle Tune.	Fault Detected	Exception: Algorithm shall not run if C0566942_ENABLE = disabled	Vehicle Power Mode Condition: RUN ECU Operational Condition: None Vehicle Operating Conditions: 6.0V < Vbat < 16V, Engine is running	Once at Power-up	Safety Non-MIL Emissions Neutral Diagnostic
		Vehicle Configuration Not Programmed	This fault is raised if the End of line data indicate that the TRW end of line has marked the part as EPS being out of specification. OR This fault indicates that the EPP has not passed TRW's end of line tests.	Fault Detected	Exception: Algorithm shall not run if C0566942_ENABLE = disabled	ECU Operational Condition: Power UP Vehicle Operating Conditions: Ignition ON.	Once at Power-up	Safety Non-MIL Emissions Neutral Diagnostic
		Micro Processor, ROM/RAM or SPI Fault The emissions neutral default action for all diagnostics under DTC C056D is to disable adaptive cruise control and/or Super Cruise	This fault is raised if the ISense current measurement is not reading a zero(+/-5A) at power up continuously for 20ms. OR This fault is raised if the ISense measurement does not respond to a positive offset correctly during power up (between 63A and 71A). OR This fault is raised if the ISense measurement does not respond to a negative offset correctly during power up (between - 63A and - 71A). OR This fault is raised if the ISense measurement does not correctly respond to both positive and negative offsets being asserted at power up (+/- 10A). OR This fault is raised if the ISense measurement indicates an un-usually high fault current (200A). OR This fault is raised when the ECU internal watch dog is not serviced continuously for 20ms by monitored tasks. OR This fault is raised during power up if the request for SafeTCore to trip has not resulted in the SafeTCore getting tripped. OR This fault is raised if the EPS raises level B fault that has a fault reaction set to "INCREMENT C69 COUNTER" continuously for three consecutive cycles. OR These faults are raised if during power up the CPU does not process the software correctly. OR This fault is raised during power up there has not been any response from SafeTMon (in the other micro) for 20ms. OR This fault is raised during power up or in normal operation if SafeTMon	Fault Detected	Exception: Algorithm shall not run if C056D00_ENABLE = disabled	Vehicle Power Mode Condition: RUN ECU Operational Condition: None Vehicle Operating Conditions: 6.0V < Vbat < 16V, Engine is running.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
ECU Hardware Performance	C056D		OR This fault is raised if SafeTMon is not in ACTIVE state for 20ms when expected. This diagnostic is scheduled every 20ms. OR This fault is raised if SafeTMon is not in run time mode when expected for a period of 20ms. OR This fault is raised if SafeTMon does not trip during power down when a fault is intentionally injected. OR This fault is raised when a SafeTMon incorrect state transition is requested. This diagnostic is scheduled every 1ms. OR This fault is raised if the EcuC micro's SafeTMon has detected a failure with EpsC micro continuously for a period of 20ms. OR This fault is raised if the EpsC micro's SafeTMon has detected a fault with EcuC Micro continuously for 20ms. OR The above fault is raised if the Motor Torque demand calculation and the SFS blend gains A and B do not match the parallel monitor calculations continuously for 20ms OR This fault is raised if an unexpected and an unhandled interrupt vector has been fired. OR This fault is raised under the following conditions: - If an OS task has been scheduled while the previous scheduling of the same task has not yet completed - If a power up fast task(100uSec task) has over run twice in a row - If a Stack under or over flow has been detected by the software - OS has triggered an unhandled or undefined task OR This fault is raised if the interrupts are not executing at the correct expected rate. OR This fault is raised if the tasks do not execute in the correct order in the software. OR This fault is raised when a fault is detected in safety communication between the two micros continuously for 20ms. This is scheduled every 1ms scheduler. OR This fault is raised if during power up the two micros cannot communicate continuously for 20ms. OR This fault is raised when an Inter Controller Communication Failure is detected continuously for 20ms. OR This fault is raised if the RAM cell does not return the RAM pattern the diagnostic is expecting. The diagnostic is run every 200uSec				0.02 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR This fault is raised if the Interrupt has been triggered at the correct rate but not for the expected reason. OR This fault will be raised If Core voltage is outside the range of 3.713V to 5.305V for 60ms, then Fault will be raised. OR This fault will be raised if 2v5 port is in between 3.713V to 4.708V for 20ms. OR This fault will be raised if SMC NVM block CRC fails. OR AA5 and A86 are raised during EPS Power Down. When AA5 and A86 are present, the TOI feature(LKA and LCC) will NOT be available in the next key cycle. EPS sets the TOI Feedback status to Temp Limited					
ECU Software	C056E	General Memory Failure The emissions neutral default action for all diagnotics under DTC C056E is to disable adaptive cruise control and/or Super Cruise	Error detected when reading from NVM. OR Error detected when writing to NVM. OR Error detected when erasing NVM data. OR This fault is raised if NVM Data format migration fails. OR This fault is raised if there is any failure with EEPROM.	Fault Detected	None	ECU Operational Condition: Power Up/Power Down/Normal Operation Vehicle Operating Conditions: Ignition ON.	0.008 s	Safety Non-MIL Emissions Neutral Diagnostic
		Operational Software / Calibration Set Not Programmed	This fault is raised if an invalid command has been received by the SafeTMon from the SafeTCore of the other micro. OR This fault is raised if the micros communicate correctly at power up but not in the same mode (ie., one micro is in bootloader mode and the other is in Application mode).	Fault Detected	Exception: Algorithm shall not run if B101E41_ENABLE = disabled	Vehicle Power Mode Condition: RUN ECU Operational Condition: None Vehicle Operating Conditions: 6.0V < Vbat < 16V, Engine is running.	0.008 s	Safety Non-MIL Emissions Neutral Diagnostic
		Calibration Data Set Not Programmed	This fault is raised at startup if the product destination is set to SERVICE ($55) and not to PRODUCTION ($AA).	Fault Detected	Exception: Algorithm shall not run if B101E42_ENABLE = disabled	Vehicle Power Mode Condition: RUN ECU Operational Condition: None Vehicle Operating Conditions: 6.0V < Vbat < 16V, Engine is running.	0.008 s	Safety Non-MIL Emissions Neutral Diagnostic
		EEPROM Error	Fault raised if Infeneon FEE EEPROM Driver indicates a fault condition; fault set on every power cycle if the configuration of the EEPROM manager is incorrect	Fault Detected	Exception: Algorithm shall not run if B101E43_ENABLE = disabled	Vehicle Power Mode Condition: RUN ECU Operational Condition: None Vehicle Operating Conditions: 6.0V < Vbat < 16V, Engine is running.	0.008 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Performance	C056E	Theft / Security Data Not Programmed	This fault is raised if stored CRC of Root Info Table doesn't match with calculated CRC.	Fault Detected	None	ECU Operational Condition: Power up Vehicle Operating Conditions: Ignition ON.	Once at Power-up	Safety Non-MIL Emissions Neutral Diagnostic
		Checksum Error	This fault is raised if the tune or calibration data is corrupted during run time. This is scheduled every 20ms OR This fault is raised if default tune is corrupted and no reference tune can be selected. This is a power up fault.	Fault Detected	Exception: Algorithm shall not run if B101E4A_ENABLE = disabled	Vehicle Power Mode Condition: RUN ECU Operational Condition: None Vehicle Operating Conditions: 9.0V < Vbat < 16V, Engine is running.	0.02 s	Safety Non-MIL Emissions Neutral Diagnostic
		Incorrect Reaction After Event	This fault will be raised if the CAN transmitted ID is different than the configured ID for 5000msec. This is scheduled at 8ms. OR This fault will be raised if the message transmitted periodicity mismatches with configured periodicity for 5000msec. This is scheduled at 1ms. OR This fault will be raised if there is any mismatch between the received EOCM A CE data and extracted data. This diagnostic runs on receipt of the message.	Fault Detected	In addition, setting of the DTC shall be delayed under the following conditions: 1) Within the first 5 seconds after Power Mode is set to RUN	Vehicle Power Mode Condition: RUN ECU Operational Condition: None Vehicle Operating Conditions: 9.0V < Vbat < 16V, Engine is running.	5 s	Safety Non-MIL Emissions Neutral Diagnostic
		Plausibility Failure	These plausibility faults are raised at startup when the appropriate map (or calibration tables) validity conditions are not met.	Fault Detected	Exception: Algorithm shall not run if B101E4B_ENABLE = disabled	Vehicle Power Mode Condition: RUN ECU Operational Condition: None Vehicle Operating Conditions: 9.0V < Vbat < 16V, Engine is running	Once at Power-up	Safety Non-MIL Emissions Neutral Diagnostic
		Signal Above Allowable Range	This fault is raised if an invalid Steering Tune is selected.	Fault Detected	None	ECU Operational Condition: Power up Vehicle Operating Conditions: Ignition ON.	Once at Power-up	Safety Non-MIL Emissions Neutral Diagnostic
Device Power	C0800	Voltage Below Threshold The emissions neutral default action for all diagnostics under DTC C0800 is to disable adaptive cruise control and/or Super Cruise	ECU supply voltage.	<9V	Exception: Algorithm shall not run if C080003_ENABLE = disabled DTC is not inhibited when MEC>0	Vehicle Power Mode Condition: RUN ECU Operational Condition: None Vehicle Operating Conditions: Engine is running.	1 s	Safety Non-MIL Emissions Neutral Diagnostic
		Voltage Above Threshold	ECU supply voltage	>16V	Exception: Algorithm shall not run if C080007_ENABLE = disabled DTC is not inhibited when MEC>0	Vehicle Power Mode Condition: RUN ECU Operational Condition: None Vehicle Operating Conditions: Engine is running.	1 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Active Safety Control Module 1	U023A	Loss of communications with Active Safety Control Module 1 (EOCM2A) on GM HS and GM CE The emissions neutral default action for all diagnostics under DTC U023A is to disable adaptive cruise control and/or Super Cruise	This fault is raised if the message StrTrqCmd_A_CE has not been received from the EOCM2A at least twice in the last 10 messages. This fault is raised if the message StrTrqCmd_A_HS has not been received for EOCM2A at least twice in the last 10 messages.	Fault Detected	Exceptions: Algorithm shall not run if; U0023A00_ENABLE = disabled, U007300 status bit 1 = True, MEC > 00, or Bus Off events counter, used in the X of Y debounce strategy is > 0. In addition, setting of the DTC shall be delayed under the following conditions: 1) Within the first 5 seconds after Power Mode is set to RUN 2) Within the first 5 seconds of a reset of the device or device power-up 3) Within the first 5 seconds following recovery from an under-voltage condition	Vehicle Power Mode Condition: Power Mode signal RUN, and EngRunAtv signal is TRUE ECU Operational Condition: ECU_COMM_Active state = True. Vehicle Operating Conditions: 9.0V < Vbat < 16V, engine is running (Engine Run flag = True.	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
