Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Park Switch Stuck Closed	B2BA2	Controller specific software that diagnoses the Shifter Park Switch Stuck Closed (in park state) condition. In this monitor, Shifter Park Switch state is compared against the Transmission Shift Lever Position signal from TCM. If Transmission Shift Lever Position signal is not in Park but Shifter Park Switch is in closed state for X out of Y counts then this DTC gets set.	Shifter Park Switch is	= PARK	All of the following conditions are met: Park Switch Closed Diagnostic Enable is **CbTRUE** No Active Lost Communication with Transmission Control Module DTC System 12V Battery Voltage is above threshold System 12V Battery Voltage Out of Range Delay has Elapsed Transmission Shift Lever Position is NOT equal to Park	= TRUE U0101 > 11.00 volts (with hysteresis disable < 10.00 volts) > 0.00 milliseconds NOT equal to PARK	4 seconds out of a 5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Park Switch Stuck Open	B2BA3	Controller specific software that diagnoses the Shifter Park Switch Stuck Open (not in park state) condition. In this monitor, Shifter Park Switch state is compared against the Transmission Shift Lever Position signal from TCM. If Transmission Shift Lever Position signal is in Park but Shifter Park Switch is in open state for calibratable fail threshold count, then this DTC gets set. And, if Transmission Shift Lever Position signal is in Park and Shifter Park Switch is in closed state for consecutively calibratable pass threshold counts then this diagnostic is passed.	Shifter Park Switch is	NOT equal to PARK	All of the following conditions are met: Park Switch Closed Diagnostic Enable is **CbTRUE** No Active Lost Communication with Transmission Control Module DTC System 12V Battery Voltage is above threshold System 12V Battery Voltage Out of Range Delay has Elapsed Transmission Shift Lever Position is equal to PARK	= TRUE U0101 > 11.00 volts (with hysteresis disable < 10.00 volts) > 0.00 milliseconds = PARK	Diagnostic will fail with 120.00 seconds of continuous fail counts Diagnostic will pass with 0.03 seconds of continuous pass counts	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Performance	P058A	The battery monitor module performance diagnostic is required to diagnose if the IBS sensor has any internal faults. The IBS checks a list of performance parameters as part of this diagnostic: reference voltage, voltage calibration check, current claibration check, NVM static data checksum, NVM dynamic data checksum, page 0 checksum, and wakeup timer check. Once all checks are completed in IBS the result is transmitted to BCM where appropriate DTC will be reported to DFIR. This diagnostic occurs once upon LIN wakeup, and the result is transmitted to BCM within 6 seconds.	IBS Sensor Internal Fault is TRUE (Internal IBS diagnostic)	= CeEM_e_IBS_DiagFailed	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Battery Monitor Module Performance Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC	> 11.00 volts (with hysteresis disable < 10.00) = TRUE = TRUE U01B000 P15FF00	6 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Current Monitoring Performance	P058B	The Battery Monitor Module Current Performance diagnostic is required to ensure there is not an open circuit fault at the shunt resistor. This diagnostic is performed within IBS and status is communicated to BCM where results are reported to DFIR. . IBS monitors the shunt resistor for open circuit while asleep and record historical result. This result is sent to BCM upon LIN wakeup. The BCM receives the historical result and reports to DIFR within 1 second of LIN wakeup. The continuous portion of this diagnostic does not run while the historical portion is running. The internal IBS diagnostic for the continuous portion uses 4 fails out of 5 samples at a rate of 16 second per sample.	IBS has open shunt condition, Battery Current Rationality Diagnostic Determination equals Diagnostic Failed (Internal IBS diagnostic)	= CeEM_e_IBS_DiagFailed	All of the following conditoins are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** IBS Current Performance Diagnostic Enable is **TRUE** IBS Current Performance Continuous Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC Battery Current Rationality Historical Diagnostic Enable is **FALSE**	> 11.00 volts (with hysteresis disable < 10.00) = TRUE = TRUE = TRUE = U01B00 = P15FF00 = FALSE	80 seconds (4 fails out of 5 samples at 16 seconds per sample)	Type B, 2 Trips
			IBS has open shunt condition: Battery Current Rationality Diagnostic Determination equals Diagnostic Failed	= CeEM_e_IBS_DiagFail	All of the following conditions are met: System 12V Battery Voltage is above threshold	> 11.00 volts (with	1 second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			(Internal IBS diagnostic)	ed		hysteresis disable < 10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					IBS Current Performance Diagnostic Enable is **TRUE**	= TRUE		
					IBS Current Performance Historical Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Temperature Monitoring Performance	P058C	The battery monitor module temperature monitoring performance is required to diagnose if the difference between IBS NTC raw temperature and IBS ASIC raw temperature is within a rational threshold. This diagnostic is performed in BCM by comparing the difference between NTC and ASIC temperature values sent by IBS with a calibratable threshold. IBS records upto 24 temperature samples at a rate of 1 set of sample per30min while LIN is off. These 24 sets of samples are used in historical diagnostic, which occurs immediately after LIN wakeup. The historical diagnostic only runs once per LIN wakeup, while the continuous diagnostic runs repeatedly. BCM uses a X of Y strategy for both types of diagnostics.	Absolute difference between ASIC Raw Temperature and NTC Raw Temperature is above threshold	> 10.00 degrees Celsius	All of the following conditions are met:		8 seconds out of a 10 seconds window	Type B, 2 Trips
					System 12V Battery Voltage is above threshold	> 11.00 volts (with hysteresis disable < 10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					Outside Air Temperature is within range	> -30.00 degrees Celsius AND < 50.00 degrees Celsius		
					IBS Temperature Performance Diagnostic Enable is **TRUE**	= TRUE		
					IBS Temperature Performance Continuous Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		
					No Active IBS Temperature Out of Range DTCs	= P058E00, P058F00, P16DE00, P16DF00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Absolute difference between ASIC Raw Temperature and NTC Raw Temperature is above threshold	> 10.00 degrees Celsius	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Outside Air Temperature is within range IBS Temperature Performance Diagnostic Enable is **TRUE** IBS Temperature Performance Historical Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC Historical Temperature Data Down Count is in range	> 11.00 volts (with hysteresis disable < 10.00) = TRUE > -30.00 degrees Celsius AND < 50.00 degrees Celsius = TRUE = TRUE = U01B000 = P15FF00 > 0 AMn	8 seconds out of a 10 seconds window	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						<= 24		
					No Active IBS Temperature Out of Range DTCs	= P058E00, P058F00, P16DE00, P16DF00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Voltage Monitoring Performance	P058D	The Battery Monitor Module Voltage Performance diagnostic is required to diagnose if the IBS Battery Voltage Sensor is accurately sensing the 12V Battery Voltage. The IBS battery voltage high resolution will be transmitted via LIN message from the sensor indicating what its internal sensor is reading for voltage. This voltage is compared with BCM's internal voltage reading (12V System Voltage). If the difference between the two voltages is greater than a calibratable threshold, then the fail counter will increment. Due to the high fluctuation of voltage during cranking event, this diagnostic is disabled from beginning of crank to a calibratable time delay after the end ofcrank. This diagnostic uses an X of Y strategy.	Absolute difference between Battery Monitor Module Voltage and BCM System Voltage is above threshold	>5.00 Volts	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Battery Monitor Module Voltage Performance Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC No Active Battery Voltage Out of Range DTCs Powertrain Crank Active is **FALSE** Post-Crank Time Delay has elapsed	 > 11.00 volts (with hysteresis disable < 10.00) = TRUE = TRUE = U01B000 = P15FF00 = P16D400, P16D500 = FALSE >5,000.00 seconds	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Temperature High	P058E	The Battery Monitor Module Temperature Out of Range High diagnostic is required to diagnose if the IBS ASIC Raw Temperature is above selected threshold value. This diagnostic is performed in BCM by comparing raw ASIC temperature values sent by IBS with a calibratable threshold. IBS records up to 24 temperature samples at a rate of 1 sample per30min while LIN is off. These 24 samples are used in historical diagnostic, which occurs immediately after LIN wakeup. The historical diagnostic only runs once per LIN wakeup, while the continuous diagnostic runs repeatedly. BCM uses a X of Y strategy for both types of diagnostics.	Battery Monitor Module ASIC Temperature above threshold	> 120.00 degrees Celsius	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Outside Air Temperature is within range IBS Temperature High Diagnostic Enable is **TRUE** IBS Temperature High Continuous Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC	> 11.00 volts (with hysteresis disable < 10.00) = TRUE > -30.00 degrees Celsius AND < 50.00 degrees Celsius = TRUE = TRUE = U01B000 = P15FF00	4 seconds out of a 5 seconds window	Type B, 2 Trips
			Battery Monitor Module ASIC Temperature above threshold	> 120.00 degrees Celsius	All of the following conditions are met: System 12V Battery Voltage is above threshold	> 11.00 volts (with hysteresis disable <	4 seconds out of a 5 seconds window	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					Outside Air Temperature is in range	> -30.00 degrees Celsius AND < 50.00 degrees Celsius		
					IBS Temperature High Diagnostic Enable is **TRUE**	= TRUE		
					IBS Temperature High Historical Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		
					Historical Temperature Data Down Count is in range	> 0 AND <= 24		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Temperature Low	P058F	The Battery Monitor Module Temperature Out of Range Low diagnostic is required to diagnose if the IBS ASIC Raw Temperature is above selected threshold value. This diagnostic is performed in BCM by comparing raw ASIC temperature values sent by IBS with a calibratable threshold. IBS records up to 24 temperature samples at a rate of 1 sample per30min while LIN is off. These 24 samples are used in historical diagnostic, which occurs immediately after LIN wakeup. The historical diagnostic only runs once per LIN wakeup, while the continuous diagnostic runs repeatedly. BCM uses a X of Y strategy for both types of diagnostics.	Battery Monitor Module ASIC Temperature below threshold	<-43.00 degrees Celsius	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Outside Air Temperature is within range IBS Temperature Low Diagnostic Enable is **TRUE** IBS Temperature Low Continuous Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC	> 11.00 volts (with hysteresis disable < 10.00) = TRUE > -30.00 degrees Celsius AND < 50.00 degrees Celsius = TRUE = TRUE = U01B000 = P15FF00	4 seconds out of a 5 seconds window	Type B, 2 Trips
			Battery Monitor Module ASIC Temperature below threshold	<-43.00 degrees Celsius	All of the following conditions are met: System 12V Battery Voltage is above threshold	> 11.00 volts (with hysteresis disable <	4 seconds out of a 5 seconds window	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					Outside Air Temperature is in range	> -30.00 degrees Celsius AND < 50.00 degrees Celsius		
					IBS Temperature Low Diagnostic Enable is **TRUE**	= TRUE		
					IBS Temperature Low Historical Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		
					Historical Temperature Data Down Count is in range	> 0 AND <= 24		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Driver Mode Select Switch A Circuit Low	P05D1	This DTC will detect an OBD-compliant analog switch bank 1 input that is too low (out-of-range low).	Analog Mode Switch low voltage threshold	< 0.5280 V	VehicleSwitchBankl Diagnostic Enable calibration is **TRUE** VehicleSwitchBankl Circuit Diagnostic Enable calibration is **TRUE** VehicleSwitchBankl Circuit Out-Of-Range Low Diagnostic Enable calibration is **TRUE**	= TRUE = TRUE = TRUE	4 seconds out of a 5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Driver Mode Select Switch A Circuit High	P05D2	This DTC will detect an OBD-compliant analog switch bank 1 input that is too high (out-of-range high).	Analog Mode Switch high voltage threshold	> 4.7170 V	VehicleSwitchBankl Diagnostic Enable calibration is **TRUE** VehicleSwitchBankl Circuit Diagnostic Enable calibration is **TRUE** VehicleSwitchBankl Circuit Out-Of-Range High Diagnostic Enable calibration is **TRUE**	= TRUE = TRUE = TRUE	4 seconds out of a 5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Driver Mode Select Switch A Range/ Performance	P05D3	This DTC will detect an OBD-compliant analog switch bank 1 input that is invalid within its performance range (in-range deadband).	Analog Mode Switch indeterminate (deadband) regions for 8-state analog resistor ladder	0.5280 < sensed voltage < 0.6280 1.0250 < sensed voltage < 1.1025 1.5220 < sensed voltage < 1.5976 2.0350 < sensed voltage <2.11 2.57 < sensed voltage < 2.64 3.10 < sensed voltage <3.18 3.61 < sensed voltage < 3.69 4.13 < sensed voltage < 4.20 4.62 < sensed voltage < 4.72	VehicleSwitchBankl Diagnostic Enable calibration is TRUE VehicleSwitchBankl Circuit Diagnostic Enable calibration is TRUE VehicleSwitchBankl Circuit Performance Diagnostic Enable calibration is TRUE	= TRUE = TRUE = TRUE	4 seconds out of a 5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration/ software checksum 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 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background.	Type B, 2 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	ROM ECC diagnostic enable is **CbTRUE**	= CbTRUE	Diagnostic runs continuously via the flash hardware.	
				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 Ilium.
Control Module Long Term Memory Reset	P0603	This DTC detects an invalid NVM which includes Static NVM, Cumuliteve NVM, and SSAR NVM invalidities at start up.	Static NVM region error detected during initialization		Static NVM fault on default diagnostic enable is **CbTRUE** Allow blank BINVDN must be **CbFALSE**	= CbTRUE = CbFALSE	Diagnostic runs at controller power up.	Type B, 2 Trips
			Cumulative NVM region error detected during initialization		Cumulative NVM fault on default diagnostic enable is **CbTRUE** Allow blank BINVDN must be **CbFALSE**	= CbTRUE = CbFALSE	Diagnostic runs at controller power up.	
			SSAR NVM region error detected during initialization.		SSAR NVM fault on default diagnostic enable is **CbTRUE** Allow blank BINVDN must be **CbFALSE**	= CbTRUE = CbFALSE	Diagnostic runs at controller power up.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module RAM Failure	P0604	Indicates that the control module has detected a RAM fault. This includes read/ write failures such as a Primary Processor System RAM Fault, Primary Processor Cache RAM Fault, and Primary Processor eTPU 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			Fault indication fed from HWIO- diagnostic runs continuously (background loop)	Type B, 2 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	>= 254 counts			Fault indication fed from HWIO- 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	>= 3 counts			Fault indication fed from HWIO - diagnostic runs continuously (background loop)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Processor Integrity Fault	P0606	Indicates that the control module has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for the primary processor.	2 fails in a row in the MAIN processor's ALU check		ALU diagnostic enable per CPU is **CbTRUE**	= CbTRUE	Run periodically at 25 ms loop rate	Type B, 2 Trips
			Checks number of stack over/under flow since last powerup reset	>=5	Stack Llimit Test diagnostic enable is **CbTRUE**	= CbTRUE	Run periodically at 100ms loop rate	
			Voltage deviation	> 0.4500 V	ADC Test diagnostic enable is **CbTRUE** A2D Test voltages used in diagnosis: **Test Voltage 1** **Test Voltage 2** **Test Voltage 3** **Test Voltage 4** Arbitrated Battery Voltage	= CbTRUE = 0 = 0 = 1 = 1 (1 means enabled, 0 means disabled) > 7.00 V	16 / 20 counts or 0.819 seconds continuous - Note: 50 ms/ count	
			MAIN processor DMA transfer test failures:	16/20 counts	DMA Transfer Test diagnostic enable is **CbTRUE**	= CbFALSE	Run periodically at 50ms loop rate	
			Safety critical software is not executed in proper order. End task calculation does not match expected value for failures	>= 1 incorrect sequence	Program Sequence Watch diagnostic enable calibration per task rate is **CbTRUE** **5ms** **10ms** **25ms** **50ms** **100ms**	 = CbTRUE = CbTRUE = CbTRUE = CbTRUE = CbTRUE	Fail time interval determined per task rate: 5ms: 12/16 counts 10ms: 12/16 counts 25ms: 12/16 counts 50ms: 6/8 counts	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							100ms: 3 / 4 counts Note: 50 ms/ count	
			MAIN processor determines a Program Sequence Watch seed has not changed within a specified time period.	Current seed value equals previous seed value.	Last Seed Timeout diagnostic enable is **CbTRUE**	= CbTRUE	Fail tolerant time set per task rate enabled through the Program Sequence Watch function: 5ms: 3,500 ms 10ms: 3,500 ms 25ms: 3,500 ms 50ms: 3,500 ms 100ms: 4,000 ms Note: 50 ms monitoring task rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Processor Integrity Performance	P0607	Indicates that the ECM has detected an internal processor integrity performance.	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	>= 3/10 (results in MIL) or >=5/10 (results in MIL and remedial action)	Flash ECC diagnostic enable is **CbTRUE**	= CbTRUE	Fail indication from HWIO, variable failure dependent on time to access corrupt flash memory	Type B, 2 Trips
			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) / 10 5 (results in MIL and remedial action) / 10	RAM ECC diagnostic enable is **CbTRUE**	= CbTRUE	Fail indication from HWIO, variable failure dependent on time to access corrupt RAM variables	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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, evaluation of NVM write at shutdown.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
5 Volt Reference #3 Circuit	P0697	Detects a continuous or intermittent short on the 5 volt reference circuit #3 by monitoring the reference percent Vref3 and failing the diagnostic when the percent Vref3 is too low or if the delta between the filtered percent Vref3 and non-filtered percent Vref3 is too large. This diagnostic only runs when battery voltage is high enough.	BCM percent Vref3 < or BCM percent Vref3 > or the difference between BCM filtered percent Vref3 and percent Vref3 >	78.13% Vref3 89.96 % Vref3 7.0000 % Vref3	Diagnostic enabled	= CbTRUE	0.8 seconds out of a 1 seconds window or 200.00 sec continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Temperature Erratic	P100C	The Battery Monitor Module Temperature Erratic diagnostic is required to diagnose if the IBS ASIC Raw Temperature sensor is erratic, caused by sudden short to ground or short to high. This diagnostic is performed in BCM by adding the absolute raw ASIC temperature values sent by IBS over a period of time and comparing with a calibratable threshold. This diagnostic uses the X of Y strategy.	Sum of the absolute difference between 10.00 ASIC Raw Temperature samples is above threshold	>70.00 degrees Celsius	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Outside Air Temperature is within range Temperature Erratic Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC	> 11.00 volts (with hysteresis disable < 10.00) = TRUE > -30.00 degrees Celsius AND < 50.00 degrees Celsius = TRUE = U01B000 = P15FF00	40 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Internal Temperature Erratic	P100D	The Battery Monitor Module Internal Temperature Erratic diagnostic is required to diagnose if the IBS NTC Raw Temperature sensor is erratic, caused by sudden short to ground or short to high. This diagnostic is performed in BCM by adding the absolute raw NTC temperature values sent by IBS over a period of time and comparing with a calibratable threshold. This diagnostic uses the X of Y strategy.	Sum of the absolute difference between 10.00 NTC Raw Temperature samples is above threshold	>70.00 degrees Celsius	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Outside Air Temperature is within range Temperature Circuit Erratic Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC	> 11.00 volts (with hysteresis disable < 10.00) = TRUE > -30.00 degrees Celsius AND < 50.00 degrees Celsius = TRUE = U01B000 = P15FF00	40 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Sensor Signal Message Counter Incorrect	P15FF	This DTC monitors for an internal error or error in communication with the Battery Monitor Signal	Any of the Alive Rolling Counts signal values listed below are incorrect for:		Time since power-up reset, running reset, recovery from under/over voltage condition	>= 5,000 milliseconds	Fastest periodic communication rate to Battery Monitor Module on LIN bus executes at 250ms.	Type B, 2 Trips
			AmpHrsChrgdARC:	8 fail counts out of 10 sample counts	All the following conditions are met for	>= 3,000 milliseconds		
			AmpHrsDischrgdARC:	8 fail counts out of 10 sample counts	Partial Network is active			
			BatCrnkDatARC:	8 fail counts out of 10 sample counts	Power Mode	= Run		
					Battery Voltage	>11.00 Volts		
			BatLINOffDatARC:	8 fail counts out of 10 sample counts				
			BatStsDatARC:	8 fail counts out of 10 sample counts				
			CfgWkupDatARC:	8 fail counts out of 10 sample counts				
			IBSCurrOORAndRatIFOMARC:	8 fail counts out of 10 sample counts				
			IBSDiagDetARC:	8 fail counts out of 10 sample counts				
			MsrdTempARC:	8 fail counts out of 10 sample counts				
			MinCrnkgDatARC:	8 fail counts out of 10 sample counts				
			MVIAndSOFDatARC:	8 fail counts out of 10 sample counts				
			BatSOCDatARC:	8 fail counts out of 10 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			IBSVItgFOMARC:	8 fail counts out of 10 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Circuit Voltage Low	P16D4	The Battery Monitor Module Circuit Low Voltage diagnostic is performed within intelligent battery sensor and is required to diagnose if the Sensor Voltage is out of range low. Once diagnostic determination is reached in IBS, the status is communicated to BCM where results are reported to DIFR. IBS monitors the battery voltage while asleep and record historical result. This result is sent to BCM upon LIN wakeup. The BCM receives the historical result and reports to DIFR within 1 second of LIN wakeup. The continuous portion of this diagnostic does not run while the historical portion is running. The internal IBS diagnostic for the continuous portion uses 200 fails out of 250 samples at a rate of 0.001 second per sample. The diagnostic result is sent to BCM continuously once per 0.25 seconds.	Battery Monitor Module Circuit Voltage below threshold (Internal IBS Diagnostic)	< 3 Volts	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Battery Voltage Out of Range Low Diagnostic Enable is **TRUE** Battery Voltage Out of Range Low Continuous Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC Battery Voltage Out of Range Low Historical Diagnostic Enable is **FALSE**	> 11.00 volts (with hysteresis disable < 10.00) = TRUE = TRUE = TRUE = U01B000 = P15FF00 = FALSE	0.25 seconds (200 fails out of 250 samples at 0.001 second loop rate)	Type B, 2 Trips
			Battery Monitor Module Circuit Voltage below threshold (Internal IBS Diagnostic)	< 3 Volts	All of the following conditions are met: System 12V Battery Voltage is above threshold	> 11.00 volts (with	1 second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						hysteresis disable < 10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					Battery Voltage Out of Range Low Diagnostic Enable is **TRUE**	= TRUE		
					Battery Voltage Out of Range Low Historical Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Circuit Voltage High	P16D5	The Battery Monitor Module Circuit High Voltage diagnostic is performed within intelligent battery sensor and is required to diagnose if the Sensor Voltage is out of range high. Once diagnostics determination is reached in IBS, the status is communicated to BCM where results are reported to DIFR. IBS monitors the battery voltage while asleep and record historical result. This result is sent to BCM upon LIN wakeup. The BCM receives the historical result and reports to DIFR within 1 second of LIN wakeup. The continuous portion of this diagnostic does not run while the historical portion is running. The internal IBS diagnostic for the continuous portion uses 200 fails out of 250 samples at a rate of 0.001 second per sample. The diagnostic result is sent to BCM continuously once per 0.25 seconds.	Battery Monitor Module Circuit Voltage above threshold (Internal IBS Diagnostic)	> 26 Volts	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Battery Voltage Out of Range High Diagnostic Enable is **TRUE** Battery Voltage Out of Range High Continuous Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC Battery Voltage Out of Range High Historical Diagnostic Enable is **FALSE**	> 11.00 volts (with hysteresis disable < 10.00) = TRUE = TRUE = TRUE = U01B000 = P15FF00 = FALSE	0.25 seconds (200 fails out of 250 samples at 0.001 second loop rate)	Type B, 2 Trips
			Battery Monitor Module Circuit Voltage above threshold (Internal IBS Diagnostic)	> 26 Volts	All of the following conditions are met: System 12V Battery Voltage is above threshold	> 11.00 volts (with	1 second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						hysteresis disable < 10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					Battery Voltage Out of Range High Diagnostic Enable is **TRUE**	= TRUE		
					Battery Voltage Out of Range High Historical Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Current Low	P16D6	The Battery Monitor Module Current Out of Range Low diagnostic is performed within intelligent battery sensor and is required to diagnose if the sensor current is out of range low. Once diagnostic determination is reached in IBS, the status is communicated to BCM where results are reported to DIFR. IBS monitors the battery current while asleep and record historical result. This result is sent to BCM upon LIN wakeup. The BCM receives the historical result and reports to DIFR within 1 second of LIN wakeup. The continuous portion of this diagnostic does not run while the historical portion is running. The internal IBS diagnostic for the continuous portion uses 200 fails out of 250 samples at a rate of 0.001 second per sample. The diagnostic result is sent to BCM continuously once per 0.25 seconds.	Battery Monitor Module Current below threshold (Internal IBS diagnostic)	< -1400 Amps	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** IBS Current Out of Range Low Diagnostic Enable is **TRUE** IBS Current Out of Range Low Continuous Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC Shunt Voltage Out of Range Low Historical Diagnostic Enable is **FALSE**	> 11.00 volts (with hysteresis disable < 10.00) = TRUE = TRUE = TRUE = U01B000 = P15FF00 = FALSE	0.25 seconds (200 fails out of 250 samples at 0.001 second loop rate)	Type B, 2 Trips
			Battery Monitor Module Current below threshold (Internal IBS diagnostic)	< -1400 Amps	All of the following conditions are met: System 12V Battery Voltage is above threshold	> 11.00 volts (with	1 second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						hysteresis disable < 10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					IBS Current Out of Range Low Diagnostic Enable is **TRUE**	= TRUE		
					IBS Current Out of Range Low Historical Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Current High	P16DD	The Battery Monitor Module Current Out of Range High diagnostic is performed within intelligent battery sensor and is required to diagnose if the sensor current is out of range high. Once diagnostic determination is reached in IBS, the status is communicated to BCM where results are reported to DIFR. IBS monitors the battery current while asleep and record historical result. This result is sent to BCM upon LIN wakeup. The BCM receives the historical result and reports to DIFR within 1 second of LIN wakeup. The continuous portion of this diagnostic does not run while the historical portion is running. The internal IBS diagnostic for the continuous portion uses 200 fails out of 250 samples at a rate of 0.001 second per sample. The diagnostic result is sent to BCM continuously once per 0.25 seconds.	Battery Monitor Module Current above threshold (Internal IBS diagnostic)	> 1400 Amps	All of the following conditions are met:		0.25 seconds (200 fails out of 250 samples at 0.001 second loop rate)	Type B, 2 Trips
					System 12V Battery Voltage is above threshold	> 11.00 volts (with hysteresis disable < 10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					IBS Current Out of Range High Diagnostic Enable is **TRUE**	= TRUE		
					IBS Current Out of Range High Continuous Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		
					Shunt Voltage Out of Range High Historical Diagnostic Enable is **FALSE**	= FALSE		
			Battery Monitor Module Current above threshold (Internal IBS diagnostic)	> 1400 Amps	All of the following conditions are met:		1 second	
					System 12V Battery Voltage is above threshold	> 11.00 volts (with		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						hysteresis disable < 10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					IBS Current Out of Range High Diagnostic Enable is **TRUE**	= TRUE		
					IBS Current Out of Range High Historical Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Internal Temperature Circuit Low	P16DE	The Battery Monitor Module Internal Temperature Out of Range High diagnostic is required to diagnose if the IBS NTC Raw Temperature is above selected threshold value. This diagnostic is performed in BCM by comparing raw NTC temperature values sent by IBS with a calibratable threshold. IBS records upto 24 temperature samples at a rate of 1 sample per 30min while LIN is off. These 24 samples are used in historical diagnostic, which occurs immediately after LIN wakeup. The historical diagnostic only runs once per LIN wakeup, while the continuous diagnostic runs repeatedly. BCM uses a X of Y strategy for both types of diagnostics.	Battery Monitor Module NTC Temperature above threshold	> 120.00 degrees Celsius	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Outside Air Temperature is within range Temperature Circuit Low Diagnostic Enable is **TRUE** Temperature Circuit Low Continuous Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC	> 11.00 volts (with hysteresis disable < 10.00) = TRUE > -30.00 degrees Celsius AND < 50.00 degrees Celsius = TRUE = TRUE = U01B000 = P15FF00	4 seconds out of a 5 seconds window	Type B, 2 Trips
			Battery Monitor Module NTC Temperature above threshold	> 120.00 degrees Celsius	All of the following conditions are met: System 12V Battery Voltage is above threshold	> 11.00 volts (with	4 seconds out of a 5 seconds window	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						hysteresis disable < 10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					Outside Air Temperature is in range	> -30.00 degrees Celsius AND < 50.00 degrees Celsius		
					Temperature Circuit Low Diagnostic Enable is **TRUE**	= TRUE		
					Temperature Circuit Low Historical Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		
					Historical Temperature Data Down Count is in range	> 0 AND <= 24		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Internal Temperature Circuit High	P16DF	The Battery Monitor Module Internal Temperature Out of Range High diagnostic is required to diagnose if the IBS NTC Raw Temperature is above selected threshold value. This diagnostic is performed in BCM by comparing raw NTC temperature values sent by IBS with a calibratable threshold. IBS records upto 24 temperature samples at a rate of 1 sample per 30min while LIN is off. These 24 samples are used in historical diagnostic, which occurs immediately after LIN wakeup. The historical diagnostic only runs once per LIN wakeup, while the continuous diagnostic runs repeatedly. BCM uses a X of Y strategy for both types of diagnostics.	Battery Monitor Module NTC Temperature below threshold	<-43.00 degrees Celsius	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Outside Air Temperature is within range Temperature Circuit High Diagnostic Enable is **TRUE** Temperature Circuit High Continuous Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC	> 11.00 volts (with hysteresis disable < 10.00) = TRUE > -30.00 degrees Celsius AND < 50.00 degrees Celsius = TRUE = TRUE = U01B000 = P15FF00	4 seconds out of a 5 seconds window	Type B, 2 Trips
			Battery Monitor Module NTC Temperature below threshold	<-43.00 degrees Celsius	All of the following conditions are met: System 12V Battery Voltage is above		4 seconds out of a 5 seconds window	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					threshold	> 11.00 volts (with hysteresis disable < 10.00)		
					IBS NormalCommEnable is TRUE	= TRUE		
					Outside Air Temperature is within range	> -30.00 degrees Celsius AND < 50.00 degrees Celsius		
					Temperature Circuit High Diagnostic Enable is **TRUE**	= TRUE		
					Temperature Circuit High Historical Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		