Lost Communication with Active Safety Control Module 2	U023B	Loss of communications with Active Safety Control Module 2 (EOCM2B) The emissions neutral default action for all diagnostics under DTC U023B is to disable adaptive cruise control and/or Super Cruise	This fault is raised if the message StrTrqCmd_A_CE has not been received from the EOCM2B at least twice in the last 10 messages. This fault is raised if the message StrTrqCmd_A_HS has not been received for EOCM2B at least twice in the last 10 messages.	Fault Detected	Exceptions: Algorithm shall not run if; U0023B00_ENABLE = disabled, U007300 status bit 1 = True, MEC > 00, or Bus Off events counter, used in the X of Y debounce strategy is > 0. In addition, setting of the DTC shall be delayed under the following conditions: 1) Within the first 5 seconds after Power Mode is set to RUN 2) Within the first 5 seconds of a reset of the device or device power-up 3) Within the first 5 seconds following recovery from an under-voltage condition	Vehicle Power Mode Condition: Power Mode signal RUN, and EngRunAtv signal is TRUE ECU Operational Condition: ECU_COMM_Active state = True. Vehicle Operating Conditions: 9.0V < Vbat < 16V, engine is running (Engine Run flag = True.	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Data Received From Active Safety Control Module 1	U053B	Invalid Serial Data Received The emissions neutral default action for all diagnotics under DTC U053B is to disable adaptive cruise control and/or Super Cruise	1) Validity - upon receipt of a monitored signal with its corresponding validity bit set to Invalid. 2) Rolling Count - upon receipt of a monitored signal without the corresponding rolling count value being properly updated. 3) Protection Value - upon receipt of a monitored signal with its corresponding protection value (checksum) not correct. The failure must be present continuously for 2000 mS before the test is considered failed The signals being monitored are: + StrTrqCmd_A_CE, at least twice in the last 10 messages. + StrTrqCmd_A_HS, at least twice in the last 10 messages.	Fault Detected	Exceptions: Algorithm shall not run if; U023A00_ENABLE = disabled, U007300 status bit 1 = True, MEC > 00, or Bus Off events counter, used in the X of Y debounce strategy is > 0. In addition, setting of the DTC shall be delayed under the following conditions: 1) Within the first 5 seconds after Power Mode is set to RUN 2) Within the first 5 seconds of a reset of the device or device power-up 3) Within the first 5 seconds following recovery from an under-voltage condition	Vehicle Power Mode Condition: Power Mode signal RUN, and EngRunAtv signal is TRUE ECU Operational Condition: ECU_COMM_Active state = True. Vehicle Operating Conditions: 9.0V < Vbat < 16V, engine is running (Engine Run flag = True.	2 s	Safety Non-MIL Emissions Neutral Diagnostic
Data Received From Active Safety Control Module 2	U053C	Invalid Serial Data Received The emissions neutral default action for all diagnotics under DTC U053C is to disable adaptive cruise control and/or Super Cruise	1) Validity - upon receipt of a monitored signal with its corresponding validity bit set to Invalid. 2) Rolling Count - upon receipt of a monitored signal without the corresponding rolling count value being properly updated. 3) Protection Value - upon receipt of a monitored signal with its corresponding protection value (checksum) not correct. The failure must be present continuously for 2000 mS before the test is considered failed The signals being monitored are: + StrTrqCmd_B_CE, at least twice in the last 10 messages. + StrTrqCmd_B_HS, at least twice in the last 10 messages.	Fault Detected	Exceptions: Algorithm shall not run if; U053C71_ENABLE = disabled, U007300 status bit 1 = True, MEC > 00, or Bus Off events counter, used in the X of Y debounce strategy is > 0. In addition, setting of the DTC shall be delayed under the following conditions: 1) Within the first 5 seconds after Power Mode is set to RUN 2) Within the first 5 seconds of a reset of the device or device power-up 3) Within the first 5 seconds following recovery from an under-voltage condition	Vehicle Power Mode Condition: Power Mode signal RUN, and EngRunAtv signal is TRUE ECU Operational Condition: ECU_COMM_Active state = True. Vehicle Operating Conditions: 9.0V < Vbat < 16V, engine is running (Engine Run flag = True.	2	Safety Non-MIL Emissions Neutral Diagnostic
Control Module High Speed Communication	U0073	Bus Off with GM High Speed CAN. The emissions neutral default action for all diagnotics under DTC U0073 is to disable adaptive cruise control and/or Super Cruise	When the Transmit Error Counter (TEC) exceeds 255 (Reference ISO 11898, Description of supervisor - Fault confinement), the GMLAN handler notifies the application of a bus off condition by using a callback function. This callback function is launched by the handler whenever a bus off condition is reported by the CAN-controller. A routine () checks every 1000ms if a Bus Off condition is present. If the number of Bus Off events exceeds a calibratable threshold of a calibratable number of consecutive tests, i.e. an X (=5) of Y (=5) algorithm, then the Bus Off fault code is set.	Fault Detected	Exceptions: Algorithm shall not run if U0073 00_ENABLE = disabled.	Vehicle Power Mode Condition: RUN ECU Operational Condition: ECU_COMM_Active state = True. Vehicle Operating Conditions: 9.0V < Vbat < 16V, engine is running.	5 seconds	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Chassis Expansion Communication Bus Off	U0077	Bus off with GM Chassis Expansion CAN The emissions neutral default action for all diagnotics under DTC U0077 is to disable adaptive cruise control and/or Super Cruise	When the Transmit Error Counter (TEC) exceeds 255 (Reference ISO 11898, Description of supervisor - Fault confinement), the GMLAN handler notifies the application of a bus off condition by using a callback function. This callback function is launched by the handler whenever a bus off condition is reported by the CAN-controller. A routine () checks every 1000ms if a Bus Off condition is present. If the number of Bus Off events exceeds a calibratable threshold of a calibratable number of consecutive tests, i.e. an X (=5) of Y (=5) algorithm, then the Bus Off fault code is set.	Fault Detected	Exceptions: Algorithm shall not run if U007700_ENABLE = disabled.	Vehicle Power Mode Condition: RUN ECU Operational Condition: ECU_COMM_Active state = True. Vehicle Operating Conditions: 9.0V < Vbat < 16V, engine is running.	5 seconds	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electronic Control Unit Hardware	B101D	The LRR detects any internal supply voltage error or Minimum Exitation Level magnet lost The emissions neutral default action for all diagnotics under DTC B101D is to disable adaptive cruise control and/or Super Cruise	MON_ADC_1V25_SMPS_V MON_ADC_3V3_LIN_AN_V MON_ADC_3V3_LIN_PA_V MON_ADC_3V8_SMPS_V MON_ADC_4V5_LIN_VCO_V MON_ADC_5V_SMPS_V MON_ADC_3V3_LIN_DIG_V	1.197< V < 1.296 Tolerance for test -1.40% + 2.10% 3.172 < V < 3.417 Tolerance for test -1.5% + 2.00% 3.172 < V < 3.417 Tolerance for test -1.5% + 2.00% 3.531 < V < 4.065 Tolerance for test -1.48% + 1.89% 4.206 < V < 4.788 Tolerance for test -3.20% + 3.70% 4.616 < V < 5.373 Tolerance for test -3.10% + 3.60% 3.172 < V < 3.417 Tolerance for test -1.498% + 1.937%	Voltage: Front LRR Sensor Mode Command Status PID $8002 –System Power Mode K_B101D_0_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	9 < V <16 V = Not Sensing or Sensing = Run Mode Only =TRUE	ECU checks every 0.01 s	Safety Non-MIL Emissions Neutral Diagnostic
		General Memory Failure. The LRR detects any memory write failure which causes the LRR to be replaced.	This failure is triggered by HW if there is something wrong with MicroController Abstraction Layer configurations (Microcontroller). This DTC should be tested directly with microcontroller register values.	Fault Detected	Voltage: Front LRR Sensor Mode Command Status PID $8002 –System Power Mode K_B101D_32_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	9 < V < 16V = Not Sensing or Sensing = Run Mode Only =TRUE	0.01 s	Safety Non-MIL Emissions Neutral Diagnostic
		Sepcial Memory Failure. The LRR detects any memory read failure or an internal voltage supply error from the slave microprocessor	This Failure is trigger when SPI module has detected a hardware error during data transfer. On every SPI transfer about 100Hz. Could be tested with oscilloscope connection on SPI_CS & SPI_CLK for correct transmission, and also running a wire from Tx/Rx lines from SPI to ground in order to create a SPI off.	Fault Detected	Voltage: Front LRR Sensor Mode Command Status PID $8002 –System Power Mode K_B101D_33_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	9 < V < 16V = Not Sensing or Sensing = Run Mode Only =TRUE	0.01 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		The LRR detects any internal hardware failure (eg. Multiple RAM errors, watchdog errors etc.)	The High Frequency chip is checked over a long time, this failure is triggered if there are invalid values . + HW Error Singal Processing Toolkit Test calulations : Singal Processing Toolkit Test calculations failed for a longer time. + Hw Error Chip Monitoring: Indicates an error in the: - Voltage Controlled Oscilator-Monitor-Path - RF-Module or V-Tune circuit. The SW is not designed to run on that HW version: - HW subcompat Ids min and max are defined in the application SW infoblock. - This failures could be tested creating failures on RF-chip module from ECU or flashing incorrect Production Parameters or SW Application Hardware to HW sample.	Fault Detected	Voltage: Front LRR Sensor Mode Command Status PID $8002 –System Power Mode K_B101D_39_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	9 < V < 16V = Not Sensing or Sensing = Run Mode Only =TRUE	0.01 s	Safety Non-MIL Emissions Neutral Diagnostic
		The LRR detects a CAN hardware failure	Microcontroller module has detected a clock source failure. Microcontroller module has detected a failure of external oscillator. Test this failures creating an error on external oscillator or bus off on clock source generator.	Fault Detected	Voltage: Front LRR Sensor Mode Command Status PID $8002 –System Power Mode K_B101D_3B_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	9 < V < 16V = Not Sensing or Sensing = Run Mode Only =TRUE	0.01 s	Safety Non-MIL Emissions Neutral Diagnostic
		Internal temperature measurement below K_LOWTEMP_THRESH_LOW for a period of K_DiagMonitorWindowTemp	Sytem Temperature for a period of K_DiagMonitorWindowTemp (0.1 s)	< -40°C	Voltage: Front LRR Sensor Mode Command Status PID $8002 –System Power Mode K_B101D_53_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	9 < V < 16V = Not Sensing or Sensing = Run Mode Only =TRUE	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Internal temperature measurement above K_HIGHTEMP_THRESH_HIGH for a period of K_DiagMonitorWindowTemp	System Temperature for a period of K_DiagMonitorWindowTemp (0.1 s)	> 105°C	Voltage: Front LRR Sensor Mode Command Status PID $8002 –System Power Mode K_B101D_54_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	9 < V < 16V = Not Sensing or Sensing = Run Mode Only =TRUE	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
Electronic Control Unit Software	B101E	ECU Software Performance - Calibration Data Set Not Programmed The emissions neutral default action for all diagnostics under DTC B101E is to disable adaptive cruise control and/or Super Cruise	The calibration field: k_default_calibration	= 0 (False)	Voltage: Front LRR Sensor Mode Command Status PID $8002 –System Power Mode K_B101D_42_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	9 < V < 16V = Not Sensing or Sensing = Run Mode Only =TRUE	0.01 s	Safety Non-MIL Emissions Neutral Diagnostic
		ECU Software Performance - Calibration Not Learned	k_default_calibration AND PID $4175 – Front Long Range Radar Aiming Status	= 0 (False) ≠ Successfully Aimed	Voltage: Front LRR Sensor Mode Command Status PID $8002 –System Power Mode K_B101E_4B_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	9 < V < 16V = Not Sensing or Sensing = Run Mode Only =TRUE	Every Factory or Service alignment diagnostic not successful	Safety Non-MIL Emissions Neutral Diagnostic
LRR - Control Module Circuit	B1325	Control Module Power Circuit - Voltage Threshold The emissions neutral default action for all diagnostics under DTC B1325 is to disable adaptive cruise control and/or Super Cruise	Bus Voltage For a period of K_DiagMonitorWindowBAT (0.5 s)	< 9V	Front LRR Sensor Mode Command Status Supply Voltage: PID $8002 –System Power Mode K_B1325_03_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	= Not Sensing or Sensing =9<V<16V =Allowed ECU operation = Run Mode Only =TRUE	0.5 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Bus Voltage For a period of K_DiagMonitorWindowBAT (0.5 s)	> 16V	Front LRR Sensor Mode Command Status Supply Voltage: PID $8002 –System Power Mode K_B1325_07_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	= Not Sensing or Sensing =9<V<16V =Allowed ECU operation = Run Mode Only =TRUE	0.5 s	Safety Non-MIL Emissions Neutral Diagnostic
Phsyical Mounting - Front Long Range Radar Sensor - Wrong Mounting Position	B390C	For Factory alignment, target alignment calibration has exceeded the k_TAC_timeout_value (40 seconds) following initialization of the algorithm and the algorithm has not converged. OR For Service alignment, if alignment calibration has not occurred successfully within 30 minutes of driving . OR While in operation, if radar was previously aligned and has now determined to be misaligned. OR PID $4175 – Front Long Range Radar Aiming Status = Aiming_Error The emissions neutral default action for all diagnotics under DTC B390C is to disable adaptive cruise control and/or Super Cruise	Algo process only verify the correct angles reported from ECU (angles are saved on Factory or Service alignment diagnostic) and if one of them is not correct on NVM it will report a failure.	Fault Detected	Voltage: Front LRR Sensor Mode Command Status PID $8002 –System Power Mode K_B390C_66_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	9 < V < 16V = Not Sensing or Sensing = Run Mode Only =TRUE	30 Minutes	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
CAN Network Communications - Object Detection CAN Bus Off - no additional information	U0075	Using CAN handler for verify messages on BUS and sliding window mechanism in order to confirm it. The emissions neutral default action for all diagnotics under DTC U0075 is to disable adaptive cruise control and/or Super Cruise	CAN OFF from bus handler For 8 out of 10 counts	Fault Detected	Front LRR Sensor Mode Command Status Supply Voltage: PID $8002 –System Power Mode K_U0075_00_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	= Not Sensing or Sensing =Allowed ECU operation = Run Mode Only =TRUE	0.08 s out of a 0.1 s window	Safety Non-MIL Emissions Neutral Diagnostic
Flexray Bus	U007E	Lost communication on Flexray Channel A or B Bus The emissions neutral default action for all diagnotics under DTC U007E is to disable adaptive cruise control and/or Super Cruise	Using FlexRay task the SW is monitoring BUS OFF fault , when is not called (FR signal absence), and this mechanism is monitoring all FlexRay PDU's.	No Flexrays messages received (all messages monitored)	Voltage: Front LRR Sensor Mode Command Status Flexray Network Manager PID $8002 –System Power Mode K_U007E_00_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	9 < V < 16V = Not Sensing or Sensing = Active or Syncronize = Run Mode Only =TRUE	ECU reports as failed after 0.38 s.	Safety Non-MIL Emissions Neutral Diagnostic
Network Communications with External Object Computation Module A	U053B	Invalid Data Received From Image Processing Module “A” (EOCM2A) The LRR detects an EOCM2A PDU and the equivalent redundant PDU with a validity bit as invalid, Or The LRR detects an EOCM2A PDU with a data out of range. Set immediately upon data determined to be out of range.	Messages: + F_Vehicle_Path_Estimate + F_Vehicle_Path_Data_2 OR EOCM2A PDU Data	PDU Invalid Bit on these two Flexray Frames Out of Range - Set fault immediately	Voltage: Front LRR Sensor Mode Command Status Flexray Network Manager PID $8002 –System Power Mode K_U053B_00_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	9 < V < 16V = Not Sensing or Sensing = Active = Run Mode Only =TRUE	0.08 s out of a 0.1 s window	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Invalid Data Received From Image Processing Module "A" (EOCM2A) - Alive Counter Incorrect / Not Updated - The LRR detects a mismatch between a received rolling counter and an internally calculated rolling counter, after being filtered through a sliding window mechanism. The emissions neutral default action for all diagnotics under DTC U053B is to disable adaptive cruise control and/or Super Cruise	Mistmatch between internal rolling counter	Does not match recieved rolling counter	Voltage: Front LRR Sensor Mode Command Status Flexray Network Manager PID $8002 –System Power Mode K_U053B_72_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	9 < V < 16V = Not Sensing or Sensing = Active = Run Mode Only =TRUE	0.08 s out of a 0.1 s window	Safety Non-MIL Emissions Neutral Diagnostic
		Invalid Data Received From Image Processing Module "A" (EOCM2A) - The LRR detects an incorrect signal protection calculation on received message	+ F_Vehicle_Path_Estimate + F_Smgr_Vehicle_Motion, + Body_Info_FOB + F_Vehicle_Path_Data_2	Signal protection calcultaion failure (checksum value)	Voltage: Front LRR Sensor Mode Command Status Flexray Network Manager PID $8002 –System Power Mode K_U053B_74_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	9 < V < 16V = Not Sensing or Sensing = Active = Run Mode Only =TRUE	ECU checks every 0.01 s	Safety Non-MIL Emissions Neutral Diagnostic
Network Communications with External Object Computation Module B	U053C	Invalid Data Received From Image Processing Module "A" (EOCM2B) The LRR detects an EOCM2B PDU and the equivalent redundant PDU with a validity bit as invalid, Or The LRR detects an EOCM2A PDU with a data out of range. Set immediately upon data determined to be out of range.	F_Vehicle_Path_Estimate F_Vehicle_Path_Data_2 OR EOCM2A PDU Data	PDU Invalid Bit on these two Flexray Frames Out of Range - Set fault immediately	Voltage: Front LRR Sensor Mode Command Status Flexray Network Manager PID $8002 –System Power Mode K_U053C_00_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	9 < V < 16V = Not Sensing or Sensing = Active = Run Mode Only =TRUE	ECU checks every 0.01 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Invalid Data Received From Image Processing Module "A" (EOCM2B) - Alive Counter Incorrect / Not Updated - The LRR detects a mismatch between a received rolling counter and an internally calculated rolling counter, after being filtered through a sliding window mechanism. The emissions neutral default action for all diagnostics under DTC U053C is to disable adaptive cruise control and/or Super Cruise	Mistmatch between internal rolling counter	Does not match recieved rolling counter	Voltage: Front LRR Sensor Mode Command Status Flexray Network Manager PID $8002 –System Power Mode K_U053C_73_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	9 < V < 16V = Not Sensing or Sensing = Active = Run Mode Only =TRUE	0.08 s out of a 0.1 s window	Safety Non-MIL Emissions Neutral Diagnostic
		Invalid Data Received From Image Processing Module "A" (EOCM2A) - The LRR detects an incorrect signal protection calculation on received message	+ F_Vehicle_Path_Estimate + F_Smgr_Vehicle_Motion, + Body_Info_FOB + F_Vehicle_Path_Data_2	Signal protection calcultaion failure (checksum value)	Voltage: Front LRR Sensor Mode Command Status Flexray Network Manager PID $8002 –System Power Mode K_U053C_74_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	9 < V < 16V = Not Sensing or Sensing = Active = Run Mode Only =TRUE	ECU checks every 0.01 s	Safety Non-MIL Emissions Neutral Diagnostic
Flexray Bus A - Lost Communication with Active Safety Control Module 1 on Flexray Bus	U18CA	CAN driver indicates bus off. Lose communication on Flexray Channel A Bus The emissions neutral default action for all diagnostics under DTC U18CA is to disable adaptive cruise control and/or Super Cruise	+ Body_Info_FOB + FLRR_Sensor_Mode_Command + F_Smgr_Vehicle_Motion + F_Vehicle_Path_Data_2 + F_Vehicle_Path_Estimate	PDU Missing from listed messages (Missing messages)	Voltage: Front LRR Sensor Mode Command Status Flexray Network Manager PID $8002 –System Power Mode K_U18CA_00_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	9 < V < 16V = Not Sensing or Sensing = Active = Run Mode Only =TRUE	0.5 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Flexray B - Lost Communication with Active Safety Control Module 2 on Flexray Bus -	U18CB	CAN driver indicates bus off. Lose communication on Flexray Channel B Bus The emissions neutral default action for all diagnotics under DTC U18CB is to disable adaptive cruise control and/or Super Cruise	+ Body_Info_FOB + FLRR_Sensor_Mode_Command + F_Smgr_Vehicle_Motion + F_Vehicle_Path_Data_2 + F_Vehicle_Path_Estimate	PDU Missing from listed messages (Missing messages)	Voltage: Front LRR Sensor Mode Command Status Flexray Network Manager PID $8002 –System Power Mode K_U18CB_00_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	9 < V < 16V = Not Sensing or Sensing = Active = Run Mode Only =TRUE	0.5 s	Safety Non-MIL Emissions Neutral Diagnostic