					Historical Temperature Data Down Count is in range	> 0 AND <= 24		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Random Access Memory (RAM) Error	P16E1	The battery Monitor Module performance (RAM) error diagnostic is required to diagnose if the IBS sensor has any internal RAM faults. This diagnostic is performed within IBS and the status is transmitted to BCM where results are reported to DFIR. This diagnostic takes approximately 10 seconds to complete upon LIN wakeup, and is only run once per wakeup. The result is immediately transmitted to BCM after.	IBS Sensor Internal RAM Fault detected: IBS Internal Fault RAM Determination equals **DiagFailed** (internal IBS diagnostic)	= CeEM_e_IBS_DiagFailed	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS LIN Normal Communication Enable is **TRUE** Battery Monitor Module RAM Error Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC	> 11.00 volts (with hysteresis disable < 10.00) = TRUE = TRUE = U01B000 = P15FF00	10 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Random Access Memory (ROM) Error	P16E2	The battery Monitor Module performance (ROM) error diagnostic is required to diagnose if the IBS sensor has any internal ROM faults. This diagnostic is performed within IBS and the status is transmitted to BCM where results are reported to DFIR.This diagnostic takes approximately 60 seconds to complete upon LIN wakeup, and is only run once per wakeup. The result is immediately transmitted to BCM after.	IBS Sensor Internal ROM Fault detected: IBS Internal Fault RAM Determination equals **DiagFailed** (internal IBS diagnostic)	= CeEM_e_IBS_DiagFailed	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Battery Monitor Module ROM Error Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC	> 11.00 volts (with hysteresis disable < 10.00) = TRUE = TRUE = U01B000 = P15FF00	60 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Data Incompatible Diagnostic	P16E3	The Battery Monitor Module Data Incompatible diagnostic is required to diagnose if the IBS is using the correct configuration information being transmitted by the Host controller to it. The IBS reads and transmits the configuration values it has loaded internally back to the host controller for verification. The historical test evaluates the IBS configuration return values to check if they are equal to the host controller's values. The diagnostic is executed once per host controller wakeup and checks only the first transmitted LIN message containing the IBS return configuration message. The continuous test compares the IBS configuration return values to those sent by BCM and uses X of Y maturation strategy to determine diagnostic state.	Any of the following criteria are met: IBS Config Return Battery Type is NOT equal to Vehicle Battery Type Configuration Battery Nominal Return C20 is above threshold IBS Config Return Battery Cal #1 U40% is above threshold IBS Config Return Battery Cal #2 U80% is above threshold IfSOC Bounding Limit Configuration check is **TRUE** then following conditions are included SOC Bounding Limit Hr3 Difference is above the threshold SOC Bounding Limit Hr8 Difference is above the threshold SOC Bounding Limit Hr24 Difference is above threshold	NOT equal to Vehicle Battery Type Configuration CeEPM_ADV_BATT_ TECH_FLOODED >5.00 >0.50 >0.50 = TRUE >0.01 >0.01 >0.01	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** IBS Configuration Diagnostic Continuous Enable is **TRUE** Battery Monitor Module Data Incompatible Determination Historical Diagnostic Enable is **FALSE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC	> 11.00 volts (with hysteresis disable < 10.00) = TRUE = TRUE = FALSE = U01B000 = P15FF00	5 seconds out of a 6 seconds window	Type B, 2 Trips
			Any of the following criteria are met IBS Config Return		All of the following conditions are met: System 12V Battery Voltage is above		1 second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Battery Type is NOT equal to Vehicle Battery Type Configuration	NOT equal to Vehicle Battery Type Configuration CeEPM_ADV_BATT_ TECH_FLOODED	threshold	> 11.00 volts (with hysteresis disable < 10.00)		
			Battery Nominal Return C20 is above threshold	>5.00	IBS NormalCommEnable is TRUE	= TRUE		
			IBS Config Return Battery Cal #1 U40% is above threshold	>0.50	IBS Configuration Diagnostic Historical Enable is TRUE	= TRUE		
			IBS Config Return Battery Cal #2 U80% is above threshold	>0.50	No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
			IfSOC Bounding Limit Configuration check is TRUE then following conditions are included	= TRUE	No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		
			SOC Bounding Limit Hr8 Difference is above the threshold	>0.01				
			SOC Bounding Limit Hr8 Difference is above the threshold	>0.01				
			SOC Bounding Limit Hr24 Difference is above threshold	>0.01				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Wake-Up Not Detected	P16FD	Detects when a control module did not wake-up at time scheduled by the wake-up alarm at shutdown.	Real Time Clock has exceeded expected wake-up time as defined by alarms scheduled at shutdown	>= 1 failure to meet scheduled controller wake-up	Control Module wake-up not detected Diagnostic Enable calibration is **CbTRUE**	= CbTRUE	Variable, dependent on scheduled controller wake-up times at shutdown	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Power Off Timer Performance	P262B	This DTC determines if the hardware timer does not initialize or count properly. There are two tests to ensure proper functioning of the timer: Count Up Test (CUT) and Range Test (RaTe). Count Up Test (CUT): Verifies that the HWIO timer is counting up with the proper increment. Range Test (RaTe): When the run/crank is not active both the hardware and mirror timers are started. The timers are compared when module shutdown is initiated or run/crank becomes active.	Count Up Test: Time difference between the current value and the previous value of the timer Range Test: The variation of the HWIO timer and mirror timer is	> 1.50 seconds > 0.25%.			Count Up Test: 4 failures out of 20 samples 1 sec / sample Continuous while run/crank is not active and until controller sleep occurs Range Test: Once or twice per trip, performed when controller shutdown is initiated or run/crank becomes active	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Security Peripheral Performance	P3186	This DTC indicates the security peripheral has experienced an internal fault indicating that MAC verification results are unreliable.	MAC verification has falsely passed a configurable number of times.	3.00	Calibration enable	= CbTRUE		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures equals or exceeds before the sample time of is reached	3 counts (equivalent to 600.01 milliseconds) 1,000.01 milliseconds	General Enable Criteria: Time since power-up reset, running reset, recovery from under/over voltage condition All below criteria have been met for CAN channel is requesting full communications Normal CAN transmission on Bus is enabled Accessory mode to off mode not pending Battery voltage Controller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/Propulsion/Start: Power Mode is run If power mode = Accessory: Off key cycle diagnostics are enabled Or	>=5,000 milliseconds >=3,000 milliseconds >11.00 Volts <=18.00 Volts CbFALSE (CbTRUE indicates enabled)	Diagnostic runs in 10 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With TCM	U0101	This DTC monitors for a loss of communication with the Transmission Control Module.	Message is not received from controller for Message $02E Message $031 Message $452	 >10,031.25 milliseconds >10,031.25 milliseconds >12,500.00 milliseconds	General Enable Criteria: Time since power-up reset, running reset, recovery from under/over voltage condition All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Controller is an OBD controller Or Battery Voltage Controller type: OBD Controller	 >=5,000 milliseconds >=3,000 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 10 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If power mode = Run/Propulsion/Start: Power Mode is run If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	CbFALSE (CbTRUE indicates enabled) >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 $425 Message $427 Message $20D Message $209 Message $561 Message $562	 > 12,500.00 milliseconds > 12,500.00 milliseconds > 10,625.00 milliseconds > 10,250.00 milliseconds > 12,500.00 milliseconds > 12,500.00 milliseconds	General Enable Criteria: Time since power-up reset, running reset, recovery from under/over voltage condition All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Controller is an OBD controller Or Battery Voltage Controller type: OBD Controller	 >=5,000 milliseconds >=3,000 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 10 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If power mode = Run/Propulsion/Start: Power Mode is run If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	 CbFALSE (CbTRUE indicates enabled) >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Battery Monitor Module	U01B0	This DTC monitors for a loss of communication with the Battery Monitor Module on the LIN bus.	Message is not received from device for IBSAmpHrChrg_Rsp_PDU IB8AmpHrDisChrg_Rsp_PDU IBSBattCrnkData_Rsp_PDU IBSBattLINOffData_Rsp_PDU IBSBattStatusData_Rsp_PDU IBSCfgWakeupData_Rsp_PDU IBSCurrentFOMData_Rsp_PDU IBSDiagDet_Rsp_PDU IBSMeasuredTemp_Rsp_PDU IBSMinCrnkData_Rsp_PDU IBSMVISOFData_Rsp_PDU IBSSOCData_Rsp_PDU IBSVoltageFOMData_Rsp	 >=12,600.00 milliseconds >=12,600.00 milliseconds >=12,600.00 milliseconds >=12,600.00 milliseconds >=12,600.00 milliseconds >=12,600.00 milliseconds >=12,600.00 milliseconds >=10,725.00 milliseconds >=10,725.00 milliseconds >=12,600.00 milliseconds >=10,725.00 milliseconds >=12,600.00 milliseconds >=12,600.00	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Slave is calibrated as present Time since power-up reset, running reset, recovery from under/over voltage condition All below criteria have been met for Accessory mode to off mode not pending Battery voltage Controller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/Propulsion/Start: Power Mode is run If power mode = Accessory:	 CbTRUE (CbTRUE indicates enabled) CbTRUE (CbTRUE indicates enabled) CbTRUE (CbTRUE indicates present) >=5,000 milliseconds >=3,000 milliseconds >11.00 Volts <=18.00 Volts	LIN bus communication executes in 250ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			_PDU	milliseconds	Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	CbFALSE (CbTRUE indicates enabled) >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From ECM/ PCM	U0401	This DTC monitors for an error in communication with the ECM.	Any of the Alive Rolling Counts, Protection Values, Checksum Values, or Cyclic Redundancy Check signal values listed below are incorrect for:		Time since power-up reset, running reset, recovery from under/over voltage condition	>= 5,000 milliseconds	Executes in 10ms loop.	Type B, 2 Trips
					All the following conditions are met for	>= 3,000 milliseconds		
			ESP_ARC:	8 fail counts out of 10 sample counts	Partial Network is active			
			ECXCI1_ARC:	8 fail counts out of 10 sample counts	Power Mode	= Run		
					Battery Voltage	>11.00 Volts		
			DRCDNDP_ARC:	8 fail counts out of 10 sample counts				
			PSP_ARC:	8 fail counts out of 10 sample counts				
			VSADP_ARC:	8 fail counts out of 10 sample counts				
			OATP_ARC:	8 fail counts out of 10 sample counts				
			EHCCI_ARC:	8 fail counts out of 10 sample counts				
			EHCCI_CS:	14 fail counts out of 18 sample counts				
			ESP_MAC:	14 fail counts out of 18 sample counts				
			DRCDNDP_MAC:	14 fail counts out of 18 sample counts				
			PSP_MAC:	14 fail counts out of 18 sample counts				
				14 fail counts out of				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			VSADP_MAC: OATP_MAC: VSANDP_ARC: VSANDP_MAC: SD81P_ARC: SD81P_MAC:	18 sample counts 14 fail counts out of 18 sample counts 8 fail counts out of 10 sample counts 14 fail counts out of 18 sample counts 8 fail counts out of 1 sample counts 14 fail counts out of 18 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Transmission Control Module	U0402	This DTC monitors for an error in communication with the TCM.	Any of the Alive Rolling Counts, Protection Values, Checksum Values, or Cyclic Redundancy Check signal values listed below are incorrect for:		Time since power-up reset, running reset, recovery from under/over voltage condition	>= 5,000 milliseconds	Executes in 10ms loop.	Type B, 2 Trips
					All the following conditions are met for	>= 3,000 milliseconds		
			TEGP_ARC:	15 fail counts out of 16 sample counts	Partial Network is active			
			TEGP_MAC:	15 fail counts out of 16 sample counts	Power Mode	= Run		
					Battery Voltage	>11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Brake System Control Module	U0418	This DTC monitors for an error in communication with the BSCM.	Any of the Alive Rolling Counts, Protection Values, Checksum Values, or Cyclic Redundancy Check signal values listed below are incorrect for: DMCP.ARC: DMCP_MAC: EPBSP_ARC: EPBSP_MAC:	8 fail counts out of 10 sample counts 14 fail counts out of 18 sample counts 15 fail counts out of 16 sample counts 15 fail counts out of 16 sample counts	Time since power-up reset, running reset, recovery from under/over voltage condition All the following conditions are met for Partial Network is active Power Mode Battery Voltage	>= 5,000 milliseconds >= 3,000 milliseconds = Run >11.00 Volts	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Gateway A	U0447	This DTC monitors for an error in communication with the CGM.	Any of the Alive Rolling Counts, Protection Values, Checksum Values, or Cyclic Redundancy Check signal values listed below are incorrect for: BSPMP_ARC: BSPMP_MAC:	15 fail counts out of 16 sample counts 15 fail counts out of 16 sample counts	Time since power-up reset, running reset, recovery from under/over voltage condition All the following conditions are met for Partial Network is active Power Mode Battery Voltage	>= 5,000 milliseconds >= 3,000 milliseconds = Run >11.00 Volts	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Body Control Module Local Interconnect Network 9	U152D	This DTC monitors for a loss of communication on the LIN bus.	Loss of Communication Method: The total number of diagnostic enabled slave nodes on LIN Bus Or LIN channel Wakeup Method: LIN channel wakeup repetition counter	= Total number of slave nodes on LIN Bus that have reported lost communications DTCs >= 10 counts	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Time since power-up reset, running reset, recovery from under/over voltage condition All below criteria have been met for Accessory mode to off mode not pending Battery voltage Controller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If power mode = Accessory: Off key cycle diagnostics are enabled	CbTRUE (CbTRUE indicates enabled) CbTRUE (CbTRUE indicates enabled) >=5,000 milliseconds >=3,000 milliseconds >11.00 Volts <=18.00 Volts CbFALSE (CbTRUE	LIN bus communication executes in 250ms loop. Dependent on bus loading.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	indicates enabled) >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Brake System Control Module 1 on CAN Bus 2	U1610	This DTC monitors for a Lost Communication with Brake System Control Module on CAN Bus 2 error as determined by the BCM	Message is not received from controller for Message $211 Message $21B Message $42A Message $012 Message $415 Message $417 Message $4B5 Message $028	 >10,625.00 milliseconds >10,625.00 milliseconds >12,500.00 milliseconds >10,025.00 milliseconds >10,250.00 milliseconds >12,500.00 milliseconds >12,500.00 milliseconds >10,025.00 milliseconds	General Enable Criteria: Time since power-up reset, running reset, recovery from under/over voltage condition All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Controller is an OBD controller Or Battery Voltage Controller type: OBD Controller	 >=5,000 milliseconds >=3,000 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 10 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If power mode = Run/Propulsion/Start: Power Mode is run If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	CbFALSE (CbTRUE indicates enabled) >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Engine Control Module on CAN Bus 2	U1611	This DTC monitors for a Lost Communication with Engine Control Module on CAN Bus 2 error as determined by the BCM.	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 10 ms loop	Type A, 1 Trips
			Message $011	>10,031.25 milliseconds	Time since power-up reset, running reset, recovery from under/over voltage condition	>=5,000 milliseconds		
			Message $01C	>10,031.25 milliseconds	All below criteria have been met for	>=3,000 milliseconds		
			Message $01D	>10,031.25 milliseconds	If message is on Bus A: U0073 not active			
			Message $213	>10,250.00 milliseconds	If message is on Bus B: U0074 not active			
			Message $21D	>10,250.00 milliseconds	If message is on Bus S: U0076 not active			
			Message $227	>10,625.00 milliseconds	CAN channel is requesting full communications			
			Message $229	>10,250.00 milliseconds	Normal CAN transmission on Bus is enabled			
			Message $22A	>10,625.00 milliseconds	If bus type is Sensor Bus, sensor bus relay is on			
			Message $41D	>12,500.00 milliseconds	Accessory mode to off mode not pending			
			Message $499	>12,500.00 milliseconds	Battery voltage	>11.00 Volts		
			Message $4BB	>12,500.00 milliseconds	Controller is an OBD controller Or Battery Voltage	<=18.00 Volts		
			Message $4BC	>12,500.00 milliseconds	Controller type: OBD Controller			
			Message $4C1	>11,250.00 milliseconds				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Message $214	>10,625.00 milliseconds	If power mode = Run/Propulsion/Start:			
			Message $4BD	>12,500.00 milliseconds	Power Mode is run			
			Message $254	>10,625.00 milliseconds	If power mode = Accessory:			
			Message $59A	>10,625.00 milliseconds	Off key cycle diagnostics are enabled Or Controller is an OBD controller	CbFALSE (CbTRUE indicates enabled)		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

Key Table Not Provisioned / Authoritative Counter At Maximum	U1960	This DTC indicates that the ECU security peripheral key slots are not provisioned OR ECU message authenticatioon Authoritative Counters are at MAX value	During controller initialization:
			
			IF (Any Security Peripheral Key Slot reports as Empty)
			-OR-
			(Any Authoritative Counter is at MAX value)
			
			During controller operation:
			
			IF (A Security Peripheral Key Slot reports as Empty)
			-OR-
			(An Authoritative Counter is at MAX value)
					Calibration enable	= CbTRUE		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Security Peripheral Performance	U1961	This DTC indicates that the ECU security peripheral has reported that it has failed.	The ECU security peripheral reports that the security peripheral hardware has failed.		Calibration enable	= CbTRUE		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Unable to Authenticate Serial Data Message	U1962	This DTC indicates that serial data message authentication on any key slot has failed a configurable number of times this key cycle.	Message authentication on a single key slot has failed a configurable number of times.	60	Calibration enable	= CbTRUE		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Input Power Circuit A/B Correlation	U3018	This diagnostic verifies that both (A and B) control module input power voltage sensors (when there are two) are neither inappropriately high nor low. It compares the sensed control module voltage A with sensed control module voltage B. If the absolute value of the difference between voltage A and B is greater than the failure threshold for sufficient time, the diagnostic will fail.	Difference between 12V Battery Power Circuit A and 12V Battery Power Circuit B	> 4.00V	Control Module Input Power Circuit A/B Correlation Diagnostic Enable calibration is **CbTRUE** 12V Starter Engaged	= CbTRUE = FALSE	4 seconds out of a 5 seconds window	Type B, 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
CGM Battery Voltage Low Detected	B2B11	This monitoring checks the system voltage and sets a fault if it is below 7.0V with a calibratable X of Y debounce strategy.	Vehicle Supply Voltage with a debounce strategy of X of Y	<7.0+/-0.5V = 320 = 400	Any participating Partial Network Control module operational software	= Active = Executing	4[sec] for pass min 3.2[sec] for fail	Type C - No MIL
Bus-Off detected on Communication CAN Bus 1	U1002	This fault is set if Communication CAN Bus i enters the Bus-Off state	Bus Off Event on CAN Bus 1 FOR	= TRUE >= 2.1 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >=k_Control Module Communication Bus Off Power Mode Time	100[msec] for pass 2.1[sec] for fail	Type B 2 Trips
Bus-Off detected on Communication CAN Bus 2	U2413	This fault is set if Communication CAN Bus 2 enters the Bus-Off state	Bus Off Event on CAN Bus 2 FOR	= TRUE >= 2.1 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >=k_Control Module Communication Bus Off Power Mode Time	100[msec] for pass 2.1[sec] for fail	Type B 2 Trips
Bus-Off detected on Communication CAN Bus 3	U1004	This fault is set if Communication CAN Bus 3 enters the Bus-Off state	Bus Off Event on CAN Bus 3 FOR	= TRUE >= 2.1 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >=k_Control Module Communication Bus Off Power Mode Time	100[msec] for pass 2.1[sec] for fail	Type B 2 Trips
Bus-Off detected on Communication CAN Bus 5	U1006	This fault is set if Communication CAN Bus 5 enters the Bus-Off state	Bus Off Event on CAN Bus 5 FOR	= TRUE >= 2.1 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >=k_Control Module Communication Bus Off Power Mode Time	100[msec] for pass 2.1[sec] for fail	Type B 2 Trips
Internal memory failure on the CGM Detected	B2B12	This monitoring checks whether a double bit ECC error has occurred in code flash or RAM. This fault is set if an ECC error has occurred.	ECC Error Detected	= TRUE	N/A	N/A	50ms	Type B 2 Trips
		This monitoring checks and sets a fault if a defect in the data flash (NVM) is detected.	NVM Fault Detected	= TRUE	N/A	N/A	1.5 us	
Microcontroller Performance Failure Detected	B2B13	This monitoring shall check the CPU by running an instruction test followed by a register test.	Instruction test failed OR Register test failed	= TRUE = TRUE	N/A	N/A	1.5 us	Type B 2 Trips
		This monitoring shall check whether any clock monitoring interrupts have occurred. If any clock monitoring interrupts have occurred this fault shall be set.	Clock Monitoring Interrupt Occurred	= TRUE	N/A	N/A		
Loss of Communication with the BCM Detected	U2203	This monitoring shall check a supervised message from the BCM for communication status. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set.	Supervised message not received FOR WHERE nominal periodic rate with an additional delay	= TRUE >= 2.5 x nominal periodic rate = 1 second = 4 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips

		periodic rate plus an additional delay of 4 seconds, then this fault shall be set.	with an additional delay	= 4 seconds	FOR	>= k_Lost Communication Power Mode Time		
Loss of Communication with the EBCM on CAN1 Detected	U2418	This monitoring shall check a supervised message from the EBCM for communication status on CAN channel 1. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set.	Supervised message not received FOR WHERE nominal periodic rate with an additional delay	= TRUE >= 2.5 x nominal periodic rate = 1 second = 4 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips
Loss of Communication with the EBCM on CAN2 Detected	U2419	This monitoring shall check a supervised message from the EBCM for communication status on CAN channel 2. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set.	Supervised message not received FOR WHERE nominal periodic rate with an additional delay	= TRUE >= 2.5 x nominal periodic rate = 1 second = 4 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips
Loss of Communication with the ECM Detected on CAN 2	U241C	This monitoring shall check a supervised message from the ECM for communication status on CAN channel 2. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set.	Supervised message not received FOR WHERE nominal periodic rate with an additional delay	= TRUE >= 2.5 x nominal periodic rate = 1 second = 4 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips
Loss of Communication with the ECM Detected on CAN 3	U241D	This monitoring shall check a supervised message from the ECM for communication status on CAN channel 3. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set.	Supervised message not received FOR WHERE nominal periodic rate with an additional delay	= TRUE >= 2.5 x nominal periodic rate = 1 second = 4 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips
Loss of Communication with the HVAC_FP_F Detected	U2209	This monitoring shall check a supervised message from the HVAC_FP_F for communication status. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set.	Supervised message not received FOR WHERE nominal periodic rate with an additional delay	= TRUE >= 2.5 x nominal periodic rate = 1 second = 4 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips
Loss of Communication with the TCM Detected	U220F	This monitoring shall check a supervised message from the TCM for communication status. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set.	Supervised message not received FOR WHERE nominal periodic rate with an additional delay	= TRUE >= 2.5 x nominal periodic rate = 1 second = 4 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips
Central Gateway Module Received Invalid Data From Body Control Module	U137F	This diagnostic monitors invalid data received from the BCM. If X (default = 3) invalid data are received within Y(default = 1.5) seconds, the fault is set. If X+I valid data are received with Y seconds, the fault is cleared.	Invalid BCM data instances WITHIN	>= X (default of 3) <= Y (default 1.5) seconds	k_OBD_APP_BCM_Inva1idData_ca1 Vehicle Supply Voltage AND Any participating Partial Network FOR	= True >= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= kjnvalid Data Received from BCM Power Mode Time	0.75 [sec] min 1.5 [sec] max	Type B 2 Trips

					Any participating Partial Network FOR	= Active >= k_KeyTable Not Provisioned Diagnostic Time		
Central Gateway Module Security Peripheral Performance	U1983	This diagnostic monitors the security peripheral and if the security peripheral indicates a fault or the key table is not provisioned, then this fault is set. Otherwise, it is cleared.	Security peripheral has a fault OR Key table is provisioned	= True = False	k_OBD_APP_SecurityPeripheralPerformance_cal Vehicle Supply Voltage AND Any participating Partial Network FOR	= True >= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= 5 seconds	150 [msec] min 5.0 [sec] max (startup)	Type B 2 Trips
Central Gateway Module Unable To Authenticate Serial Data Message	U1984	This diagnostic monitors for serial data message authentication failures. If X (default = 3) failures occur on a particular key slot, the fault is set. If X-I messages on a failed key slot authenticate, the fault is cleared.	Serial data authentication failure instances on a key slot	>=X (default of 3)	k_OBD_APP_UnableToAuthenticateSerialData_cal Vehicle Supply Voltage AND Any participating Partial Network FOR	= True > k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= 2 seconds	30 [msec] min 0.72 [sec] max 2.0 [sec] on startup	Type B 2 Trips
ECUIdentification ListNVM Corruption	U197C	ECUIdentification ListNVM Corruption Diagnostic	When the checksum of the memory that stores the learned content no longer matches the stored checksum.	= TRUE	Vehicle Supply Voltage U197700 ECUIdentification Self Learn Not Completed DTC	> k_Battery Voltage Low Threshold = >=7V < k_Battery Voltage High Threshold = >=30V = Not Set	1.5 [sec] min 5 [sec] max on startup	Type B 2 Trips
Self-Learn Did Not Execute	U197B	Self Learn Did not Execute Diagnostic	Unlearn all ECU'sor do not self learn any of the ECU's	= TRUE	System Power mode Any participating Partial Network FOR	= OFF = Active >= 2 seconds	150 [msec] min 500 [msec] max on startup	Type B 2 Trips
Self-Learn Invalid Due to VIN Mismatch	U197D	Self Learn Invalid Due to VIN Mismatch Diagnostic	When all 17 characters of the DID $F190 i.e. Vehicle Identification Number do not match all 17 characters of VIN being broadcasted. OR When last 8 characters of the DID$F190 i.e. Vehicle Identification Number do not match the last 8 characters of VIN being broadcasted.	= TRUE = TRUE	When last 8 digits of Vehicle Identification Number (i.e. DID $F190) are checked OR When all 17 digits of Vehicle Identification Number (i.e. DID $F190) are checked AND U300251 Vehicle Identification Number - Not Programmed DTC	= True =True = Not Set	500 [msec] min 5 [sec] max on startup	Type B 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Control Module Sensor Reference Voltage 1 Low Voltage	P1018	This monitoring checks if the UTLC Sensor 5V supply is lower than expected	Quality sensor power supply voltage	< 4.75V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.2s Failure out of 20 samples Time basis = 0.01s	Type A, ITrip
Reductant Control Module Sensor Reference Voltage 1 High Voltage	P1019	This monitoring checks if the UTLC Sensor 5V supply is higher than expected	Quality sensor power supply voltage	> 5.25V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.2s Failure out of 20 samples Time basis = 0.01s	Type A, ITrip
Engine Diagnostic Status Signals Message Counter Incorrect	P10C6	The diagnostic monitor detects an alive rolling count error or checksum error in any of the CAN frames $297,$2A0, $453, $58F, $2A6, and $531 sent by ECM that is received by Reductant Control Module (DEFC).	If the frames counter value increments in the order (0->l->2->3->0->...), with wrap-around after 3, then the diagnostic reports pass. If any value is not in the order listed for any of the frames, then the diagnostic reports fail. OR		Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	2s Failure out of 10 to 200 samples (depending on the CAN Frame IDs transmit rate) Time basis = 0.01s	Type A, ITrip
			if any of the frames checksum	* computed checksum				
Reductant Control Module Sensor Reference Voltage 2 Low Voltage	P10C9	This monitoring checks if the reductant pressure sensor 5V supply is lower than expected	Pressure sensor power supply voltage	< 4.75V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.4s Failure out of 40 samples Time basis = 0.01s	Type A, ITrip
Reductant Control Module Sensor Reference Voltage 2 High Voltage	P10CA	This monitoring checks if the reductant pressure sensor 5V supply is higher than expected	Pressure sensor power supply voltage	> 5.25V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.4s Failure out of 40 samples Time basis = 0.01s	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Heater 1 Control Circuit Shorted	P10D9	This monitoring checks if at least one heater high side and low side are shorted together. The 3 reductant heaters (2 tank heaters, and 1 supply line heater) share a low side driver, and therefore cannot pinpoint which heater is faulted. While heaters are commanded off, shorted high side to low side faults are indistinguishable to an unfaulted heater. Upon the presence of certain heater circuit faults, the heater driver hardware will enter a self-protection mode and will shut off automatically. Other heater circuit diagnostics can be diagnosed while the heaters are off. If no fault is confirmed after sufficient time with the heaters off, the heaters are commanded back on. A shorted high side to low side fault is confirmed after the heaters have automatically shut off via hardware protection sufficient times without confirming the presence of any other circuit faults.	Heater driver hardware protection has shut off heaters due to the following conditions: [Low side FET drain OR load current] AND Error Counter Notel: The control system will determine that other circuit faults are not detected, and the heaters will be commanded back on when the following criteria are met: ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side Note2: A fault is confirmed when the Error Counter (based on number of heater transitions between the on and off states) exceeds the Error counter threshold.	 > 0.45 V >95 A >4 < 0.909V > 0.767V < 0.613V > 0.487V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) Heater power supply voltage Propulsion System Heater 1 PWM Command No DCU internal fault Note: Heaters PWM command is set to zero in response to a fault on the: Tank temperature sensor Tank temperature power supply Heater 1 Heater 2 Heater 3 Heater power supply CAN communication Hardwired Run/Crank	= ACTIVE > 5.7V = ACTIVE >0% P20FF & P10F4 P205B & P205C & P205D & P205E P131B&P131C P214F & P21DD & P20BB & P20BC & P20B9 & P20BA P221C & P221D & P20C0 & P20BE & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC& P10DD P10C6 & U2212 & U1009 P10DA & P10DB	Up to 1.2 s Failure out of 4 samples Success out of 12 samples Time basis = 0.2s Recovery only at next driving cycle Note: The **Error counter** is incremented by 6 each time the heater is turned off and back on, but decremented by 1 each time loop that the heater is on.	Type A, ITrip
Reductant Control Module Ignition On/Start Switch Circuit High Voltage	P10DA	This monitoring checks if the Run/Crank wired input on the DEF controller is high, when it is expected to be low	Reductant Control Module internal error flag for the corosponding failure Notel: Error flag determination is based on the AUTOSAR Standard Utility Modules Specifications & Architecture, implemented with GM XoutY fault maturation strategy. It compares hardware information to the CAN status from different controllers.	= True	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	Up to 0.2s 16 failures out of 20 samples O.Ols/sample	Type A, ITrip
Reductant Control Module Ignition On/Start Switch Circuit Low Voltage	P10DB	This monitoring checks if the Run/Crank wired input on the DEF controller is low, when it is expected to be high	Reductant Control Module internal error flag for the corosponding failure Notel: Error flag determination is based on the AUTOSAR Standard Utility Modules Specifications & Architecture, implemented with GM XoutY fault maturation strategy. It compares hardware information to the CAN status from different controllers.	= TRUE	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	Up to 0.2s 16 failures out of 20 samples O.Ols/sample	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Control Module Heater Supply Circuit Low	P10DC	This monitoring checks if the reductant tank heater supply voltage is lower than reductant controller permanent power supply voltage	ECU power supply voltage - Tank heater power supply voltage	>3.3V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) Propulsion System Active Time after controller initialization Engine cranking (received over CAN) Pump State No CAN communication fault No DCU internal fault Note 1: To obtain clear understanding of various pump states & transitions, refer to the "Pump States & Transitions" sheet.	= ACTIVE = ACTIVE > 0.51s = FALSE * After-run P10C6 & U2212 & U1009 P20FF & P10F4	0.5s Failure out of 50 samples Time basis = 0.01s	Type B, 2 Trips
Reductant Control Module Heater Supply Circuit High	P10DD	This monitoring checks if the reductant tank heater supply voltage is greater than reductant controller permanent power supply voltage	Tank heater power supply voltage - ECU power supply voltage	>3.3V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) Propulsion System Active Time after controller initialization Engine cranking (received over CAN) Pump State No CAN communication fault No DCU internal fault Note 1: To obtain clear understanding of various pump states & transitions, refer to the "Pump States & Transitions" sheet.	= ACTIVE = ACTIVE > 0.51s = FALSE * After-run P10C6 & U2212 & U1009 P20FF & P10F4	0.5 s Failure out of 50 samples Time basis = 0.01s	Type B, 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Heater 2 Control Circuit Shorted	P1OF3	This monitoring checks if at least one heater high side and low side are shorted together. The 3 reductant heaters (2 tank heaters, and 1 supply line heater) share a low side driver, and therefore cannot pinpoint which heater is faulted. While heaters are commanded off, shorted high side to low side faults are indistinguishable to an unfaulted heater. Upon the presence of certain heater circuit faults, the heater driver hardware will enter a self-protection mode and will shut off automatically. Other heater circuit diagnostics can be diagnosed while the heaters are off. If no fault is confirmed after sufficient time with the heaters off, the heaters are commanded back on. A shorted high side to low side fault is confirmed after the heaters have automatically shut off via hardware protection sufficient times without confirming the presence of any other circuit faults.	Heater driver hardware protection has shut off heaters due to the following conditions: [Low side FET drain OR load current] AND Error Counter Note1: The control system will determine that other circuit faults are not detected, and the heaters will be commanded back on when the following criteria are met: ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side Note2: A fault is confirmed when the Error Counter (based on number of heater transitions between the on and off states) exceeds the Error counter threshold.	> 0.45 V >95 A >4 < 0.909V > 0.767V < 0.613V > 0.487V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) Heater power supply voltage Propulsion System Heater 2 PWM Command No DCU internal fault Note: Heaters PWM command is set to zero in response to a fault on the: Tank temperature sensor Tank temperature power supply Heater 1 Heater 2 Heater 3 Heater power supply CAN communication Hardwired Run/Crank	= ACTIVE > 5.7V = ACTIVE >0% P20FF, P10F4 P205B & P205C & P205D & P205E P131B&P131C P214F & P21DD & P20BB & P20BC & P20B9 & P20BA & P10D9 P221C & P221D & P20C0 & P20BE & P20BF & P20BD P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC& P10DD P10C6 & U2212 & U1009 P10DA & P10DB	Up to 1.2 s Failure out of 4 samples Success out of 12 samples Time basis = 0.2s Recovery only at next driving cycle Note: The **Error counter** is incremented by 6 each time the heater is turned off and back on, but decremented by 1 each time loop that the heater is on.	Type A, ITrip
Reductant Control Module Not Programmed	P1OF4	This monitoring checks if the ECU is a service part that has not been programmed with application specific software and calibration.	**Software Operational Reference Calibration** AND MEC Note: **Software operational reference calibration** is set to true if application specific calibration has been flashed.	= FALSE = 0	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion)	= ACTIVE	No debounce applied Once at ECU initialization	Type A, ITrip
Reductant Control Module Sensor Reference Voltage 3 Low Voltage	P131B	This monitoring checks if the reductant temperature sensor 5V supply is lower than expected	Reducant temperature sensor power supply voltage	< 4.75V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.4 s Failure out of 40 samples Time basis = 0.01s	Type A, ITrip
Reductant Control Module Sensor Reference Voltage 3 High Voltage	P131C	This monitoring checks if the reductant temperature sensor 5V supply is higher than expected	Reducant temperature sensor power supply voltage	> 5.25V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.4 s Failure out of 40 samples Time basis = 0.01s	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater	P143C	This monitoring checks if at least one	Heater driver hardware protection has		Vehicle Power Mode	= ACTIVE	Up to 1.2 s	Type A,
3 Control Circuit		heater high side and low side are shorted	shut off heaters due to the following		(Accessory, Run, Start Request or Propulsion)		Failure out of 4 samples	1 Trip
Shorted		together. The 3 reductant heaters (2 tank	conditions:		Heater power supply voltage	> 5.7V	Success out of 12 samples	
		heaters, and 1 supply line heater) share a	[Low side FET drain	> 0.45 V			Time basis = 0.2s	
		low side driver, and therefore cannot	OR		Propulsion System	= ACTIVE	Recovery only at next driving	
		pinpoint which heater is faulted.	load current]	>95 A			cycle	
		While heaters are commanded off,	AND		Heater 3 PWM Command]	>0%		
		shorted high side to low side faults are	Error Counter	>4			Note: The **Error counter** is	
		indistinguishable to an unfaulted heater.			No DCU internal fault		incremented by 6 each time the	
		Upon the presence of certain heater	Note1: The control system will determine		Note: Heaters PWM command is set to zero	P20FF & P10F4	heater is turned off and back on,	
		circuit faults, the heater driver hardware	that other circuit faults are not detected,		in response to a fault on the:		but decremented by 1 each time	
		will enter a self-protection mode and will	and the heaters will be commanded back		Tank temperature sensor	P205B &P205C & P205D & P205E	loop that the heater is on.	
		shut off automatically. Other heater	on when the following criteria are met:		Tank temperature power supply	P131B & P131C		
		circuit diagnostics can be diagnosed	ADC voltage on high side	< 0.909V	Heater 1	P214F & P21DD & P20BB & P20BC & P20B9 &		
		while the heaters are off. If no fault is	AND			P20BA & P10D9		
		confirmed after sufficient time with the	ADC voltage high side	> 0.767V	Heater 2	P221C & P221D & P20C0 & P20BE & P20BF &		
		heaters off, the heaters are commanded	AND			P20BD & P10F3		
		back on. A shorted high side to low side	ADC voltage low side	< 0.613V	Heater 3	P221E & P221F & P20C1 & P20C2 & P20C3 &		
		fault is confirmed after the heaters have	AND			P20C4		
		automatically shut off via hardware	ADC voltage low side	> 0.487V	Heater power supply	P10DC & P10DD		
		protection sufficient times without			CAN communication	P10C6 & U2212 & U1009		
		confirming the presence of any other	Note2: A fault is confirmed when the		Hardwired Run/Crank	P10DA & P10DB		
		circuit faults.	Error Counter (based on number of					
			heater transitions between the on and off					
			states) exceeds the Error counter					
			threshold.					