Flexray - Control Module Improper Wake-up Performance	U3012	LRR unable to successfully integrate with FlexRay network. Successful Integration is determined by Flexray CommStack reporting Full Communication The emissions neutral default action for all diagnotics under DTC U3012 is to disable adaptive cruise control and/or Super Cruise	Flexray CommStack reporting Full Communication	Fault Detected	Voltage: Front LRR Sensor Mode Command Status Flexray Network Manager PID $8002 –System Power Mode K_U3012_00_ENABLE LRR shall not report this DTC in the first 5 seconds after Enable criteria are met, including the case where the LRR is recovering from a low voltage condition.	9 < V < 16V = Not Sensing or Sensing = Active = Run Mode Only =TRUE	ECU checks every 0.01 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
ECU Hardware Performance	B101D	General Checksum Failure The emissions neutral default action for all diagnotics under DTC B101D is to disable adaptive cruise control and/or Super Cruise	The purpose of this DTC is to detect checksum failure of NAND Flash File System. DTC is set only when partition mount failed at boot up time. And during run-time, file monitor daemon (It's name is "cfm-daemon") will request system reboot when detect error then system has a chance to repair the problem file system (try fix up or try format) at boot up time. if system couldn't recover file system and fail to mount it then DTC will be set.	= Fault Detected	Exceptions: Algorithm shall not run if; B101D 31_ENABLE = disabled	Vehicle Power Mode condition: ACCESSORY, RUN 'DTC is set when file system not mounted.	Power On Diagnostics	Safety Non-MIL Emissions Neutral Diagnostic
		General Memory Failure	The purpose of DTC is to detect general memory failure. In order to find out this failure, the algorithm perform RAM march test.	DTC is set when RAM check result is not same to defined success value.	Exceptions: Algorithm shall not run if; B101D 32_ENABLE = disabled	Vehicle Power Mode condition: ACCESSORY, RUN	Power On Diagnostics	Safety Non-MIL Emissions Neutral Diagnostic
		Watchdog / Safety µC Failure	The purpose of DTC is to detect watchdog happened in previous cycle. It just only show watch dog was happened.	DTC is set when register value is same to written value in the previous cycle.	Exceptions: Algorithm shall not run if; B101D 37_ENABLE = disabled	Vehicle Power Mode condition: RUN	Running Diagnostics	Safety Non-MIL Emissions Neutral Diagnostic
		Loss of Communications with GPS - Internal Commumications	TBD. 1) The VCP main micro is unable to communicate to the GPS OR 2) The GPS receiver detects an internal fault preventing normal GPS operation.	Cannot communicate with receiver module for 10 seconds. OR Failure set by GPS Reciever	Exceptions: Algorithm shall not run if; B101D 3C_ENABLE = disabled	Vehicle Power Mode condition: ACCESSORY, RUN	Running Diagnostics	Safety Non-MIL Emissions Neutral Diagnostic
Global Positioning System Signal	B2462	Short to Battery The emissions neutral default action for all diagnotics under DTC B246 is to disable adaptive cruise control and/or Super Cruise	The purpose of this DTC is to detect short to positive of GPS(secondary) antenna circuit. DTC is set when the latest 6 consecutive GPS(secondary) antenna ADC values are under the open/short threshold defined in DID and ANT_PT_SENSE values is high.	Short to Battery Threshold = 1.53 - 2.35 V	Exceptons: Algorithm shall not run if; B2462 01_ENABLE = disabled or, B1325 (IF SUPPORTED) 03 status bit 1 = True or, B1325 (IF SUPPORTED) 07 status bit 1 = True.	Vehicle Power Mode condition: ACCESSORY, RUN Algorithm will be started just after TCP is getting to OnStar on mode.	After the end of boot sequence, modem sends GPS(secondary) antenna ADC value and ANT_PT_SENSE value to MDM via LocAPI every second. MDM checks GPS(secondary) antenna state with these values.	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Short to Ground	The purpose of this DTC is to detect short to ground of GPS(secondary) antenna circuit. Short to Ground DTC is set when the GPS(secondary) Antenna ADC value is under the open/short threshold defined in DID and	ANT_PT_SENSE(GPIO) is low state - GPS Antenna Short to Ground DTC Voltage Lower Value Threshold = 0.05V	Exceptions: Algorithm shall not run if; B2462 02_ENABLE = disabled	Vehicle Power Mode condition: ACCESSORY, RUN Algorithm will be started just after TCP is getting to OnStar on mode.	After the end of boot sequence, modem sends GPS(secondary) antenna ADC value and ANT_PT_SENSE value to MDM via LocAPI every second. MDM checks GPS(secondary) antenna state with these values.	Safety Non-MIL Emissions Neutral Diagnostic
		Open Circuit	The purpose of this DTC is to detect open of GPS(secondary) antenna circuit. DTC is set when the latest 6 consecutive GPS(secondary) antenna ADC values are between open/short threshold and connect/open threshold defined in DID.-	GPS Antenna Open DTC Voltage Upper Value Threshold = 0.2V	Exceptions: Algorithm shall not run if; B2462 04_ENABLE = disabled	Vehicle Power Mode condition: ACCESSORY, RUN Algorithm will be started just after TCP is getting to OnStar on mode.	After the end of boot sequence, modem sends GPS(secondary) antenna ADC value and ANT_PT_SENSE value to MDM via LocAPI every second. MDM checks GPS(secondary) antenna state with these values.	Safety Non-MIL Emissions Neutral Diagnostic
Control Module Communication High Speed CAN Bus Off	U0073	The purpose of this DTC is to detect Bus off status on HS CAN The emissions neutral default action for all diagnotics under DTC U0073 is to disable adaptive cruise control and/or Super Cruise	DTC is set when CAN Bus does not send normal electric current to TCP	= Fault Detected	Exceptions: Algorithm shall not run if; U0073 00_ENABLE = disabled (reference DID $03) In addition, the storing of DTCs shall not be enabled in case that the following conditions are true: - The SystemPowerMode ≠ RUN - Within the first 5 seconds after the High Voltage Wake Up Frame - Within the first 5 s after the transition into the SystemPowerMode RUN - Within the first 5 s of a reset of the module - Within the first 5 s of a recovery from an under or over voltage condition	Vehicle Power Mode condition: OFF, ACCESSORY, or RUN Virtual Network condition: Any Virtual Network that the module participates in is active. ECU Operational condition: While in the ECU_COMM_Active state	Signal supervision timeout (2.5 times the nominal periodic rate of the signal) occurs when the periodic message from the supervised source is lost.	Safety Non-MIL Emissions Neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
ECU Hardware Performance	C056D	Fault in the microcontroller The emissions neutral default action for all diagnostics under DTC C056D is to disable adaptive cruise control and/or Super Cruise	Failure of system tests (RAM, ROM, Stack, Watchdog, CPU, ADC) EEPROM does not match SW version	Singe occurrence	Vehicle Power Mode condition: Supply Voltage	= ANY =ANY	Singe occurrence	Safety Non-MIL Emissions Neutral Diagnostic
Steering Position Signal	C0710	Fault in digital hall sensor for steering angle - Includes Angle Out of Range The emissions neutral default action for all diagnostics under DTC C0710 is to disable adaptive cruise control and/or Super Cruise	An internal fault was detected inside the Melexis hall sensor	Singe occurrence	Vehicle Power Mode condition: Supply Voltage	= ANY = ANY	Singe occurrence	Safety Non-MIL Emissions Neutral Diagnostic
		Part not calibrated	Steering angle calibration not performed	Singe occurrence	Vehicle Power Mode condition:	= ANY = ANY	Singe occurrence	Safety Non-MIL Emissions Neutral
Device Power	C0800	Voltage Out of Range The emissions neutral default action for all diagnostics under DTC C0800 is to disable adaptive cruise control and/or Super Cruise	V Supply	< 6.5V (No DTC code set, however emissions neutral default action will occur) or >16 V (DTC code is set, however the emissions neutral default action does not occur - device can function under high voltage conditions)	Vehicle Power Mode condition:	= ANY	5 s	Safety Non-MIL Emissions Neutral Diagnostic
Control Module Communication Bus 'A' Off	U0073	Short circuit on CAN bus or bus off state The emissions neutral default action for all diagnostics under DTC U0073 is to disable adaptive cruise control and/or Super Cruise	CAN Bus	3 bus off events	Vehicle Power Mode condition: Supply Voltage	= ANY = 9-16V	3 Times	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Primary (Sensor 1) IMU Sensor - Lateral Acceleration Circuit	C0186	This monitor cover various aspects of the lateral acceleration 1 sensor circuit, including: software, hardware, and out of range The emissions neutral default action for all diagnostics under DTC C0186 is to disable adaptive cruise control and/or Super Cruise	① IMU SW driver configuration mismatch. ② Sensor Active Check error. ③ Sensor Continuous Selftest error. ④ Sensor Message Counter error. ⑤ Sensor Checksum error. ⑥ Sensor Lateral Acc. signal error.	①, ② = Fault at start-up ③,④,⑤ = Fault Detetected ⑥ ± 160 deg/s	Comm_Enable Operating Voltage DTC Enabled	= Available = 6.0 - 16.0v = True	①, ② = startup ③ 0.04 s ④, ⑤ = 0.008 s ⑥ = 2 s out of range or 0.022 s out of range because of slope.	Safety Non-MIL Emissions Neutral Diagnostic
Secondary (Sensor 2) IMU Sensor - Lateral Accelerometer Circuit	C018A	This monitor cover various aspects of the lateral acceleration 2 sensor circuit, including: software, hardware, and out of range The emissions neutral default action for all diagnostics under DTC C018A is to disable adaptive cruise control and/or Super Cruise	① IMU SW driver configuration mismatch. ② Sensor Active Check error. ③ Sensor Continuous Selftest error. ④ Sensor Message Counter error. ⑤ Sensor Checksum error. ⑥ Sensor Lateral Acc. signal error.	①, ② = Fault at start-up ③,④,⑤ = Fault Detetected ⑥ ± 160 deg/s	Comm_Enable Operating Voltage DTC Enabled	= Available = 6.0 - 16.0v = True	①, ② = startup ③ 0.04 s ④, ⑤ = 0.008 s ⑥ = 2 s out of range or 0.022 s out of range because of slope.	Safety Non-MIL Emissions Neutral Diagnostic
Lateral Accelerometers 1 & 2 Correlation	C018B	Agreement between primary and secondary lateral acceleration signals. Also monitors the offset bias value within the RAM. The emissions neutral default action for all diagnostics under DTC C018B is to disable adaptive cruise control and/or Super Cruise	① Lateral Acc. signals Correlation error. ② IMU Data Integrity Check. ③ IMU Data Transmission Check. ④ Offset Bias value in RAM (CRC).	① +/- 0.188489209*Acceleration +1.468057554 ② Fault Detected ③ Fault Detected ④ Fault Detected	Comm_Enable Operating Voltage DTC Enabled	= Available = 6.0 - 16.0v = True	① = 0.04 s (max) ②, ③ = Single Occurrence ④ = 0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