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Pump Resistance Performance	P149F	This monitor checks if the reductant pump resistance is too low during the pump heating phase.	Pump driver power supply * duty cycle / measured driver current OR	<0.230	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) Pump state Measured pump driver current Note: Pump heating is disabled in response to the following faults: Pressure Sensor fault Reductant Pump fault Pressure sensor power supply fault CAN communication fault Hardwired Run/Crank No DCU internal fault Note 1: To obtain clear understanding of various pump states & transitions, refer to the "Pump States & Transitions" sheet.	= ACTIVE = Heating >0A P204B & P204C & P204D & P204E P249C & P208B & P20E8 & P20E9 & P2C11 & P214E & P208D & P208C & P208A P10CA & P10C9 P10C6 & U2212 & U1009 P10DA & P10DB P20FF & P10F4	8 s Failure out of 800 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, 1Trip
		This monitor checks if the reductant pump resistance is too high during the pump heating phase.	Pump driver power supply * duty cycle / measured driver current	>0.80				
Reductant Level Sensor Circuit Range/Performance	P203B	This monitor checks if reductant level measurements are not available when they are expected to be available. The ultrasonic level sensor transmits a readiness bit with each level measurement to identify when the sensor has low confidence in the fluid height (level) measurement due to a weak, missing, or inconsistent echo returned to the piezo element. This monitor specifically checks if the readiness bit is false when it is expected to be true.	Reductant Level Readiness Bit	= FALSE	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) Time since last Refill / Draining Estimated DEF Level Reductant tank temperature Reductant UTLC temperature Heater 1 PWM Command Heater 3 PWM Command Slosh Detection Flag Tank Agitation Flag Vehicle speed Propulsion System Off Time Don't Use Data Propulsion System Off Time Invalid No Level Sensor voltage fault No SENT communication fault No DCU internal fault Note: See "Level & Quality Performance" sheet for parameter definitions	= ACTIVE > 300s >5L > 0°C & < 70°C >3°C = 0% = 0% = FALSE = TRUE > 2km/h = FALSE = FALSE P203C & P203D U2627 & U2628 & U2630 P20FF & P10F4	Up to 200s Failure out of 2000 samples Success out of 6 samples Time basis = 0.1s	Type B, 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Level Sensor Circuit Low Voltage	P203C	This monitor checks if the reductant level sensor signal is out of range low. This computation is performed in the smart UTLC sensor, and a corresponding error flag indicating either piezo excitation voltage faults or piezo circuit faults are detected is transmitted to the DEFC on the SENT bus.	[PZT Excitation Voltage OR PZT Excitation Voltage OR PZT Voltage OORH OR PZT Voltage OORL] Note: 1. All signals are transmitted by UTLC sensor, where it is internally computed. 2. PZT conditions are based on a single diagnosis status bit transmitted by the UTLC sensor	>5.5V < 4.5V > 2.0V < 0.125V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No Level Sensor Power Supply Fault No SENT Communication Fault No DCU internal fault	= ACTIVE P1018 & P1019 U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 0.5s	Type B, 2 Trips
Reductant Level Sensor Circuit High Voltage	P203D	This monitor checks if the reductant level sensor signal is out of range high. This computation is performed in the smart UTLC sensor, and a corresponding error flag indicating that the reductant level measurement is greater than the maximum measureable range is transmitted to the DEFC on the SENT bus.	Reductant Level measurement AND Reductant Level readiness bit Note: Reductant Level readiness flag is broadcasted by the smart UTLC sensor to Reductant Control Module	> 400 mm = TRUE	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No Level Sensor Power Supply Fault No SENT Communication Fault No DCU internal fault	= ACTIVE P1018 & P1019 U2627 & U2628 & U2630 P20FF & P10F4	6 s Failure out of 12 samples Sucess out of 4 samples Time basis = 0.5s	Type B, 2 Trips
Reductant Pressure Sensor Performance	P204B	This monitor checks if the reductant pressure sensor measure is lower than ambient pressure before the system is pressurized.	Reductant pressure OR Time when pumping internal debounce counter has not reached pass/fai1 decision maturation	< -36.4 kPa >ls	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) Pump state No Pressure Sensor fault No Pressure Sensor Power Supply Fault No DCU internal fault Note: To obtain clear understanding of various pump states & transitions, refer to the "Pump States & Transitions" sheet.	= ACTIVE = Startup P204C & P204D P10C9 & P10CA P20FF & P10F4	Up to 33 s (3xls timeout + 2x15s wait) Malfunction criteria confirmation out of 88 samples Time basis = 0.01s Failure confirmation after **two retries** Recovery only at next driving cycle Note: See **"Repeat Defrost"** sheet for retries definition	Type A, lTrip
		This monitor checks if the reductant pressure sensor measure is greater than ambient pressure before the system is pressurized.	Reductant pressure OR Time when puming internal debounce counter has not reached pass/fai1 decision maturation	>36.4 kPa >ls				
Reductant Pressure Sensor Circuit Low Voltage	P204C	This monitor checks if the reductant pressure sensor is shorted to ground or open circuit by monitoring the pressure sensor output voltage and failing the diagnostic when this voltage is too low. The reductant pressure sensor is an analog pressure sensor in which the voltage across the sensor is proportional to the measured pressure.	Reductant pressure sensor voltage Note: Pressure variable is saturated to -50kPa for 0.35V < Voltages < 0.5V. Additionally, pressure variable is set to OkPA for Voltages < 0.35V.	< 0.45V (-50 kPa)	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.1 s 6 failures out of 100 samples O.Ols/sample	Type A, lTrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Pressure Sensor Circuit High Voltage	P204D	This monitor checks if the reductant pressure sensor is shorted to power by monitoring the pressure sensor output voltage and failing the diagnostic when this voltage is too high. The reductant pressure sensor is an analog pressure sensor in which the voltage across the sensor is proportional to the measured pressure.	Reductant pressure sensor voltage Note: Pressure variable is saturated to 900kPa for 4.5V < Voltages < 4.75V. Additionally, pressure variable is set to OkPA for Voltages > 4.75V.	> 4.90V (0 kPa)	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.1s 6 failures out of 100 samples O.Ols/sample	Type A, ITrip
Reductant Pressure Sensor Circuit Intermittent/Erratic	P204E	This monitor checks if the reductant pressure signal is erratic. A fail is detected when the change in pressure on a moving window of measurements is greater than expected.	If pump control mode = forward Pressure string length OR If pump control mode = stop Pressure string length OR If pump control mode = heating Pressure string length OR If pump control mode is in reverse Pressure string length The moving window length is Notel: String length is computed as summation of all pressure absolute variation within a moving window. Note2: The string length is reseted when switching pump modes (forward, reverse, stop). Note3: To obtain clear understanding of various pump states & transitions, refer to the **"Pump States & Transitions"** sheet.	 > 1500 kPa/Moving Window > 1000 kPa/Moving Window > 1000 kPa/Moving Window > 200 kPa/Moving Window = 100 samples (O.Ols/sample)	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) Time after controller initialization No Pressure Sensor fault No DCU internal fault	= ACTIVE > 0.510s P204C & P204D P20FF & P10F4	0.1s 10 failures out of 100 samples O.Ols/sample	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Tank Temperature Sensor Performance	P205B	This monitor checks if, at key on, the reductant temperature sensor is coherent with average value among all the available system temperature sensors (exhaust temperature sensors, coolant temperature sensor, fuel temperature sensor, ambient temperature sensor, intake temperature sensor). The number of sensors used for the average calculation shall be at least 4 but which sensor to use is calibratable and the sensor should not be faulted. The average temperature is calculated at the system start up after a calibratable engine stop when all the temperature sensors are expected to be stabilized.	Latched average system startup reference temperature - reductant tank temperature sensor OR Reductant tank temperature sensor - latched average system startup reference temperature	> 30°C >30°C	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) [Average engine startup reference temperature mask AND [Average engine startup reference temperature] AND Time after controller initialization AND Time during which the cold soak flag is active when cold soak conditions are detected] No Tank Temperature Sensor fault No CAN communication fault No DCU internal fault Notel: Average engine start-up reference temperature mask is set to true if : Engine off time AND At least 4 sensors used in average engine startup reference temperature are: Note2: The malfunction criteria is compared 60s after the first reception of Average engine start-up reference temperature mask if the faults listed in enable conditions are not active.	= ACTIVE = "Use Data" > -10°C >Is < 3.5 s P205C & P205D & P205E U1009 & U2212 & P10C6 P20FF & P10F4 > 8hrs = Valid	0.3 s Failure out of 3 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Tank Temperature Sensor Circuit Low Voltage	P205C	This monitor checks if the reductant temperature sensor signal is shorted to ground or open circuit by monitoring the temperature sensor output voltage and failing the diagnostic when this voltage is too low. The reductant temperature sensor is a thermistor in which the voltage across the sensor can be equated to a temperature. A lower voltage is equivalent to a higher temperature.	Reductant temperature sensor signal voltage	<0.3 V (75°C)	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.5 s Failure out of 50 samples Time basis = 0.01s	Type A, ITrip
Reductant Tank Temperature Sensor Circuit High Voltage	P205D	This monitor checks if the reductant temperature sensor signal is shorted to power by monitoring the temperature sensor output voltage and failing the diagnostic when this voltage is too high. The reductant temperature sensor is a thermistor in which the voltage across the sensor can be equated to a temperature. A higher voltage is equivalent to a lower temperature.	Reductant temperature sensor signal voltage	> 4.75V (-40°C)	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.5 s Failure out of 50 samples Time basis = 0.01s	Type A, ITrip
Reductant Tank Temperature Sensor Circuit Erratic	P205E	This monitor checks if the reductant temperature signal is erratic. A fail is detected when the change in temperature on a moving window of measurements is greater than expected.	Tank temperature string length The moving window length is Notel; String length is computed as summation of all temperature absolute variation within a moving window.	> 4°C / Moving Window = 10 samples (O.ls/sample)	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No Temperature Sensor fault No Temp Sensor Pwr Supply fault No DCU internal fault	= ACTIVE P205C & P205D P131B & P131C P20FF & P10F4	0.3 s 3 failures out of 9 samples O.ls/sample	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Quality Sensor Circuit Range/ Performance	P206B	This monitor checks if reductant quality measurements are not available when they are expected to be available. The ultrasonic quality sensor transmits a readiness bit with each the quality measurement to identify when the sensor has low confidence in the quality measurement due to a weak, missing, or inconsistent echo returned to the piezo element. This monitor specifically checks if the readiness bit is false when it is expected to be true.	Reductant Quality Readiness Bit	= FALSE	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) Time since last Refill / Draining Estimated DEF Level Reductant tank temperature Reductant UTLC temperature Heater 1 PWM Command Heater 3 PWM Command Slosh Detection Flag Tank Agitation Flag Vehicle speed Propulsion System Off Time Don't Use Data Propulsion System Off Time Invalid No Level Sensor voltage fault No SENT communication fault No DCU internal fault Note: See "Level & Quality Performance" sheet for parameter definitions	= ACTIVE > 300s >5L > 0°C & < 70°C >3°C = 0% = 0% = FALSE = TRUE > 2km/h = FALSE = FALSE P206C & P206D U2627 & U2628 & U2630 P20FF and P10F4	60s Failure out of 600 samples Success out of 40 samples Time basis = 0.1s	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Quality Sensor Circuit Low	P206C	This monitor checks if the reductant quality sensor signal is out of range low. This computation is performed in the smart UTLC sensor, and a corresponding error flag indicating either quality measurement is lower than the minimum measureable range, piezo excitation voltage faults are detected, or piezo circuit faults are detected is transmitted to the DEFC on the SENT bus.	[(UTLC quality measurement AND Quality readiness bit) OR PZT Excitation Voltage OR PZT Excitation Voltage OR PZT Voltage OORH OR PZT Voltage OORL] Note: All related signals are directly transmitted by UTLC sensor, where it is internally computed. 2. PZT conditions are based on a single diagnosis status bit transmitted by the UTLC sensor	<0% = TRUE >5.5V < 4.5V >2V < 0.125V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No SENT Communication Fault No DCU internal fault	= ACTIVE U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 0.5s	Type A, ITrip
Reductant Quality Sensor Circuit High Voltage	P206D	This monitor checks if the reductant quality sensor signal is out of range high. The DEFC receives the quality measurement and corresponding quality readiness bit from the smart UTLC sensor, and performs this check in the DEFC.	Reductant quality measurement AND Reductant Quality readiness bit Note: Reductant Quality readiness flag is broadcasted by the smart UTLC sensor to Reductant Control Module	> 63.25% = TRUE	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No SENT Communication Fault No DCU internal fault	= ACTIVE U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 0.5s	Type A, ITrip
Reductant Pump Control Circuit	P208A	This monitor checks if any of the 3 phase pump motor control circuits are open.	Off-line: Reductant Internal Driver device status indicating that Pump Circuit is Open On-line: Fault indication when back EMF is not detected every 60° leads to transition of pump to off-line state. Note: fault cannot be pinpointed in the pump on-state. Therefore, if fault is detected with the pump on, the pump will be commanded off, allowing to pin-point the specific failure mode	= TRUE	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.4 s Failure out of 40 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Pump Performance	P208B	This monitor checks if the commanded, arbitrated reducant pump speed and the sensed reductant pump speed are coherent.	ABS(Sensed pump speed - pump speed command)	>712 rpm	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) Pump State No DCU internal fault Note1: The pump will be stopped and this monitor will be disabled when pump state is set to Off in response to a fault on the: Pressure Sensor fault Reductant Pump fault Pressure Sensor power supply fault CAN communication fault Hardwired Run/Crank Note 1: To obtain clear understanding of various pump states & transitions, refer to the "Pump States & Transitions" sheet.	= ACTIVE = Wait Authorization, OR = Priming, OR = Buildup, OR = Closed Loop Control, OR = Purge, OR = Reductant Delivery Performance, OR = AutoStop P20FF & P10F4 P204B & P204C & P204D & P204E P249C & P149F & P20E8 & P20E9 & P2C11 & P214E & P208D & P208C & P208A P10CA & P10C9 P10C6 & U2212 & U1009 P10DA & P10DB	63 s (2x15s fail to stabilize timeout + 2x15s wait time + 3s pump blocked confirmation) Malfunction criteria confirmation out of 300 samples Time basis = 10ms Failure confirmation after **two retries.** Between two retries, pump is stopped for 15s. When pressure hold is achieved, retries are no longer permitted and an effective retry is counted after 3s with the malfunction criteria met. Success is reported after maximum time that would be required to mature a fault has elapsed. Recovery is possible only on the next driving cycle Note 2: See **"Repeat Defrost"** sheet for retries definition	Type A, ITrip
Reductant Pump Control Circuit Low Voltage	P208C	This monitor checks if any of the 3 phase pump motor control circuits is shorted to ground.	Off-line: Reductant Internal Driver device status indicating that Pump Circuit is low voltage due to short to ground On-line: Fault indication when back EMF is not detected every 60° leads to transition of pump to off-line state. Note: fault cannot be pinpointed in the pump on-state. Therefore, if fault is detected with the pump on, the pump will be commanded off, allowing to pin-point the specific failure mode	= TRUE	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.4 s Failure out of 40 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Pump Control Circuit High Voltage	P208D	This monitor checks if any of the 3 phase pump motor control circuits is shorted to power.	Off-line: Reductant Internal Driver device status indicating that Pump Circuit is high voltage to due to short to power On-line: Fault indication when back EMF is not detected every 60° leads to transition of pump to off-line state. Note: fault cannot be pinpointed in the pump on-state. Therefore, if fault is detected with the pump on, the pump will be commanded off, allowing to pin-point the specific failure mode	= TRUE	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.4 s Failure out of 40 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, ITrip
Reductant Heater 1 Control Circuit	P20B9	This monitoring checks if reductant heater 1 (tank heater 1) control circuit high side or low side are open circuit. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	If heater is commanded on: [Low side FET drain OR load current] If heater is commanded off: [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side]	 > 0.45V >95A < 1.083V > 0.926V = 0V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip
Reductant Heater 1 Performance	P20BA	This monitoring checks if the reductant heater 1 (tank heater 1) resistance or power is outside operating limits.	(Reductant heater 1 high side voltage - Reductant heater 1 low side voltage) / Reductant heater 1 current OR	< 1.00	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) Reductant heater 1 PWM command No DCU internal fault Note: Heater PWM command is set to zero in response to a fault on the: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 Heater 2 Heater 3 Heater power supply fault CAN communication fault Hardwired Run/Crank	= ACTIVE >0% P20FF & P10F4 P205B & P205C & P205D & P205E P131B&P131C P214F & P21DD & P20BB & P20BC & P20B9 & P10D9 P221C & P221D & P20C0 & P20BE & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2212 & U1009 P10DA & P10DB	8 s Failure out of 80 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip
			(Reductant heater 1 high side voltage - Reductant heater 1 low side voltage) / Reductant heater 1 current OR	>1.80				
			Reductant heater 1 power command - Reductant heater 1 power OR	> 45W			10 s Failure out of 100 samples Time basis = 0.1s Recovery only at next driving cycle	
			Reductant heater 1 power - Reductant heater 1 power command	> 45W				

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Heater 1 Control Circuit Low Voltage	P20BB	This monitoring checks if reductant heater 1 (tank heater 1) control circuit high side and or side are shorted to ground. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	If heater is commanded on: [Low side FET drain OR load current] If heater is commanded off: [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side]	 > 0.45V >95A < 0.601V > 0.506V = 0V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip
Reductant Heater 1 Control Circuit High Voltage	P20BC	This monitoring checks if reductant heater 1 (tank heater 1) control circuit high side or low side are shorted to power. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	If heater is commanded on: [Low side FET drain OR load current] If heater is commanded off: [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side]	 > 0.45V >95A < 4.168V > 2.021V < 4.325V > 2.097V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip
Reductant Heater 2 Control Circuit	P20BD	This monitoring checks if reductant heater 2 (line heater) control circuit high side or low side are open circuit. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	If heater is commanded on: [Low side FET drain OR load current] If heater is commanded off: [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side]	 > 0.45V >95A < 1.083V > 0.926V = 0V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Heater 2 Performance	P20BE	This monitoring checks if the reductant heater 2 (line heater) resistance or power is outside operating limits.	(Reductant heater 2 high side voltage - Reductant heater 2 low side voltage) / Reductant heater 2 current OR (Reductant heater 2 high side voltage - Reductant heater 2 low side voltage) / Reductant heater 2 current OR Reductant heater 2 power command - Reductant heater 2 power OR Reductant heater 2 power - Reductant heater 2 power command	<2.80 >7.50 >16.5W >16.5W	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) Reductant heater 2 PWM command No DCU internal fault Note: Heater PWM command is set to zero in response to a fault on the: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 Heater 2 Heater 3 Heater power supply fault CAN communication fault Hardwired Run/Crank	= ACTIVE >0% P20FF & P10F4 P205B & P205C & P205D & P205E P131B&P131C P214F & P20BA & P21DD & P20BB & P20BC & P20B9 & P10D9 P221C & P221D & P20C0 & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC& P10DD P10C6 & U2212 & U1009 P10DA & P10DB	8 s Failure out of 80 samples Time basis = 0.1s Recovery only at next driving cycle 10 s Failure out of 100 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip
Reductant Heater 2 Control Circuit Low Voltage	P20BF	This monitoring checks if reductant heater 2 (line heater) control circuit high side or low side are shorted to ground. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	If heater is commanded on: [Low side FET drain OR load current] If heater is commanded off: [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side]	 > 0.45V >95A < 0.601V > 0.506V = 0V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip
Reductant Heater 2 Control Circuit High Voltage	P20C0	This monitoring checks if reductant heater 2 (line heater) control circuit high side or low side are shorted to power. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	If heater is commanded on: [Low side FET drain OR load current] If heater is commanded off: [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side]	 > 0.45V >95A < 4.168V > 2.021V < 4.325V > 2.097V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Heater 3 Control Circuit/Open	P20C1	This monitoring checks if reductant heater 3 (tank heater 2) control circuit high side or low side are open circuit. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	If heater is commanded on: [Low side FET drain OR load current] If heater is commanded off: [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side]	 > 0.45V >95A < 1.083V > 0.926V = 0V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip
Reductant Heater 3 Control Circuit Performance	P20C2	This monitoring checks if the reductant heater 3 (tank heater 2) resistance or power is outside operating limits.	(Reductant heater 3 high side voltage - Reductant heater 3 low side voltage) / Reductant heater 3 current OR	< 1.50	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) Reductant heater 3 PWM command No DCU internal fault Note: Heater PWM command is set to zero in response to a fault on the: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 Heater 2 Heater 3 Heater power supply fault CAN communication fault Hardwired Run/Crank	= ACTIVE >0% P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P21DD & P10D9 P20BE & P221D & P20C0 & P20BF & P20BD & P221C & P10F3 P221E & P221F & P20C1 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2212 & U1009 P10DA & P10DB	8 s Failure out of 80 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip
			(Reductant heater 3 high side voltage - Reductant heater 3 low side voltage) / Reductant heater 3 current OR	>2.60				
			Reductant heater 3 power command - Reductant heater 3 power OR	> 29W			10 s Failure out of 100 samples Time basis = 0.1s Recovery only at next driving cycle	
			Reductant heater 3 power - Reductant heater 3 power command	> 29W				
Reductant Heater 3 Control Circuit Low	P20C3	This monitoring checks if reductant heater 3 (tank heater 2) control circuit high side or low side are shorted to ground. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	If heater is commanded on: [Low side FET drain OR load current] If heater is commanded off: [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side]	 > 0.45V >95A < 0.601V > 0.506V = 0V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Heater 3 Control Circuit High	P20C4	This monitoring checks if reductant heater 3 (tank heater 2) control circuit high side or low side are shorted to power. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	If heater is commanded on: [Low side FET drain OR load current] If heater is commanded off: [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side]	 > 0.45V >95A < 4.168V > 2.021V < 4.325V > 2.097V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip
Reductant Low Pressure	P20E8	This monitoring checks if reductant pressure is lower than the desired setpoint during closed loop pressure control operation when sufficient fluid in the DEF tank ensures reliable pressure control.	Reductant pressure setpoint - reductant pressure control signal	> 63 kPa	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) Pump state DEF Level Estimation No DCU internal fault Note1: The pump will be stopped and this monitor will be disabled when pump state is set to Off in response to a fault on the: No Pressure Sensor fault No Reductant Pump fault No Pressure Sensor power supply fault No CAN communication fault Hardwired Run/Crank Note2: To obtain clear understanding of various pump states & transitions, refer to the "Pump States & Transitions" sheet.	= ACTIVE = Buildup, OR = Closed Loop Control, OR = Reductant Delivery Performance >3L P20FF & P10F4 P204B & P204C & P204D & P204E P208B & P149F & P20E9 & P2C11 & P214E & P208D & P208C & P208A & P249C P10CA & P10C9 P10C6 & U2212 & U1009 P10DA & P10DB	30 s Failure out of 3000 samples Success out of 400 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant High Pressure	P20E9	This monitoring checks if reductant pressure is greater than the desired setpoint during closed loop pressure control operation when sufficient fluid in the DEF tank ensures reliable pressure control.	Reductant pressure control signal - reductant pressure setpoint	> 63 kPa	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) Pump state Engine Auto Stop Active DEF Level Estimation No DCU internal fault Notel: The pump will be stopped and this monitor will be disabled when pump state is set to Off in response to a fault on the: No Pressure Sensor fault No Reductant Pump fault No Pressure Sensor power supply fault No CAN communication fault Hardwired Run/Crank Note2: To obtain clear understanding of various pump states & transitions, refer to the "Pump States & Transitions" sheet.	= ACTIVE = Buildup, OR = Closed Loop Control, OR = Reductant Delivery Performance = False > 3 L P20FF & P10F4 P204B & P204C & P204D & P204E P208B & P149F & P20E9 & P2C11 & P214E & P208D & P208C & P208A & P249C P10CA & P10C9 P10C6 & U2212 & U1009 P10DA & P10DB	4 s Failure out of 400 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Control Module Performance	P20FF	This monitoring checks if the Reducant Control Module has detected a RAM fault.	After writting a checker-board type pattern of 0's and I's into the cells of a bit-oriented memory, difference is found between any cells' expected contents <u>Note:</u> this test is executed with RamTst Vector module, using checkerboard algorithm		Vehicle Power Mode (Accessory, Run, Start Request or Propulsion)	= ACTIVE	No debounce applied Once at initialization	Type A, ITrip
		This monitoring checks if the Reductant Control Module has detected a dataset version that does not fit the SW version.	Computed checksum OR Software operational reference calibration is incompatible to the application software	* stored frame checksum				
		This monitoring checks if the Reductant Control Module has witnessed persistent data error in Non-Volatile Memory	Aborded write operation is detected on applied NVM blocks OR Calculated checksums of related NVM blocks <u>Note:</u> Apply on Application data & IUMPR data NVM blocks	* stored checksums				
		This monitoring checks if the Reductant Control Module has detected inconstistency in data stored in Non-Volatile Memory	Aborted write operation is detected on applied blocks OR Computed data checksum of related NVM blocks OR Heater calibration are not learned during EOL <u>Note:</u> Apply on Heater calibration NVM blocks	* stored data checksum				

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Pump High Current	P214E	This monitoring checks if the reductant pump motor output driver current exceeds the maximum operating limit current. Calibrateable over-current thresholds are defined for both pumping and heating modes. The pump can be controlled as a heater to increase frozen DEF defrost performance. Otherwise, the reductant pump motor will spin to move fluid into the reductant supply line at the desired pressure setpoint.	Reducant pump hardware protection OR [If Pump Mode = Heating: Reducant pump motor current Else: Reducant pump motor current]	= ACTIVE > 15A > 7 A	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	4 s Failure out of 1 sample in case of pump hardware protection is detected. Else, failure out of 400 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, ITrip
Reductant Heater 1 High Current	P214F	This monitoring checks if the reductant heater 1 (tank heater 1) output driver current exceeds the maximum operating limit current.	Reductant heater 1 current	> 15A	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault Note: Heaters PWM command is set to zero in response to a fault on the: Tank temperature sensor Tank temperature power supply Heater 1 Heater 2 Heater 3 Heater power supply CAN communication Hardwired Run/Crank	= ACTIVE P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P10D9 & P21DD & P20BB & P20BC & P20B9 & P20BA P221C & P221D & P20C0 & P20BE & P20BF & P20BD & P1OF3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC& P10DD P10C6 & U2212 & U1009 P10DA & P10DB	4 s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Level Sensor 1 Stuck	P21C5	This monitor checks if reductant level measurements are available but stuck. The ultrasonic level sensor transmits a readiness bit with each the level measurement to identify when the sensor has low confidence in the fluid height (level) measurement due to a weak, missing, or inconsistent echo returned to the piezo element. If this readiness bit indicates that the level measurements are available, but the level measurements do not change sufficiently when tank fluid slosh is expected, this monitor will fail.	Reductant level sensor signal(t) - Reductant level sensor signal (t - 1000ms)	< 0.3mm	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) Vehicle speed (see notel) Vehicle speed validity Vehicle long, acceleration (see note4) Urea state Filtered readiness flag (see note2) Estimated DEF Level No Level Sensor faults No Tank Temperature Sensor B faults No CAN communication faults No SENT communication faults No DCU internal faults Notel: Vehicle speed shall be FALSE for 2 consecutive samples to disable this condition. Note2: Sensed level readiness bit shall be TRUE for 6 consecutive samples (600ms) to set the filtered readiness flag to TRUE. Sensed level readiness bit shall be FALSE for 1 sample (100ms) to set the filtered readiness flag to FALSE. Note3: See "Level & Quality Performance" sheet for parameters definition	= ACTIVE > 5 km/h = TRUE > 0.1 m/s² = Liquid = TRUE >5L P203B & P203C & P203D & P131B & P131C P2ADA & P2ADB & PADC & P2ADD P10C6 & U2212 & U1009 U2627 & U2628 & U2630 P20FF and P10F4	200s to Fail or 10s to Pass (Step-up/down: 1 / 20 Fail/pass count : 2000 / -2000 Time basis = 0.1s Note4: Long. acc. is computed internally in Reductant Control Module from vehicle speed derivation.	Type B, 2 Trips
Reductant Control Module Supply Voltage Low Voltage	P21CB	This monitoring checks if measured reductant permanent power supply voltage is low compared to the vehicle system voltage (received by serial data from CGM)	CGM (Serial Data) Voltage - Reductant Permanent Power Supply Voltage	>3V	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) Engine Cranking (serial data) Engine Controller Sensed Powertrain Relay Voltage Mask No DCU internal fault CAN communication fault	= Active = False = True P20FF & P10F4 U2213&U1368	3 s Failure out of 300 samples Time basis = 0.01s	Type B, 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Heater 1 Low Current	P21DD	This monitoring checks if the reductant heater 1 (tank heater 1) output driver current is below the minimum operating limit while the heater is commanded on.	Reductant heater 1 current	< 0.75A	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) Reductant tank heater 1 PWM command No DCU internal fault Note: Heaters PWM command is set to zero in response to a fault on the: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault Hardwired Run/Crank	= ACTIVE >0% P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P10D9 P221C & P221D & P20C0 & P20BE & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC& P10DD P10C6 & U2212 & U1009 P10DA & P10DB	4 s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip
Reductant Heater 2 Low Current	P221C	This monitoring checks if the reductant heater 2 (line heater) output driver current is below the minimum operating limit while the heater is commanded on.	Reductant heater 2 current	< 0.75A	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) Reductant line heater PWM command No DCU internal fault Note: Heaters PWM command is set to zero in response to a fault on the: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault Hardwired Run/Crank	= ACTIVE >0% P20FF & P10F4 P205B & P205C & P205D & P205E P131B&P131C P214F & P20BA & P20BB & P20BC & P20B9 & P21DD & P10D9 P20BE & P221D & P20C0 & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC& P10DD P10C6 & U2212 & U1009 P10DA & P10DB	4 s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Heater 2 High Current	P221D	This monitoring checks if the reductant heater 2 (line heater) output driver current exceeds the maximum operating limit current.	Reductant heater 2 current	> 15A	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault Note: Heaters PWM command is set to zero in response to a fault on the: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault Hardwired Run/Crank	= ACTIVE P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P21DD & P10D9 P20BE & P20C0 & P20BF & P20BD & P221C & P1OF3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC& P10DD P10DA & P10DB	4 s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, I Trip
Reductant Heater 3 Current Too Low	P221E	This monitoring checks if the reductant heater 3 (tank heater 2) output driver current is below the minimum operating limit current while the heater is commanded on.	Reductant heater 3 current	< 0.75A	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) Reductant tank heater 2 PWM command No DCU internal fault Note: Heaters PWM command is set to zero in response to a fault on the: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault Hardwired Run/Crank	= ACTIVE > 0 % P20FF & P10F4 P205B & P205C & P205D & P205E P131B&P131C P214F & P20BA & P20BB & P20BC & P20B9 & P21DD & P10D9 P20BE & P221D & P20C0 & P20BF & P20BD & P221C& P10F3 P20C2 & P221F & P20C1 & P20C3 & P20C4 & P143C P10DC& P10DD P10C6 & U2212 & U1009 P10DA & P10DB	4 s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, I Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Heater 3 Current Too High	P221F	This monitoring checks if the reductant heater 3 (tank heater 2) output driver current exceeds the maximum operating limit current.	Reductant heater 3 current	> 15A	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault Note: Heaters PWM command is set to zero in response to a fault on the: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault Hardwired Run/Crank	= ACTIVE P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P21DD & P10D9 P20BE & P221D & P20C0 & P20BF & P20BD & P221C& P1OF3 P20C2 & P221F & P20C1 & P20C3 & P20C4 & P143C P10DC& P10DD P10C6 & U2212 & U1009 P10DA & P10DB	4 s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, I Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Excessive Time To Enter Closed Loop Reductant Injection Control	P249C	This monitoring checks if the reductant pressure does not stabilize to the desired setpoint within the expected time.	**Pressure Closed Loop Control**	* ACTIVE	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion)	= ACTIVE	75 s (3x15s timeout + 2x15s wait) Malfunction criteria confirmation out of 1500 samples Time basis = 0.01s	Type A, ITrip
			AND					
			[Total time from the start of line filling	> 15s	Pump state	= WaitAuthorization, OR		
			OR			= Priming, OR		
		If the control system determines that the DEF tank may be frozen, the pressure build-up command will be delayed until this defrost routine is complete. The defrost time is defined as a function of measured reductant tank temperature at key on. After this defrost time (or immediately, if no defrost routine was necessary) the control system will attempt a calibrateable number of pressure build-up attempts before this diagnostic reports a failure.	Total time from the exit of Start & Stop]	> 7.5s		= Buildup, OR = Closed Loop Control	Failure confirmation after **two retries.** Between two retries, pump is stopped forl5s. Success is reported as soon as 'Pressure Closed Loop Control' is active. Recovery only at next driving cycle Note: See **"Repeat Defrost"** sheet for retries definition	
			Note: See **"Repeat Defrost"** section for Pressure hold definition		Estimated DEF Level	>3L		
					No DCU internal fault	P20FF & P10F4		
					Notel: Pump is force to stop if:			
					Pressure Sensor fault	P204B & P204C & P204D & P204E		
					Reductant Pump fault	P149F & P208B & P20E8 & P20E9 & P2C11 & P214E & P208D & P208C & P208A		
					Pressure Sensor power supply fault	P10CA & P10C9		
					CAN communication fault	P10C6 & U2212 & U1009		
					Hardwired Run/Crank	P10DA & P10DB		
					Note2: When estimated DEF level is below the diagnostic enable (reporting threshold) noted above and the failure is confirmed after 1 retry, then "Reductant Tank Empty" flag is set, impacting low reductant driver warning and inducement. Note3: To obtain clear understanding of various pump states & transitions, refer to the "Pump States & Transitions" sheet.			