Primary (Sensor 1) IMU Sensor - Yaw Rate Circuit	C0196	Validation of the yaw rate 1 signal is within acceptable ranges The emissions neutral default action for all diagnostics under DTC C0196 is to disable adaptive cruise control and/or Super Cruise	Sensor Yaw Rate signal error.	± 28.5 m/s²	Comm_Enable Operating Voltage DTC Enabled	= Available = 6.0 - 16.0v = True	0.2 s	Safety Non-MIL Emissions Neutral Diagnostic
Secondary (Sensor 2) IMU Sensor - Yaw Rate Signal	C019A	Validation of the yaw rate 2 signal is within acceptable ranges. The emissions neutral default action for all diagnostics under DTC C019A is to disable adaptive cruise control and/or Super Cruise	Sensor Yaw Rate signal error.	± 28.5 m/s²	Comm_Enable Operating Voltage DTC Enabled	= Available = 6.0 - 16.0v = True	0.2 s	Safety Non-MIL Emissions Neutral Diagnostic
Yaw Rate Signal Primary and Secondary Sensor Correlation	C019B	Yaw Rate Primary and Secondary plausiblty check via correlation between both signals The emissions neutral default action for all diagnostics under DTC C019B is to disable adaptive cruise control and/or Super Cruise	Yaw Rate signals correlation error	+/- 0.081956155*Yaw Rate + 7.113153457	Comm_Enable Operating Voltage DTC Enabled	= Available = 6.0 - 16.0v = True	0.03 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary (Sensor 2) IMU Sensor - Longitdinal Accl. Rate Signal	C027E	Validation of the Longitduinal accleration secondary sensor signal is within acceptable ranges. The emissions neutral default action for all diagnostics under DTC C027E is to disable adaptive cruise control and/or Super Cruise	Sensor Longitduinal Acceleration signal error.	± 28.5 m/s²	Comm_Enable Operating Voltage DTC Enabled	= Available = 6.0 - 16.0v = True	0.2 s	Safety Non-MIL Emissions Neutral Diagnostic
Longitudinal Accelerometers Signal Primary and Secondary Sensor Correlation	C027F	Validation of the Longitduinal accleration secondary sensor signal is within acceptable ranges. The emissions neutral default action for all diagnostics under DTC C027F is to disable adaptive cruise control and/or Super Cruise	Longitudinal acceleration signals correlation error	+/- 0.188489209*Acceleration +1.468057554	Comm_Enable Operating Voltage DTC Enabled	= Available = 6.0 - 16.0v = True	0.04 s	Safety Non-MIL Emissions Neutral Diagnostic
Primary (Sensor 1) IMU Sensor - Longitdinal Accl. Rate Signal	C0287	Validation of the Longitduinal accleration primary sensor signal is within acceptable ranges The emissions neutral default action for all diagnostics under DTC C0287 is to disable adaptive cruise control and/or Super Cruise	Sensor Longitduinal Acceleration signal error.	± 28.5 m/s²	Comm_Enable Operating Voltage DTC Enabled	= Available = 6.0 - 16.0v = True	0.2 s	Safety Non-MIL Emissions Neutral Diagnostic
SDM Primary Key	B1001	Wrong Primary Key detected. Primary Key not programmed in the SDM. The emissions neutral default action for all diagnostics under DTC B1001 is to disable adaptive cruise control and/or Super Cruise	Priamry Key not Programmed	Fault Detected	Primary Key Power mode Operating voltage DTC DID$40	= Configured and learned in configuration. = RUN, CRANK or PROLONGATION TIME = 6.0 - 16.0v = Enabled = Enabled	0.01 s Single Event	Safety Non-MIL Emissions Neutral Diagnostic
Programmed/Learned Mismatch within SDM Software	B1019	System Configuration Error - Incorrect software (software mismatch and mis-learn) The emissions neutral default action for all diagnostics under DTC B1019 is to disable adaptive cruise control and/or Super Cruise	Comparison between DPID$11 (Programmed) and DPID$12 (Learned) fails.	DPID$11 ≠ DPID $12	Power mode. SDM Lock Status Operating voltage: DTC	= RUN = Unlocked. = 6.0 - 16.0v =Enabled	0.01 s Single Event	Safety Non-MIL Emissions Neutral Diagnostic
ECU Hardware Performance	B101D	General Failure The emissions neutral default action for all diagnostics under DTC B101D is to disable adaptive cruise control and/or Super Cruise	SDM internal sensor fault detected OR SDM internal ASIC fault detected OR SDM internal voltage out of range detected OR SDM internal microcontroller fault detected OR SDM internal memory error detected	For RAM, ROM and EEPROM errors, CRC is used.	Power Mode DTC	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled	Within 0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
		General Checksum Failure	Checksum mismatch	Fault Detected	Power Mode DTC	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled	Within 0.1 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		General Memory Failure	Failure of the general memory	Fault Detected	Power Mode DTC	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled	Within 0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
		Special Memory Failure	Failure of Special Memory	Fault Detected	Power Mode DTC	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled	Within 0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
		RAM Failure	Failure of RAM	Fault Detected	Power Mode DTC	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled	Within 0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
		ROM Failure	Failure of ROM	Fault Detected	Power Mode DTC	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled	Within 0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
		EEPROM Failure	Failure of EEPROM	Fault Detected	Power Mode DTC	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled	Within 0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Electronic Failure	Sensor, Microprocessor or Powersupply Failure	Fault Detected	Power Mode DTC	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled	Within 0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Self Test Failed	Failure during self-test	Fault Detected	Power Mode DTC	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled	Within 0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Communications Failure	Internal Mircoprocessor to Other SDM Communications Failure	Fault Detected	Power Mode DTC	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled	Within 0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
ECU Software Performance	B101E	Internal Fault The emissions neutral default action for all diagnostics under DTC B101E is to disable adaptive cruise control and/or Super Cruise	General Fault within ECU	Fault Detected	VIN or Immobilizer function Power mode Operating voltage DTC	= Enabled in SDM configuration. = RUN, CRANK, PROLONGATION TIME or ACC (for Immobilizer) power mode. = 6.0 - 16.0v = Enabled	0.01 s Single Event	Safety Non-MIL Emissions Neutral Diagnostic
		Operational Software / Calibration Set Not Programmed	Operational Software / Calibration Set Not Programmed	Fault Detected	VIN or Immobilizer function Power mode Operating voltage DTC	= Enabled in SDM configuration. = RUN, CRANK, PROLONGATION TIME or ACC (for Immobilizer) power mode. = 6.0 - 16.0v = Enabled	0.01 s Single Event	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Calibration Data Set Not Programmed	Calibration Data Set Not Programmed	Fault Detected	VIN or Immobilizer function Power mode Operating voltage DTC	= Enabled in SDM configuration. = RUN, CRANK, PROLONGATION TIME or ACC (for Immobilizer) power mode. = 6.0 - 16.0v = Enabled	0.01 s Single Event	Safety Non-MIL Emissions Neutral Diagnostic
		EEPROM Error	EEPROM Error	Fault Detected	VIN or Immobilizer function Power mode Operating voltage DTC	= Enabled in SDM configuration. = RUN, CRANK, PROLONGATION TIME or ACC (for Immobilizer) power mode. = 6.0 - 16.0v = Enabled	0.01 s Single Event	Safety Non-MIL Emissions Neutral Diagnostic
		Security Access Not Activated	Security Access Not Activated	Device Locked	VIN or Immobilizer function Power mode Operating voltage DTC	= Enabled in SDM configuration. = RUN, CRANK, PROLONGATION TIME or ACC (for Immobilizer) power mode. = 6.0 - 16.0v = Enabled	0.01 s Single Event	Safety Non-MIL Emissions Neutral Diagnostic
		Variant Not Programmed	Variant Not Programmed	Fault Detected	VIN or Immobilizer function Power mode Operating voltage DTC	= Enabled in SDM configuration. = RUN, CRANK, PROLONGATION TIME or ACC (for Immobilizer) power mode. = 6.0 - 16.0v = Enabled	0.01 s Single Event	Safety Non-MIL Emissions Neutral Diagnostic
		Vehicle Configuration Not Programmed	Calibration for vehicle not provided	Fault Detected	VIN or Immobilizer function Power mode Operating voltage DTC	= Enabled in SDM configuration. = RUN, CRANK, PROLONGATION TIME or ACC (for Immobilizer) power mode. = 6.0 - 16.0v = Enabled	0.01 s Single Event	Safety Non-MIL Emissions Neutral Diagnostic
		VIN Not Programmed	VIN Programmed = False	VIN has not been written	VIN or Immobilizer function Power mode Operating voltage DTC	= Enabled in SDM configuration. = RUN, CRANK, PROLONGATION TIME or ACC (for Immobilizer) power mode. = 6.0 - 16.0v = Enabled	0.01 s Single Event	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Theft / Security Data Not Programmed	Security Code is not programmed	Security Code Not programmed and SDM is not in vehicle assembly mode.	VIN or Immobilizer function Power mode Operating voltage DTC	= Enabled in SDM configuration. = RUN, CRANK, PROLONGATION TIME or ACC (for Immobilizer) power mode. = 6.0 - 16.0v = Enabled	0.01 s Single Event	Safety Non-MIL Emissions Neutral Diagnostic
		Checksum Error	VTD security data checksum error	CRC data manipulation error. Only when data manipulation is detected in security code, immobilizer id and environment id.	VIN or Immobilizer function Power mode	= Enabled in SDM configuration. = RUN, CRANK, PROLONGATION TIME or ACC (for Immobilizer) power mode.	0.01 s Single Event	Safety Non-MIL Emissions Neutral Diagnostic
		Calibration Not Learned	Calibration not learned	Fault Detected	VIN or Immobilizer function Power mode	= Enabled in SDM configuration. = RUN, CRANK, PROLONGATION TIME or ACC (for Immobilizer) power mode.	0.01 s Single Event	Safety Non-MIL Emissions Neutral Diagnostic
		DTC Memory Full	Memory full for DTCs	SDM has 24 records available in memory for Continental fault codes.	VIN or Immobilizer function Power mode	= Enabled in SDM configuration. = RUN, CRANK, PROLONGATION TIME or ACC (for Immobilizer) power mode.	On Demand	Safety Non-MIL Emissions Neutral Diagnostic
Device Power Circuit	B1325	Voltage Below Threshold The emissions neutral default action for all diagnostics under DTC B1325 is to disable adaptive cruise control and/or Super Cruise	V Battery (Same as Supply Voltage)	Vbatt < 8.2V Code is set <8.2V - Emissions Neutral Default Action occurs < 5.2V due to safety design reasons	Power Mode DTC	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled	15.8 s	Safety Non-MIL Emissions Neutral Diagnostic
Control Module Communication Chassis Expansion CAN Bus	U0077	Monitoring to check if the Chassis Expansion CAN Bus is ON The emissions neutral default action for all diagnostics under DTC U0077 is to disable adaptive cruise control and/or Super Cruise	CE HS Leakage to Battery. CE HS-CAN Leakage to Ground. CE HS-CAN Shorted.	32 consecutive error frames detected on the bus	Power Mode DTC Operating Voltage	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled = 6.0 to 16.0v	2.5 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
ECU Hardware Performance	B101D	RAM Failure The emissions neutral default action for all diagnotics under DTC B101D is to disable SRR data as an input, and not consume data generated by the SRR into the control system	•Writes pattern 0x55555555 into RAM address and read back and writes pattern 0xAAAAAAAA into he RAM address and read back. If any error in reading back the pattern, sets this fault • DSP Faults: DSP_RAM_Error • DSP_ROM_Error: When targets are complete for a look the checksum is computed and then where the target data is ready to be sent to the ARM the checksum is checked again. If the checksum does not match then it sets the fault • At boot time executable code loaded from external FLASH to DSP RAM. This image is continually checked for a correct checksum and if the checksum fails, sets the fault. • No sensor internal RAM to set this fault	Fault Detected	Vehicle Power Mode condition: 5 second delay after COM is enabled AND B101D_34_ENABLED = TRUE	=OFF, ACCESSORY, RUN	3 s	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Electronic Failure	• Reads PLL0 status register, if PLL is not stable, sets the fault. • Checks all arithmetic logic unit registers are correct or not (This is provided by NEC) • Checks program sequence execution is wrong • ARM program sequence is incorrect OR DSP program sequence is incorrect OR ARM critical interrupt execution is incorrect OR ARM critical interrupt execution is incorrect, sets his fault • Check critical interrupt execution is wrong , sets this fault (SPI and Flexray Interrupts) • Supply 5V voltage is < 4.5V OR >5.5V, sets the fault • RCM thermostir A2D counts <10 OR >1015, sets the fault • Supply 1.8V voltage is < 1.28V OR >2.2999V, sets the fault • Supply 1.1V voltage is < 0.599V OR >1.599V, sets the fault • DSP Fault:DSP_Tuning_Sensitivity_Error - A VCO is used as the reference to generate the radar sweep frequence. On alternating looks a high and low DC value will be set for the VCO and the DC value is measured with the ADC. If the measured voltage for the high or low setting is outside of the expected range, sets this fault • DSP fault: Antenna_RxTxElement_Error, sets this fault	Fault Detected	Vehicle Power Mode condition: 5 second delay after COM is enabled AND B101D_39_ENABLED = TRUE	=OFF, ACCESSORY, RUN	6 s	Safety Non-MIL Emissions Neutral Diagnostic

		Internal Communications Failure	• DSP fault: .ADC_SPI_Transfer_Error ADC SPI Registers are written and then read back to verify register setting. If the registers are written and the read back fails for 3 times, sets this fault • DSP Fault: LNZER_SPI_Transfer_Error LNZER SPI Registers are written and then read back to verify register setting. If the registers are written and the read back fails for 3 times, sets this fault • DSP Fault:RRN_SPI_Transfer_Error RRN SPI Registers are written and then read back to verify register setting. If the registers are written and the read back fails for 3 times, sets this fault • DSP Fault:RTN_SPI_Transfer_Error RTN SPI Registers are written and then read back to verify register setting. If the registers are written and the read back fails for 3 times, sets this fault • Any 2 of the below dsp faults are set, ADC_SPI_Transfer_Error LNZER_SPI_Transfer_Error RRN_SPI_Transfer_Error RTN_SPI_Transfer_Error, sets this fault • There are no operational messages received by host from ARM, increments 100 count, if received operation message, decrements 1 count. So count is >500, sets the fault • There is no single operational message is received by host from ARM, sets the fault • ARM fault: Loss_of_Comm_With_DSP_Error, sets the fault • Any operational messages received by host from ARM, has checksum mismatch, increments 40 count, if checksum matched, decrements 1 count. So count is >80, sets the fault	Fault Detected	Vehicle Power Mode condition: 5 second delay after COM is enabled AND B101D_3C_ENABLED = TRUE	=OFF, ACCESSORY, RUN	0.28 s	Safety Non-MIL Emissions Neutral Diagnostic
		Calibration Data Set Not Programmed The emissions neutral default action for all diagnotics under DTC B101E is to disable SRR data as an input, and not consume data generated by the SRR into the control system	•DSP fault:Check the chip ID for the RRN and RTN is not matched the expected chip ID for 3 times, sets this fault. •Shared types are not matched in Host and ARM, sets the fault •OEM cals check is not correct, sets this fault •If default cal programmed for GM cal, sets this fault •If default cal programmed for delphi cal, sets this fault •If default cal programmed for J2 cal, sets this fault	Fault Detected	Vehicle Power Mode condition: Voltage Range 5 second delay after COM is enabled AND B101E_42_ENABLED = TRUE	=OFF, ACCESSORY, RUN =9-16V	0.08 s	Safety Non-MIL Emissions Neutral Diagnostic

ECU Software Performance	B101E	Checksum Error	• Calculates checksum for application code start to end addresses by excluding 2 byte checksum. Compare calculated checksum with checksum existed in application code. If both are not matched sets this fault • Calculates checksum fo cal (Delphi cal/oem cal) start to end addresses by excluding 2 byte checksum. Compare calculated checksum with checksum existed in corresponding cal area. If any of the cal checksums are mismatched, sets the fault. • KAM (Keep aliva memory) dataflash both primary and secondary blocks are corrupted, sets the fault • ARM code flash checksum is wrong, sets this fault • J2 program calibration cheksum is wrong, sets fault	Fault Detected	Vehicle Power Mode condition: Voltage Range 5 second delay after COM is enabled AND B101E_4A_ENABLED = TRUE	=OFF, ACCESSORY, RUN =9-16V	10 s	Safety Non-MIL Emissions Neutral Diagnostic
		Stack Overflow	• If stack hits top OR bottom margins, sets the fault • ARM stack pointer is out of stack top or bottom OR DSP stack poiner is out of stack top or bottom, sets this fault	Fault Detected	Vehicle Power Mode condition: Voltage Range 5 second delay after COM is enabled AND B101E_4D_ENABLED = TRUE	=OFF, ACCESSORY, RUN =9-16V	0.12 s	Safety Non-MIL Emissions Neutral Diagnostic
Device Power	B1325	Voltage Below Threshold The emissions neutral default action for all diagnotics under DTC B1325 is to disable SRR data as an input, and not consume data generated by the SRR into the control system	Battery Voltage	<8.16V	Vehicle Power Mode condition: 5 second delay after COM is enabled AND B1325_03_ENABLED = TRUE	=OFF, ACCESSORY, RUN	0.28 s	Safety Non-MIL Emissions Neutral Diagnostic
		Voltage Above Threshold	Battery Voltage	>17.3V	Vehicle Power Mode condition: 5 second delay after COM is enabled AND B1325_07_ENABLED = TRUE	=OFF, ACCESSORY, RUN	0.28 s	Safety Non-MIL Emissions Neutral Diagnostic

Short Range Object Sensor	B390A	Short Range Object Sensor - Variant Not Programmed The emissions neutral default action for all diagnotics under DTC B390A is to disable SRR data as an input, and not consume data generated by the SRR into the control system	DID $7A (Sensor Addr Learn Status) Active_Fault.bit.sensor_position_not_programmed_fault	=0 =TRUE	Vehicle Power Mode condition: MEC 5 second delay after COM is enabled AND B390A_45_ENABLED = TRUE	=OFF, ACCESSORY, RUN =0	0.04 s	Safety Non-MIL Emissions Neutral Diagnostic
		Short Range Object Sensor - Temperature High	• DSP Fault: TX_Temperature_Error • RCM temperature is	>115°C >115°C	Vehicle Power Mode condition: MEC 5 second delay after COM is enabled AND B390A_54_ENABLED = TRUE	=OFF, ACCESSORY, RUN =0	0.28 s	Safety Non-MIL Emissions Neutral Diagnostic
		Short Range Object Sensor - Wrong Mounting Position	Absolute value of misalignment angle is > 5 degrees, sets the fault	Fault Detected	Vehicle Power Mode condition: MEC 5 second delay after COM is enabled AND B390A_66_ENABLED = TRUE	=OFF, ACCESSORY, RUN =0	0.12 s	Safety Non-MIL Emissions Neutral Diagnostic
		Short Range Object Sensor - Incorrect Assembly	Power on address and current address position mismatch Active_Fault.bit.sensor_addr_unstable_fault = TRUE	Fault Detected	Vehicle Power Mode condition: MEC 5 second delay after COM is enabled AND B390A_67_ENABLED = TRUE	=OFF, ACCESSORY, RUN =0	1 s	Safety Non-MIL Emissions Neutral Diagnostic

Control Module Communication	U0075	Object Detection CAN Bus Off The emissions neutral default action for all diagnotics under DTC U0075 is to disable SRR data as an input, and not consume data generated by the SRR into the control system	VCAN Bus off detected, fault shall be set	Fault Detected	Vehicle Power Mode condition: Voltage Range 5 second delay after COM is enabled AND U0075_00_ENABLED = TRUE	=OFF, ACCESSORY, RUN =9-16V	0.12 s	Safety Non-MIL Emissions Neutral Diagnostic
Control Module Communication FlexRay Bus	U007E	FlexRay Bus 1A Bus Off The emissions neutral default action for all diagnotics under DTC U007E is to disable SRR data as an input, and not consume data generated by the SRR into the control system	If SRR detects global bus error i.e. global bus error (bus loading/off, short to batt, short to ground) on FR Channel. Following are the bus off situations: 1. Short BP to ground: Detected by Tranceiver error interrupt, more than 30 error interrupt counts for 100ms is considered as 1 retry. After 3 retries, fault e.2 (Flexray bus off) shall be set. DTC U007E 0x00 shall be set. 2. Short BM to ground: : Detected by Tranceiver error interrupt, more than 30 error interrupt counts for 100ms is considered as 1 retry. After 3 retries, fault e.2 (Flexray bus off) shall be set. DTC U007E 0x00 shall be set. 3. Short BP to Battery: : Detected by Tranceiver error interrupt, more than 30 error interrupt counts for 100ms is considered as 1 retry. After 3 retries, fault e.2 4. (Flexray bus off) shall be set. DTC U007E 0x00 shall be set. 4.Short BM to Battery: : Detected by Tranceiver error interrupt, more than 30 error interrupt counts for 100ms is considered as 1 retry. After 3 retries, fault e.2 (Flexray bus off) shall be set. DTC U007E 0x00 shall be set. Note: Tranceiver error pulse is very short (around 12us) for below bus off errors, so it could not be captured by interrupt so it is detected by Vector flexray driver variables. 5. Short BP and BM to ground: Detected by flexray vector stack, so fault c.1 (bus activity fault) shall be set. DTC U007E 0x00 shall be set. 6. Short BP and BM to battery: Detected by flexray vector stack, so fault c.1 (bus activity fault) shall be set. DTC U007E 0x00 shall be set. 7.Open BP: Detected by flexray vector stack, so fault c.1 (bus activity fault) shall be set. DTC U007E 0x00 shall be set. 8. Open BM: Detected by flexray vector stack, so fault c.1 (bus activity fault) shall be set. DTC U007E 0x00 shall be set. 9.Open BP & BM: Detected by flexray vector stack, so fault	Fault Detected	SRR Sensor Mode Voltage Range FlexRay Networking Management System Power Mode AND 5 second delay after COM is enabled AND K_U007E_00_ENABLED = TRUE AND Lost Communication with EOCM fault is not present	=Not Senseing and Sensing =9-16V =Active =RUN	0.2 s	Safety Non-MIL Emissions Neutral Diagnostic