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Tank Temperature Sensor B Circuit Range/Performance	P2ADA	This monitor checks if, at key on, the reductant UTLC temperature sensor is coherent with the reductant temperature sensor. This monitor runs only at system start up after a calibratable engine stop is elapsed. At this time, all the temperature sensors are expected to be stabilized.	Reductant secondary device temperature information - reductant tank temperature sensor OR	> 21°C	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) [(Average engine startup reference temperature mask OR Service Tamper Bay test request) AND Reductant Tank Temperature Sensor A AND Time after controller initialization AND Time during which the cold soak flag is active when cold soak conditions are detected] No Tank Temperature Sensor A fault No Tank Temperature Sensor B fault No SENT communication fault CAN communication No DCU internal fault Notel: Average engine start-up reference temperature mask is set to "Use Data" if : Engine Off Time Powertrain High Resolution AND At least 4 sensors used in average engine startup reference temperature are) Note2:The malfunction criteria is compared 60s after the first reception of Average engine start-up reference temperature mask if the faults listed in enable conditions are not active.	= Active = "Use Data" > -29°C >Is < 3.5 s P205B & P205C & P205D & P205E P2ADD & P2ADB & P2ADC U2627 & U2628 & U2630 P10C6 & U2212 & U1009 P20FF and P1OF4 > 8hrs = Valid	3 s Failure out of 6 samples Time basis = 0.5s Recovery only at next driving cycle	Type A, ITrip
			Reductant tank temperature sensor - reductant secondary device temperature information	> 21°C				

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Tank Temperature Sensor B Circuit Low	P2ADB	This monitor checks if the reductant UTLC temperature sensor signal is out of range low. This computation is performed in the smart UTLC sensor, and a corresponding error flag is transmitted to the DEFC on the SENT bus.	Reductant UTLC temperature measurement	< -50°C	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No SENT communication fault No DCU internal fault	= ACTIVE U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 0.5ms	Type A, ITrip
Reductant Tank Temperature Sensor B Circuit High	P2ADC	This monitor checks if the reductant UTLC temperature sensor signal is out of range high. This computation is performed in the smart UTLC sensor, and a corresponding error flag is transmitted to the DEFC on the SENT bus.	Reductant UTLC temperature measurement	>90°C	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No SENT communication fault No DCU internal fault	= ACTIVE U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 0.5s	Type A, ITrip
Reductant Tank Temperature Sensor B Circuit Intermittent/Erratic	P2ADD	This monitor checks if the UTLC temperature signal is erratic. A fail is detected when the change in temperature on a moving window of measurementsis greater than expected.	Reductant UTLC Secondary temperature string length The moving window length is Note1: String length is computed as summation of all temperature absolute variation within a moving window.	> 6°C/Moving Window 14 samples (1.3s/sample)	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No UTLC temperature sensor circuit fault No SENT communication fault No DCU internal fault	= ACTIVE P2ADB & P2ADC U2627 & U2628 & U2630 P20FF & P10F4	1.3 s 1 failures out of 3 samples 1.3s/sample	Type A, ITrip
Reductant Pump Low Current	P2C11	This monitoring checks if the reductant pump motor output driver current is below the minimum operating limit current. Calibrateable under-current thresholds are defined for both pumping and heating modes. The pump can be controlled as a heater to increase frozen DEF defrost performance. Otherwise, the reductant pump motor will spin to move fluid into the reductant supply line at the desired pressure setpoint.	If Pump Mode = Heating: Reducant pump motor current Else if (Pump State = Priming OR Run): Reducant pump motor current	 < 0.75A < 0.5A	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) Pump State Reductant Pressure Sensor Measurement Pump hardware protection Note1: The pump will be stopped and this monitor will be disabled when pump state is set to Off in response to the following faults: Pressure Sensor fault Reductant Pump fault Pressure Sensor power supply fault CAN communication fault Hardwired Run/Crank No DCU internal fault Note2: To obtain clear understanding of various pump states & transitions, refer to the "Pump States & Transitions" sheet.	= ACTIVE = Pump Heating, OR = Priming, OR = Buildup, OR = Closed Loop Control > 250 kPa = NOT ACTIVE P204B & P204C & P204D & P204E P208B & P20E8 & P20E9 & P149F & P214E & P208D & P208C & P208A & P249C P10CA & P10C9 P10C6 & U2212 & U1009 P10DA & P10DB P20FF & P10F4	4 s Failure out of 400 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Exhaust Fluid Control Module Received Invalid Data from Central Gateway Module	U1368	The diagnostic monitor detects an alive rolling count error or checksum error in the frame $20D sent by CGM that are received by Reductant Control Module (DEFC).	If the frames counter value increments in the order (0->l->2->3->0->...), with wrap-around after 3, then the diagnostic reports **pass.** If any value is not in the order listed, then the diagnostic reports **fail.**		Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	5s Failure out of 20 samples Time basis = 0.25s.	Type B, 2 Trips
			if the Message Frame ID $20D checksum	* computed cheksum				
Diesel Exhaust Fluid Control Module Received Invalid Data from Body Control Module	U1369	The diagnostic monitor detects an alive rolling count error or checksum error in the frames $284 and $274 sent by BCM that is received by Reductant Control Module (DEFC).	If the frames counter value increments in the order (0->l->2->3->0->...), with wrap-around after 3, then the diagnostic reports **pass.** If any value is not in the order listed, then the diagnostic reports **fail.**		Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	5s Failure out of 20 samples Time basis = 0.25s.	Type B, 2 Trips
			if any of the frames checksum	* computed cheksum				
Reductant Control Module CAN Bus 3 Off	U1009	The diagnostic monitor detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	CAN bus transmitter transmission errors count Note: The BusOff state is defined by the CAN controller hardware per ISO 11898	>255	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.09s Failure out of 9 samples Time basis = 0.01s	Type A, ITrip
Reductant Control Module Lost Communication with Body Control Module	U2211	This DTC monitors for a loss of communication with Body Control Module	Reductant Control Module has not received CAN Message from Body Control Module for: Message Frame ID $284 OR Message Frame ID $274	 > 0.26s > 0.110s	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	5s Failure out of 20 to 50 samples (depending on the CAN Frame IDs transmit rate) Time basis = 0.10s to 0.25s	Type B, 2 Trips
Reductant Control Module Lost Communication with Engine Control Module	U2212	This DTC monitors for a loss of communication with Engine Control Module	Reductant Control Module has not received CAN Message from Engine Control Module for: Message Frame ID $297 OR Message Frame ID $2A0 OR Message Frame ID $453 OR Message Frame ID $58F OR Message Frame ID $2A6 OR Message Frame ID $531	 > 0.110s > 0.060s > 1.010s > 1.010s > 0.110s > 0.110s	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	5s Failure out of 10 to 200 samples (depending on the CAN Frame IDs transmit rate) Time basis = 0.05s to Is (depending on the CAN Frame IDs transmit rate)	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Control Module Lost Communication with Central Gateway Module	U2213	This DTC monitors for a loss of communication with Central Gateway Module	Reductant Control Module has not received CAN Message from Central Gateway Module for: Message Frame ID $20D	 > 0.26s	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	5 s Failure out of 20 samples Time basis = 0.25s.	Type B, 2 Trips
Reductant Control Module Lost Communication with Reductant Level Sensor	U2627	This monitoring checks if Reductant Control Module is able to detect UTLC Sensor Lost Communication diagnostic failure modes described in SAE "J2716 - SENT: Single Edge Nibble Transmission for Automotive Applications, Section 5.3.3 Received Messages Diagnostics".	Calibration pulse length Calibration pulse length Nibble value Nibble value Successive calibrations pulses differ by Cheksum error Not the expect number of falling edges between calibration pulses	< 42 clock ticks > 70 clock ticks >15 <0 +/- 1/64 TRUE TRUE	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.42 s Failure out of 14 samples Time basis = 0.03s	Type A, 1Trip
Reductant Control Module Lost Communication with Reductant Concentration Sensor	U2628	This monitoring checks if Reductant Control Module is able to detect UTLC Sensor Lost Communication diagnostic failure modes described in SAE "J2716 - SENT: Single Edge Nibble Transmission for Automotive Applications, Section 5.3.3 Received Messages Diagnostics".	Calibration pulse length Calibration pulse length Nibble value Nibble value Successive calibrations pulses differ by Cheksum error Not the expect number of falling edges between calibration pulses	< 42 clock ticks > 70 clock ticks >15 <0 +/- 1/64 TRUE TRUE	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.42 s Failure out of 14 samples Time basis = 0.03s	Type A, 1Trip
Reductant Control Module Lost Communication with Reductant Tank Temperature Sensor 2	U2630	This monitoring checks if Reductant Control Module is able to detect UTLC Sensor Lost Communication diagnostic failure modes described in SAE "J2716 - SENT: Single Edge Nibble Transmission for Automotive Applications, Section 5.3.3 Received Messages Diagnostics".	Calibration pulse length Calibration pulse length Nibble value Nibble value Successive calibrations pulses differ by Cheksum error Not the expect number of falling edges between calibration pulses	< 42 clock ticks > 70 clock ticks >15 <0 +/- 1/64 TRUE TRUE	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.42 s Failure out of 14 samples Time basis = 0.03s	Type A, 1Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Heater 1 Temperature Response Matured Diagnostic	P2D45	This monitoring checks if measured average reductant temperature is deviating from the Reductant Control Module computed estimation of limit part temprature. Reductant Control Module estimates limit acceptable part (WPA) & non-functional heater (BPU) temperatures based on heaters power & external conditions (ambient temperature, tank temperature, and other noise factors such as slosh & wind) in case of tank heaters activation request.	**Average temperature - WPA temperature** Note: See **"Reductant Temperature Too Low"** sheet for parameters description and values	>o.rc	Vehicle Power Mode (Accessory, Run, Start Request or Propulsion)	=ACTIVE	Time basis = 600s One decision per driving cycle Recovery only at next driving cycle	Type B, 2 Trips
					Temperature sensor initilization (waiting timer)	> 150s		
					Temperature sensor validity	= TRUE		
					Secondary temperature sensor validity	= TRUE		
					Ambiant air temperature validity	= TRUE		
					Ambient temperature variation range during trip	<20°C		
					Vehicule engine off time	> 28,800s		
					Refill/Draining Monitoring status set this driving cycle	= FALSE		
					Initial absolute difference between ambient temperature and average temperature	<30°C		
					Initial absolute difference between average temperature and average loss temperature	<5°C		
					Average temperature	<-14°C & >-40°C		
					Estimated DEF Level	>5L		
					[Tank heater 1 PWM command	> 10W		
					OR			
					Tank heater 2 PWM command]	> 10W		
					WPA temperature - BPU temperature	>2°C		
					No DCU internal fault	P20FF & P10F4 & P10DA & P10DB		
					Note: Tank heaters power command are force to zero if:			
					Tank Temperature Sensor fault	P205B & P205C & P205D & P205E		
					Tank Temperature power supply fault	P131B&P131C		
					Heater 1 fault	P214F & P20BA & P20BB & P20BC & P20B9 & P10D9 & P21DD		
					Heater 3 fault	P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C		
					Heater power supply fault	P10DC& P10DD		
					CAN communication fault	P10C6 & U2212 & U1009		

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
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_FRONTLEFT	C0503	This monitor checks if: • HS Shorted to Battery • 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 HS OC = TRUE when High side current > 40mA	High side over current bit= True OR High side short to battery bit= True OR Low side over current bit= True OR Low side short to ground bit= True	• Wheel speed sensor supply is enabled	100 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_SHORT_FRONT_RIGHT	C0509	This monitor checks if: • HS Shorted to Battery • 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 HS OC = TRUE when High side current > 40mA	High side over current bit= True OR High side short to battery bit= True OR Low side over current bit= True OR Low side short to ground bit= True	• Wheel speed sensor supply is enabled	100 ms	Type A. MIL Illumination.
WSS_SHORT_REARLEFT	C050F	This monitor checks if: • HS Shorted to Battery • 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 HS OC = TRUE when High side current > 40mA	High side over current bit= True OR High side short to battery bit= True OR Low side over current bit= True OR Low side short to ground bit= True	• Wheel speed sensor supply is enabled	100 ms	Type A. MIL Illumination.
WSS_SHORT_REARRIGHT	C0515	This monitor checks if: • HS Shorted to Battery • 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 HS OC = TRUE when High side current > 40mA	High side over current bit= True OR High side short to battery bit= True OR Low side over current bit= True OR Low side short to ground 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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_LS_SHORT_TO_GND_FRONT_RIGHT	C0508	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_REAR_LEFT	C050E	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_REAR_RIGHT	C0514	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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) 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	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 B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
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 TO, 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 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	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 B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_MISSING_REARLEFT	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 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	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 B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
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 TO, 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 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	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 B. MIL Illumination.
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	$\|Wheel\_Accel\| > 491\ m/s^2$	• 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	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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/s^2	• 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_REARLEFT	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/s^2	• 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/s^2	• 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	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSSDROPOUTFRONT_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. Wheelscan 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 B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSSDROPOUTFRONT_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. Wheelscan 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 B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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. Wheelscan 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 B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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. Wheelscan 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 B. 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 4km/h. 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 B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 4km/h. 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 B. 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 4km/h. 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 B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 4km/h. 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 B. 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 only this wheelspeed sensor reaches a speed over 3.73mph (6 km/h) while at least one of 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.	• Only 1 wheel is > 6kph • At least 1 wheel is < 1.5kph • Other two wheel is < 6kph • No other WSS Faults	40 sec	Type B. 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 only this wheelspeed sensor reaches a speed over 3.73mph (6 km/h) while at least one of 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.	• Only 1 wheel is > 6kph • At least 1 wheel is < 1.5kph • Other two wheel is < 6kph • No other WSS Faults	40 sec	Type B. MIL Illumination.
WSS_TOO_FAST_SENSORREARLEFT	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 only this wheelspeed sensor reaches a speed over 3.73mph (6 km/h) while at least one of 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.	• Only 1 wheel is > 6kph • At least 1 wheel is < 1.5kph • Other two wheel is < 6kph • No other WSS Faults	40 sec	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 only this wheelspeed sensor reaches a speed over 3.73mph (6 km/h) while at least one of 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.	• Only 1 wheel is > 6kph • At least 1 wheel is < 1.5kph • Other two wheel is < 6kph • No other WSS Faults	40 sec	Type B. 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	100 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	100 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	100 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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	100 ms	Type A. MIL Illumination.
WSS_HS_OC_FRONTLEFT	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	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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_REARLEFT	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_HS_OC_REARRIGHT	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	P0562	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 Note: This bit will activate when Battery voltage drops below 5.6 V	• Wheel speed sensor supply is enabled • No voltage DTCs are set	100 msec	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_UNDER_VOLTAGE_FRONT_RIGHT "	P0562	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 Note: This bit will activate when Battery voltage drops below 5.6 V	• Wheel speed sensor supply is enabled • No voltage DTCs are set	100 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
WSS_UNDER_VOLTAGE_REAR_LEFT	P0562	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 Note: This bit will activate when Battery voltage drops below 5.6 V	• Wheel speed sensor supply is enabled • No voltage DTCs are set	100 msec	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_UNDER_VOLTAGE_REAR_RIGHT	P0562	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 Note: This bit will activate when Battery voltage drops below 5.6 V	• Wheel speed sensor supply is enabled • No voltage DTCs are set	100 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
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 • WSS supply voltage is in normal range	10 Counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
ASIC_THREE_LEVEL_DATA_READ_FAULT_LF	C0501	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly • Defective wheel-speed sensor not sending speed or standstill data at expected rate.	• 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.	time between data frames is > 390 ms	• Polaris is initialized • WSS supply voltage is in normal range	3 Counts	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 • Defective wheel-speed sensor not sending speed or standstill data at expected rate.	• When the ASIC updates the PWM Pulse Width and Standstill SPI register fields, the ASIC shall also set the Data Read SPI flag.	time between data frames is > 863 ms.	• Polaris is initialized • WSS supply voltage is in normal range	3 Counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 • WSS supply voltage is in normal range	10 Counts	Type A. MIL Illumination.
ASIC_THREE_LEVEL_DATA_READ_FAULTRF	C0507	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly • Defective wheel-speed sensor not sending speed or standstill data at expected rate.	• 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.	time between data frames is > 390 ms	• Polaris is initialized • WSS supply voltage is in normal range	3 Counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 • Defective wheel-speed sensor not sending speed or standstill data at expected rate.	• When the ASIC updates the PWM Pulse Width and Standstill SPI register fields, the ASIC shall also set the Data Read SPI flag.	time between data frames is > 863 ms.	• Polaris is initialized • WSS supply voltage is in normal range	3 Counts	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 • WSS supply voltage is in normal range	10 Counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
ASIC_THREE_LEVEL_DATA_READ_FAULTLR	C050D	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly • Defective wheel-speed sensor not sending speed or standstill data at expected rate.	• 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.	time between data frames is > 390 ms	• Polaris is initialized • WSS supply voltage is in normal range	3 Counts	Type A. MIL Illumination.
ASIC_TWO_LEVEL_DATA_READ_FAULTLR	P0606	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly • Defective wheel-speed sensor not sending speed or standstill data at expected rate.	• When the ASIC updates the PWM Pulse Width and Standstill SPI register fields, the ASIC shall also set the Data Read SPI flag.	time between data frames is > 863 ms.	• Polaris is initialized • WSS supply voltage is in normal range	3 Counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 • WSS supply voltage is in normal range	10 Counts	Type A. MIL Illumination.
ASIC_THREE_LEVEL_DATA_READ_FAULTRR	C0513	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly • Defective wheel-speed sensor not sending speed or standstill data at expected rate.	• 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.	time between data frames is > 390 ms	• Polaris is initialized • WSS supply voltage is in normal range	3 Counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 • Defective wheel-speed sensor not sending speed or standstill data at expected rate.	• When the ASIC updates the PWM Pulse Width and Standstill SPI register fields, the ASIC shall also set the Data Read SPI flag.	time between data frames is > 863 ms.	• Polaris is initialized • WSS supply voltage is in normal range	3 Counts	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	250 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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	250 msec	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	250 msec	Type A. 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	250 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_PARITY_FRONTLEFT	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 airgap (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	35 msec	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 airgap (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	35 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_PARITY_REARLEFT	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 airgap (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	35 msec	Type A. MIL Illumination.
WSS_PARITY_REARRIGHT	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 airgap (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	35 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 • Wheel speed edge or stand still pulse received • WSS supply voltage is in normal range	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 • Wheel speed edge or stand still pulse received • WSS supply voltage is in normal range	15 msec -375ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_VDA_TP_OUT_OF_RANGE_REARLEFT	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 • Wheel speed edge or stand still pulse received • WSS supply voltage is in normal range	15 msec -375ms	Type A. MIL Illumination.
WSS_VDA_TP_OUT_OF_RANGE_REARRIGHT	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 • Wheel speed edge or stand still pulse received • WSS supply voltage is in normal range	15 msec -375ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 expected rate.	time between data frames is > 390 ms for 3-level sensors or > 863 ms for 2-level sensors	• Polaris is initialized	3 Counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 expected rate.	time between data frames is > 390 ms for 3-level sensors or > 863 ms for 2-level sensors	• Polaris is initialized	3 Counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 expected rate.	time between data frames is > 390 ms for 3-level sensors or > 863 ms for 2-level sensors	• Polaris is initialized	3 Counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 expected rate.	time between data frames is > 390 ms for 3-level sensors or > 863 ms for 2-level sensors	• Polaris is initialized	3 Counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYS_ASIC_WSS_EDGE_MISMATCH_LF	P0606	This monitor checks if: Resistive short in the wheelspeed sensor wiring other possible causes Wheel Speed Sensor fault, ASIC outputs shorted to neighboring 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: Resistive short in the wheelspeed sensor wiring other possible causes Wheel Speed Sensor fault, ASIC outputs shorted to neighboring 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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYS_ASIC_WSS_EDGE_MISMATCH_LR	P0606	This monitor checks if: Resistive short in the wheelspeed sensor wiring other possible causes Wheel Speed Sensor fault, ASIC outputs shorted to neighboring 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: Resistive short in the wheelspeed sensor wiring other possible causes Wheel Speed Sensor fault, ASIC outputs shorted to neighboring 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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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. Looking for 30 speed pulses that match a particular wheel speed sensor type. Time depends on combination of expected wheel speed sensor and actual wheel speed sensor. Nominal calculations: Expecting 2 level nonIntelligent but have 3 level WSS (30*150 ms=4.5 sec). 2 level directional stand still pulses take 737 ms and for each puse the probablity counter increments by 3. Therefore it takes about ((30\3)*737 ms= 7.37 seconds) to detect.	Algorithm has detected that a directional WSS has incorrectly been installed	• WSS must be valid (supply enabled and no electrical problems)	Goal = 1 count Time = Depends on combination (about 4.5 sec if 3 level sensor installed and about 7.37 secs if 2 level with standstill sensor is installed for 2 level non intelligent sensor expected.	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. Looking for 30 speed pulses that match a particular wheel speed sensor type. Time depends on combination of expected wheel speed sensor and actual wheel speed sensor. Nominal calculations: Expecting 2 level nonIntelligent but have 3 level WSS (30*150 ms=4.5 sec). 2 level directional stand still pulses take 737 ms and for each puse the probablity counter increments by 3. Therefore it takes about ((30\3)*737 ms= 7.37 seconds) to detect.	Algorithm has detected that a directional WSS has incorrectly been installed	• WSS must be valid (supply enabled and no electrical problems)	Goal = 1 count Time = Depends on combination (about 4.5 sec if 3 level sensor installed and about 7.37 secs if 2 level with standstill sensor is installed for 2 level non intelligent sensor expected.	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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. Looking for 30 speed pulses that match a particular wheel speed sensor type. Time depends on combination of expected wheel speed sensor and actual wheel speed sensor. Nominal calculations: Expecting 2 level nonIntelligent but have 3 level WSS (30*150 ms=4.5 sec). 2 level directional stand still pulses take 737 ms and for each puse the probablity counter increments by 3. Therefore it takes about ((30\3)*737 ms= 7.37 seconds) to detect.	Algorithm has detected that a directional WSS has incorrectly been installed	• WSS must be valid (supply enabled and no electrical problems)	Goal = 1 count Time = Depends on combination (about 4.5 sec if 3 level sensor installed and about 7.37 secs if 2 level with standstill sensor is installed for 2 level non intelligent sensor expected.	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. Looking for 30 speed pulses that match a particular wheel speed sensor type. Time depends on combination of expected wheel speed sensor and actual wheel speed sensor. Nominal calculations: Expecting 2 level nonIntelligent but have 3 level WSS (30*150 ms=4.5 sec). 2 level directional stand still pulses take 737 ms and for each puse the probablity counter increments by 3. Therefore it takes about ((30\3)*737 ms= 7.37 seconds) to detect.	Algorithm has detected that a directional WSS has incorrectly been installed	• WSS must be valid (supply enabled and no electrical problems)	Goal = 1 count Time = Depends on combination (about 4.5 sec if 3 level sensor installed and about 7.37 secs if 2 level with standstill sensor is installed for 2 level non intelligent sensor expected.	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYS_ASIC_WSS_SUPPLY_LOW	P0562	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. Note: sufficient voltage for wheelspeed operation depends upon the type of wheelspeed sensor used.	• Polaris is initialized	100 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_DIRECTION_ FAILURE_FRONT_ LEFT "	C0056	This monitor checks if: • Wheel speed sensor not mounted correctly. • Electro-magnetic interference (EMI).	• Number of valid directional and non-directional WSS sensors must be greater than 0. • Number of valid directional WSS sensors must be greater than 0. • Valid directional and non-directional WSS sensors must: • Show unfiltered wheel-speed velocity >= 15 km/h. • Show unfiltered wheel-speed acceleration < 50 m/s^2. • All valid directional and non-directional WSS sensors must show velocities within 15% of the slowest valid wheel.	At least 1 sensor indicates Unknown, or at least 1 sensor indicates Forward and at least one sensor indicates Backwards For duration > 5 seconds While vehicle speed >15 km/h.	• WSS must be valid (supply enabled and no electrical problems)	5 seconds	Type B. MIL Illumination.