Active Safety Control Module 1 Data	U053B	Invalid Data Received From Active Safety Control Module 1 (EOCM 2A) - Invalid Serial Data Received The emissions neutral default action for all diagnotics under DTC U053B is to disable SRR data as an input, and not consume data generated by the SRR into the control system	DTC is set when ANY of the following Active Fault bits are TRUE • system_power_mode_signal_invalid_fault • yaw_rate_signal_invalid_fault_fault • veh_lateral_velocity_signal_invalid_fault • veh_longitudinal_velocity_signal_invalid_fault • veh_path_curvature_signal_invalid_fault • veh_longitudinal_offset_signal_invalid_fault • time_sync_master_clock_signal_invalid_fault	3 frames out of 10 frames will set fault	Voltage Range System Power Mode AND Lost Communication with EOCM fault is not present AND 5 second delay after COM is enabled AND U053B_71_ENABLED = TRUE	=9-16V =RUN	1 s	Safety Non-MIL Emissions Neutral Diagnostic
		Invalid Data Received From Active Safety Control Module 1 (EOCM 2A) - Alive Counter Incorrect / Not Updated	• For every VPD2 message indication, VPD2 rolling count shall be checked, if it is insequence, sliding window check 3 out of 10 frames, sets the fault • For every vehcile motion message indication, SVM rolling count shall be checked, if it is insequence, sliding window check 3 out of 10 frames, sets the fault • For every VPE message indication, VPE rolling count shall be checked, if it is insequence, sliding window check 3 out of 10 frames, sets the fault	3 frames out of 10 frames will set fault	SRR Sensor Mode Voltage Range FlexRay Networking Management System Power Mode AND 5 second delay after COM is enabled AND K_U053B_72_ENABLED = TRUE AND Lost Communication with EOCM fault is not present	=Not Senseing and Sensing =9-16V =Active =RUN	1 s	Safety Non-MIL Emissions Neutral Diagnostic
		Invalid Data Received From Active Safety Control Module 1 (EOCM 2A) - Value of Signal Protection Calculation Incorrect	• For every VPD2 message indication, VPD2 checksum shall be checked, if it is mismatched, sliding window check 3 out of 10 frames, sets the fault • For every vehcile motion message indication, SVM checksum shall be checked, if it is mismatched, sliding window check 3 out of 10 frames, sets the fault • For every VPE message indication,VPE checksum shall be checked, if it is mismatched, sliding window check 3 out of 10 frames, sets the fault	3 frames out of 10 frames will set fault	SRR Sensor Mode Voltage Range FlexRay Networking Management System Power Mode AND 5 second delay after COM is enabled AND K_U053B_74_ENABLED = TRUE AND Lost Communication with EOCM fault is not present	=Not Senseing and Sensing =9-16V =Active =RUN	1 s	Safety Non-MIL Emissions Neutral Diagnostic

Active Safety Control Module 2 Data	U053C	Invalid Data Received From Active Safety Control Module 2 (EOCM 2B) - Invalid Serial Data Received The emissions neutral default action for all diagnotics under DTC U053C is to disable SRR data as an input, and not consume data generated by the SRR into the control system	DTC is set when ANY of the following Active Fault bits are TRUE • system_power_mode_signal_invalid_fault • yaw_rate_signal_invalid_fault_fault • veh_lateral_velocity_signal_invalid_fault • veh_longitudinal_velocity_signal_invalid_fault • veh_path_curvature_signal_invalid_fault • veh_longitudinal_offset_signal_invalid_fault • time_sync_master_clock_signal_invalid_fault	3 frames out of 10 frames will set fault	Voltage Range System Power Mode AND Lost Communication with EOCM fault is not present AND 5 second delay after COM is enabled AND U053C_71_ENABLED = TRUE	=9-16V =RUN	1 s	Safety Non-MIL Emissions Neutral Diagnostic
		Invalid Data Received From Active Safety Control Module 2 (EOCM 2B) - Alive Counter Incorrect / Not Updated	• For every vehcile motion message indication, SVM rolling count shall be checked, if it is insequence, sliding window check 3 out of 10 frames, sets the fault • For every VPD2 message indication, VPD2 rolling count shall be checked, if it is insequence, sliding window check 3 out of 10 frames, sets the fault • For every VPE message indication, VPE rolling count shall be checked, if it is insequence, sliding window check 3 out of 10 frames, sets the fault	3 frames out of 10 frames will set fault	SRR Sensor Mode Voltage Range FlexRay Networking Management System Power Mode AND 5 second delay after COM is enabled AND K_U053C_72_ENABLED = TRUE AND Lost Communication with EOCM fault is not present	=Not Senseing and Sensing =9-16V =Active =RUN	1 s	Safety Non-MIL Emissions Neutral Diagnostic
		Invalid Data Received From Active Safety Control Module 2 (EOCM 2B) - Value of Signal Protection Calculation Incorrect	• For every VPD2 message indication, VPD2 checksum shall be checked, if it is mismatched, sliding window check 3 out of 10 frames, sets the fault • For every VPE message indication,VPE checksum shall be checked, if it is mismatched, sliding window check 3 out of 10 frames, sets the fault • For every vehcile motion message indication, SVM checksum shall be checked, if it is mismatched, sliding window check 3 out of 10 frames, sets the fault	3 frames out of 10 frames will set fault	SRR Sensor Mode Voltage Range FlexRay Networking Management System Power Mode AND 5 second delay after COM is enabled AND K_U053C_74_ENABLED = TRUE AND Lost Communication with EOCM fault is not present	=Not Senseing and Sensing =9-16V =Active =RUN	1 s	Safety Non-MIL Emissions Neutral Diagnostic

Lost Communication with Active Safety Control Module 1 on Flexray Bus	U18CA	This DTC is set when the bus off condition detected by the SRR on Flexray Channel A. The emissions neutral default action for all diagnostics under DTC U18CA is to disable SRR data as an input, and not consume data generated by the SRR into the control system	• CAN driver indicates bus off • Lose communication on Flexray Channel A Bus	Fault Detected	SRR Sensor Mode Voltage Range FlexRay Networking Management System Power Mode AND 5 second delay after COM is enabled AND K_U18CA_00_ENABLED = TRUE AND Lost Communication with EOCM fault is not present	=Not Senseing and Sensing =9-16V =Active =RUN	0.01 s	Safety Non-MIL Emissions Neutral Diagnostic
Lost Communication with Active Safety Control Module 2 on Flexray Bus	U18CB	This DTC is set when the bus off condition detected by the SRR on Flexray Channel A. The emissions neutral default action for all diagnostics under DTC U018CB is to disable SRR data as an input, and not consume data generated by the SRR into the control system	• CAN driver indicates bus off • Lose communication on Flexray Channel A Bus	Fault Detected	SRR Sensor Mode Voltage Range FlexRay Networking Management System Power Mode AND 5 second delay after COM is enabled AND K_U18CA_00_ENABLED = TRUE AND Lost Communication with EOCM fault is not present	=Not Senseing and Sensing =9-16V =Active =RUN	0.01 s	Safety Non-MIL Emissions Neutral Diagnostic
Control Module Improper Wake-up Perfomance	U3012	LRR unable to successfully integrate with FlexRay network. Successful Integration is determined by Flexray CommStack reporting Full Communication The emissions neutral default action for all diagnostics under DTC U3012 is to disable SRR data as an input, and not consume data generated by the SRR into the control system	Flexray CommStack reporting Full Communication	Fault Detected	Front SRR Sensor Mode Command Status Voltage Flexray Network Manager: K_ U3012_00_ ENABLE	= Not Sensing and Sensing = 9 < V < 16V =Active =True	During Flexray network integration - First instance	Safety Non-MIL Emissions Neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
VPM Software	B1015	Vehicle Identification Number Information Error The emissions neutral default action for all diagnotics under DTC B1015 is to disable VPM data as an input, and not consume data generated by the VPM into the control system	VIN stored in DID $90 does not match with the received GMLAN VIN information.	Fault Detected	B101500_ENABLE = Enabled	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Startup	Safety Non-MIL Emissions Neutral Diagnostic
ECU Hardware Perfromance	B101D	RAM Failure The emissions neutral default action for all diagnotics under DTC B101D is to disable VPM data as an input, and not consume data generated by the VPM into the control system	VPM RAM component is detected to have permanent failures	Fault Detected	B101D34_ENABLE = Enabled.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		ROM Failure	VPM ROM component is detected to have permanent failures	Fault Detected	B101D35_ENABLE =Enabled.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Electronic Failure	VPM internal circuit failure is detected	Fault Detected	B101D39_ENABLE = Enabled.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously and at Startup.	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Communications Failure	VPM internal communication failure is detected	Fault Detected	B101D3C_ENABLE = Enabled.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Temperature Low	VPM internal temperature blow threshold	-40C	B101D53_ENABLE = Enabled.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Temperature High	VPM internal temperature above threshold	75C	B101D54_ENABLE = Enabled	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
ECU Software Performance	B101E	Operational Software / Calibration Set Not Programmed The emissions neutral default action for all diagnotics under DTC B101E is to disable VPM data as an input, and not consume data generated by the VPM into the control system	Application Data File Not Programmed	Fault Detected	B101D54_ENABLE = Enabled	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Startup	Safety Non-MIL Emissions Neutral Diagnostic
		EEPROM Error	Detects errors from its EEPROM components which can be remedied through reflashing/reprogramming.	Fault Detected	B101E43_ENABLE = Enabled	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Startup	Safety Non-MIL Emissions Neutral Diagnostic
		VIN Not Programmed	VIN coding is not programmed in DID $90	Fault Detected	B101E47_ENABLE = Enabled.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Startup	Safety Non-MIL Emissions Neutral Diagnostic
		RAM Error	Detects errors from its RAM components which can be remedied through reflashing/reprogramming.	Fault Detected	B101E49 _ENABLE = Enabled.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Checksum Error	Internal ECU Memory Checksum Failure Detected.	Fault Detected	B101E4A _ENABLE =Enabled.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Startup	Safety Non-MIL Emissions Neutral Diagnostic
Battery Supply Voltage	B1517	Battery Voltage - Voltage Below Threshold The emissions neutral default action for all diagnotics under DTC B1517 is to disable VPM data as an input, and not consume data generated by the VPM into the control system	Battery Voltage Below Threshold - less than 9.0 volts	9.0volts	B151703_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 4.5v-9v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Battery Voltage - Voltage Above Threshold	Battery Voltage Above Threshold - greater than 16V VDC.	16 volts	B151707_ENABLE = Enabled	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 16v-36v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Front View Camera	B390F	Signal Invalid The emissions neutral default action for all diagnotics under DTC B390F is to disable VPM data as an input, and not consume data generated by the VPM into the control system	No video signal detected from the front camera or the signal from the front camera is not plausible given the operating conditions.	Fault Detected	B390F08_ENABLE = Enabled.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Electronic Failure	Camera internal electronic failure detected	Fault Detected	B390F39 _ENABLE = Enabled.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Communications Failure	Internal Camera Communication Failure Detected.	Fault Detected	B390F3C_ENABLE = Enabled.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Startup	Safety Non-MIL Emissions Neutral Diagnostic
		Calibration Not Learned	Camera has not been calibrated or camera calibration process failed.	Fault Detected	B390F4B_ENABLE = Enabled.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Temperature Low	Camera internal temperature below threshold	-30C	B390F53 _ENABLE =Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Temperature High	Camera internal temperature above threshold.	105C	B390F54 _ENABLE = Enabled.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Incorrect Reaction After Event	Unable to align failure is detected for an effective distance	Fault Detected	B390F58_ENABLE = Enabled.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Wrong Mounting Position	MTC is outside tolerance	Fault Detected	B390F66_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition:9-16v, MEC = 0 (locked)	Continuously	Safety Non-MIL Emissions Neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Rearview Camera	B395A	Signal Invalid The emissions neutral default action for all diagnotics under DTC B395A is to disable VPM data as an input, and not consume data generated by the VPM into the control system	No video signal detected from the front camera or the signal from the rear camera is not plausible given the operating conditions.	Fault Detected	B395A08_ENABLE = Enabled.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Electronic Failure	Camera internal electronic failure detected	Fault Detected	B390A39_ENABLE = Enabled.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Communications Failure	Internal Camera Communication Failure Detected.	Fault Detected	B395A3C_ENABLE = Enabled	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Startup	Safety Non-MIL Emissions Neutral Diagnostic
		Calibration Not Learned	Camera has not been calibrated or camera calibration process failed.	Fault Detected	B395A4B_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: MEC = 0 (locked)	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Temperature Low	Camera internal temperature below threshold	-30C	B395A53_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Temperature High	Camera internal temperature above threshold.	105C	B395A54_ENABLE =Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Incorrect Reaction After Event	Unable to align failure is detected for an effective distance	Fault Detected	B395A58_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Wrong Mounting Position	MTC is outside tolerance	Fault Detected	B395A66_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition:9-16v, MEC = 0 (locked)	Continuously	Safety Non-MIL Emissions Neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sideview Camera - Left	B395B	Signal Invalid The emissions neutral default action for all diagnostics under DTC B395B is to disable VPM data as an input, and not consume data generated by the VPM into the control system	No video signal detected from the front camera or the signal from the Left camera is not plausible given the operating conditions.	Fault Detected	B395B08_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Electronic Failure	Camera internal electronic failure detected	Fault Detected	B395B39 _ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Communications Failure	Internal Camera Communication Failure Detected.	Fault Detected	B395B3C_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Startup	Safety Non-MIL Emissions Neutral Diagnostic
		Calibration Not Learned	Camera has not been calibrated or camera calibration process failed.	Fault Detected	B395B4B_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v,MEC = 0 (locked)	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Temperature Low	Camera internal temperature below threshold	-30C	B395B53 _ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Temperature High	Camera internal temperature above threshold.	105C	B395B54 _ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Incorrect Reaction After Event	Unable to align failure is detected for an effective distance	Fault Detected	B295B58_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Wrong Mounting Position	MTC is outside tolerance	Fault Detected	B395B66_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v, MEC = 0 (locked)	Continuously	Safety Non-MIL Emissions Neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sideview Camera - Right	B395C	Signal Invalid The emissions neutral default action for all diagnotics under DTC B395C is to disable VPM data as an input, and not consume data generated by the VPM into the control system	No video signal detected from the front camera or the signal from the Right camera is not plausible given the operating conditions.	Fault Detected	B395C08_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Electronic Failure	Camera internal electronic failure detected	Fault Detected	B395C39 _ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Communications Failure	Internal Camera Communication Failure Detected.	Fault Detected	B395C3C_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Startup	Safety Non-MIL Emissions Neutral Diagnostic
		Calibration Not Learned	Camera has not been calibrated or camera calibration process failed.	Fault Detected	B395C4B_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition:9-16v, MEC = 0 (locked)	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Temperature Low	Camera internal temperature below threshold	-30C	B395C53 _ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Temperature High	Camera internal temperature above threshold.	105C	B395C54 _ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Incorrect Reaction After Event	Unable to align failure is detected for an effective distance	Fault Detected	B395C58_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Wrong Mounting Position	MTC is outside tolerance	Fault Detected	B395C66_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational	Continuously	Safety Non-MIL Emissions Neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Front View Camera Supply Circuit	B399A	Short to Ground The emissions neutral default action for all diagnotics under DTC B399A is to disable VPM data as an input, and not consume data generated by the VPM into the control system	Short to ground failure is detected from the front camera.	Fault Detected	B399A02_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Short to Battery or Open	Short to battey or open circuit failure is detected from the front camera.	Fault Detected	B399A05_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
Rearview Cameria Supply Circuit	B399B	Short to Ground The emissions neutral default action for all diagnotics under DTC B399B is to disable VPM data as an input, and not consume data generated by the VPM into the control system	Short to ground failure is detected from the rear camera.	Fault Detected	B399B02_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Short to Battery or Open	Short to battey or open circuit failure is detected from the rear camera.	Fault Detected	B396B05_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
Sideview Camera - Left Supply Circuit	B399C	Short to Ground The emissions neutral default action for all diagnotics under DTC B399C is to disable VPM data as an input, and not consume data generated by the VPM into the control system	Short to ground failure is detected from the left camera.	Fault Detected	B399C02_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Short to Battery or Open	Short to battey or open circuit failure is detected from the left camera.	Fault Detected	B399C05_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
Sideview Camera - Right Supply Circuit	B399D	Short to Ground The emissions neutral default action for all diagnotics under DTC B399D is to disable VPM data as an input, and not consume data generated by the VPM into the control system	Short to ground failure is detected from the right camera.	Fault Detected	B399D02_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Short to Battery or Open	Short to battey or open circuit failure is detected from the right camera.	Fault Detected	B399D05_ENABLE = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
High Speed CAN Communication	U0073	When the Transmit Error Counter (TEC) exceeds 255 , the GMLAN handler notifies the application of a bus off condition by using a callback function. This callback function is launched by the handler whenever a bus off condition is reported by the CAN-controller. A routine checks every 1000ms if a Bus Off condition is present. If the number of Bus Off events exceeds a calibratable threshold of a calibratable number of consecutive tests, i.e. an X (=5) of Y (=5) algorithm, then the Bus Off fault code is set. The emissions neutral default action for all diagnotics under DTC U0073 is to disable Super Cruise	Monitored continuously while GMLAN frames are being transmitted. Upon notification of bus off condition (passed up to the application from the handler), the algorithm checks for this condition every 1000ms.	Fault Detected	Exceptions: 1) Algorithm shall not run if P_ENABLE_DTC_C073_FTB_00 = Disabled. 2) The conditions listed in Inhibiting Storage of “Lost Communication with DTCs” section are not active.	- Vehicle Power Mode condition = OFF / ACCESSORY / RUN. - ECU Operational condition: While in the ECU_COMM_Active state. System voltage between 9 < volts < 16V	Monitored continuously while GMLAN frames are being transmitted.	Safety Non-MIL Emissions Neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.