WSS_DIRECTION_ FAILURE_FRONT_ RIGHT	C0057	This monitor checks if: • Wheel speed sensor not mounted correctly. • Electro-magnetic interference (EMI).	• Number of valid directional and non-directional WSS sensors must be greater than 0. • Number of valid directional WSS sensors must be greater than 0. • Valid directional and non-directional WSS sensors must: • Show unfiltered wheel-speed velocity >= 15 km/h. • Show unfiltered wheel-speed acceleration < 50 m/s^2. • All valid directional and non-directional WSS sensors must show velocities within 15% of the slowest valid wheel.	At least 1 sensor indicates Unknown, or at least 1 sensor indicates Forward and at least one sensor indicates Backwards For duration > 5 seconds While vehicle speed >15 km/h.	• WSS must be valid (supply enabled and no electrical problems)	5 seconds	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_DIRECTION_FAILURE_REAR_LEFT	C0058	This monitor checks if: • Wheel speed sensor not mounted correctly. • Electro-magnetic interference (EMI).	• Number of valid directional and non-directional WSS sensors must be greater than 0. • Number of valid directional WSS sensors must be greater than 0. • Valid directional and non-directional WSS sensors must: • Show unfiltered wheel-speed velocity >= 15 km/h. • Show unfiltered wheel-speed acceleration < 50 m/s^2. • All valid directional and non-directional WSS sensors must show velocities within 15% of the slowest valid wheel.	At least 1 sensor indicates Unknown, or at least 1 sensor indicates Forward and at least one sensor indicates Backwards For duration > 5 seconds While vehicle speed >15 km/h.	• WSS must be valid (supply enabled and no electrical problems)	5 seconds	Type B. MIL Illumination.
WSS_DIRECTION_FAILURE_REAR_RIGHT	C0059	This monitor checks if: • Wheel speed sensor not mounted correctly. • Electro-magnetic interference (EMI).	• Number of valid directional and non-directional WSS sensors must be greater than 0. • Number of valid directional WSS sensors must be greater than 0. • Valid directional and non-directional WSS sensors must: • Show unfiltered wheel-speed velocity >= 15 km/h. • Show unfiltered wheel-speed acceleration < 50 m/s^2. • All valid directional and non-directional WSS sensors must show velocities within 15% of the slowest valid wheel.	At least 1 sensor indicates Unknown, or at least 1 sensor indicates Forward and at least one sensor indicates Backwards For duration > 5 seconds While vehicle speed >15 km/h.	• WSS must be valid (supply enabled and no electrical problems)	5 seconds	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_DIRECTION_FAILUREJJNKNOWN	C003F	This monitor checks if: • Wheel speed sensor not mounted correctly. Electro-magnetic interference (EMI).	• Number of valid directional and non-directional WSS sensors must be greater than 0. • Number of valid directional WSS sensors must be greater than 0. • Valid directional and non-directional WSS sensors must: • Show unfiltered wheel-speed velocity >= 15 km/h. • Show unfiltered wheel-speed acceleration < 50 m/s^2. • All valid directional and non-directional WSS sensors must show velocities within 15% of the slowest valid wheel.	When an equal number of sensors report opposite directions, this DTC is latched and all DWSS sensors are marked Failed. num_dwss_forward_dir == num_dwss_reverse_dir	• WSS must be valid (supply enabled and no electrical problems)	5 seconds	Type B. MIL Illumination.
WSS_SUPPLY_SWITCH_FAIL_FRONT_LEFT	C0505	This monitor checks if: internal ECU fault	The Wheel Speed Sensor Supply HS and LS driver request state, that is sent from the system ASIC Polaris via SPI is compared with Wheel Speed Sensor Supply HS and LS driver response state that is received by the system ASIC Polaris via SPI. A fault is set, if the request and response does not fit together.	The Wheel Speed Sensor Supply HS and LS driver request state, that is sent from the system ASIC Polaris via SPI is compared with Wheel Speed Sensor Supply HS and LS driver response state that is received by the system ASIC Polaris via SPI. A fault is set, if the request and response does not fit together.	- WSS supply is not in excessive under- or overvoltage.	100 ms	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_SUPPLY_SWITCH_FAIL_FRONT_RIGHT	C050B	This monitor checks if: internal ECU fault	The Wheel Speed Sensor Supply HS and LS driver request state, that is sent from the system ASIC Polaris via SPI is compared with Wheel Speed Sensor Supply HS and LS driver response state that is received by the system ASIC Polaris via SPI. A fault is set, if the request and response does not fit together.	The Wheel Speed Sensor Supply HS and LS driver request state, that is sent from the system ASIC Polaris via SPI is compared with Wheel Speed Sensor Supply HS and LS driver response state that is received by the system ASIC Polaris via SPI. A fault is set, if the request and response does not fit together.	- WSS supply is not in excessive under- or overvoltage.	100 ms	Type B. MIL Illumination.
WSS_SUPPLY_SWITCH_FAIL_REAR_LEFT	C0511	This monitor checks if: internal ECU fault	The Wheel Speed Sensor Supply HS and LS driver request state, that is sent from the system ASIC Polaris via SPI is compared with Wheel Speed Sensor Supply HS and LS driver response state that is received by the system ASIC Polaris via SPI. A fault is set, if the request and response does not fit together.	The Wheel Speed Sensor Supply HS and LS driver request state, that is sent from the system ASIC Polaris via SPI is compared with Wheel Speed Sensor Supply HS and LS driver response state that is received by the system ASIC Polaris via SPI. A fault is set, if the request and response does not fit together.	- WSS supply is not in excessive under- or overvoltage.	100 ms	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_SUPPLY_SWITCH_FAIL_REAR_RIGHT	C0517	This monitor checks if: internal ECU fault	The Wheel Speed Sensor Supply HS and LS driver request state, that is sent from the system ASIC Polaris via SPI is compared with Wheel Speed Sensor Supply HS and LS driver response state that is received by the system ASIC Polaris via SPI. A fault is set, if the request and response does not fit together.	The Wheel Speed Sensor Supply HS and LS driver request state, that is sent from the system ASIC Polaris via SPI is compared with Wheel Speed Sensor Supply HS and LS driver response state that is received by the system ASIC Polaris via SPI. A fault is set, if the request and response does not fit together.	- WSS supply is not in excessive under- or overvoltage.	100 ms	Type B. MIL Illumination.
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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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_REARLEFT	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_OPEN_DUMP_REARRIGHT	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_TC_ISO1	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.	SPI channel must be functioning properly	This fault is set based on diagnostic information received from the Coil Driver ASIC Fault sets if failure flags received from Coil Driver ASIC indicate that a solenoid is open.	Power Switch is On	30 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_OPEN_TC_IS02	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.	SPI channel must be functioning properly	This fault is set based on diagnostic information received from the Coil Driver ASIC Fault sets if failure flags received from Coil Driver ASIC indicate that a solenoid is open.	Power Switch is On	30 ms	Type A. MIL Illumination.
SOL_OPEN_TC_SUPPLY1	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.	SPI channel must be functioning properly	This fault is set based on diagnostic information received from the Coil Driver ASIC Fault sets if failure flags received from Coil Driver ASIC indicate that a solenoid is open.	Power Switch is On	30 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_OPEN_TC_SUPPLY2	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.	SPI channel must be functioning properly	This fault is set based on diagnostic information received from the Coil Driver ASIC Fault sets if failure flags received from Coil Driver ASIC indicate that a solenoid is open.	Power Switch is On	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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_TCJSO1	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. Open Power Switch Open Solenoid	SPI channel must be functioning properly	This fault is set based on diagnostic information received from the Coil Driver ASIC Fault sets if failure flags received from Coil Driver ASIC indicate that a solenoid driver is shorted.	Power Switch is On	30 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
DRIVER_SHORT_TCJSO2	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. Open Power Switch Open Solenoid	SPI channel must be functioning properly	This fault is set based on diagnostic information received from the Coil Driver ASIC Fault sets if failure flags received from Coil Driver ASIC indicate that a solenoid driver is shorted.	Power Switch is On	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_TC_SUPPLY1	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. Open Power Switch Open Solenoid	SPI channel must be functioning properly	This fault is set based on diagnostic information received from the Coil Driver ASIC Fault sets if failure flags received from Coil Driver ASIC indicate that a solenoid driver is shorted.	Power Switch is On	30 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
DRIVER_SHORT_TC_SUPPLY2	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. Open Power Switch Open Solenoid	SPI channel must be functioning properly	This fault is set based on diagnostic information received from the Coil Driver ASIC Fault sets if failure flags received from Coil Driver ASIC indicate that a solenoid driver is shorted.	Power Switch is On	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.
SOL_SHORT_ISO_ REARLEFT	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_SHORT_ISO_REARRIGHT	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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_TC_ISO1	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 high when the solenoid is not energized.	SPI channel must be functioning properly	This fault is set based on diagnostic information received from the Coil Driver ASIC Fault sets if failure flags received from Coil Driver ASIC indicate that a solenoid is shorted.	Power Switch is On	15 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_SHORT_TC_ISO2	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 high when the solenoid is not energized.	SPI channel must be functioning properly	This fault is set based on diagnostic information received from the Coil Driver ASIC Fault sets if failure flags received from Coil Driver ASIC indicate that a solenoid is shorted.	Power Switch is On	15 ms	Type A. MIL Illumination.
SOL_SHORT_TC_SUPPLY1	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 high when the solenoid is not energized.	SPI channel must be functioning properly	This fault is set based on diagnostic information received from the Coil Driver ASIC Fault sets if failure flags received from Coil Driver ASIC indicate that a solenoid is shorted.	Power Switch is On	15 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_SHORT_TC_SUPPLY2	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 high when the solenoid is not energized.	SPI channel must be functioning properly	This fault is set based on diagnostic information received from the Coil Driver ASIC Fault sets if failure flags received from Coil Driver ASIC indicate that a solenoid is shorted.	Power Switch is On	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 A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
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 A. MIL Illumination.
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 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	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
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 A. 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 A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
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 A. MIL Illumination.
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 A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_OVERTEMP_ DUMP REAR RIG HT " '	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 A. MIL Illumination.
SOL_OVERTEMP_ TCJSO1	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_OVERTEMP_TCJSO2	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_TC_SUPPLY1	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	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_OVERTEMP_TC_SUPPLY2	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_DRIVER_OVERTEMP_ISO_FRONTLEFT	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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_TC_ISO1	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_DRIVER_OVERTEMP_TC_ISO2	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. Solenoid is commanded On 2. Power Switch is On 3. Battery voltage is within operating range.	45 counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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. Solenoid is commanded On 2. Power Switch is On 3. Battery voltage is within operating range.	45 counts	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. Solenoid is commanded On 2. Power Switch is On 3. Battery voltage is within operating range.	45 counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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. Solenoid is commanded On 2. Power Switch is On 3. Battery voltage is within operating range.	45 counts	Type A. MIL Illumination.
CLAMP_ACTIVATION_FAILURE_TC_ISO1	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. Solenoid is commanded On 2. Power Switch is On 3. Battery voltage is within operating range.	45 counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
CLAMP_ACTIVATION_FAILURE_TC_IS02	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. Solenoid is commanded On 2. Power Switch is On 3. Battery voltage is within operating range.	45 counts	Type A. MIL Illumination.
LEAKY_DRIVER_UNKNOWN	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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. Command is less than 720 mA. Self-test complete. Excessive Low Voltage fault not maturing.	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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. Command is less than 720 mA. Self-test complete. Excessive Low Voltage fault not maturing.	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_CC_DC_SATURATED_HIGH_ISO_REARRIGHT	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. Command is less than 720 mA. Self-test complete. Excessive Low Voltage fault not maturing.	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_LOW_ISO_REARRIGHT	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	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_CC_DC_SATURATED_HIGH_ISO_REARLEFT	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. Command is less than 720 mA. Self-test complete. Excessive Low Voltage fault not maturing.	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_LOW_ISO_REARLEFT	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_CC_DC_SATURATED_HIGH_TC_ISO1	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. Command is less than 720 mA. Self-test complete. Excessive Low Voltage fault not maturing.	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_LOW_TC_ISO1	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	100ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_HIGH_TC_ISO2	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. Command is less than 720 mA. Self-test complete. Excessive Low Voltage fault not maturing.	100 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_CC_DC_SATURATED_LOW_TC_ISO2	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	100ms	Type A. MIL Illumination.
SOL_OVER_VOLTAGE_DUMP_FRONT_LEFT	C0011	This monitor checks if: • Anything that causes the solenoid to be active for excessive (usually unintended) period of time	Polaris ASIC monitors the DRDx (driver) pin voltage. If the DRDx pin voltage exceeds 40V for longer than the DRDx overvoltage debounce time, the ASIC shall set the DRDx Overvoltage Warning SPI bit. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the DRDx Overvoltage Warning SPI bit is set then the DRDx Overvoltage fault is set.	1. Solenoid is commanded On 2. Power Switch is On 3. Battery voltage is within operating range.	7 counts	Type A. MIL Illumination.
SOL_OVER_VOLTAGE_DUMP_FRONT_RIGHT	C0015	This monitor checks if: • Anything that causes the solenoid to be active for excessive (usually unintended) period of time	Polaris ASIC monitors the DRDx (driver) pin voltage. If the DRDx pin voltage exceeds 40V for longer than the DRDx overvoltage debounce time, the ASIC shall set the DRDx Overvoltage Warning SPI bit. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the DRDx Overvoltage Warning SPI bit is set then the DRDx Overvoltage fault is set.	1. Solenoid is commanded On 2. Power Switch is On 3. Battery voltage is within operating range.	7 counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_OVER_VOLTAGE_DUMP_REAR_LEFT	C0019	This monitor checks if: • Anything that causes the solenoid to be active for excessive (usually unintended) period of time	Polaris ASIC monitors the DRDx (driver) pin voltage. If the DRDx pin voltage exceeds 40V for longer than the DRDx overvoltage debounce time, the ASIC shall set the DRDx Overvoltage Warning SPI bit. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the DRDx Overvoltage Warning SPI bit is set then the DRDx Overvoltage fault is set.	1. Solenoid is commanded On 2. Power Switch is On 3. Battery voltage is within operating range.	7 counts	Type A. MIL Illumination.
SOL_OVER_VOLTAGE_DUMP_REAR_RIGHT	C001D	This monitor checks if: • Anything that causes the solenoid to be active for excessive (usually unintended) period of time	Polaris ASIC monitors the DRDx (driver) pin voltage. If the DRDx pin voltage exceeds 40V for longer than the DRDx overvoltage debounce time, the ASIC shall set the DRDx Overvoltage Warning SPI bit. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the DRDx Overvoltage Warning SPI bit is set then the DRDx Overvoltage fault is set.	1. Solenoid is commanded On 2. Power Switch is On 3. Battery voltage is within operating range.	7 counts	Type A. MIL Illumination.
SOL_OVER_VOLTAGE_TC_SUPPLY1	C05D5	This monitor checks if: Defective/Missing Suppression diode Defective PCB	Polaris ASIC monitors the DRDx (driver) pin voltage. If the DRDx pin voltage exceeds 40V for longer than the DRDx overvoltage debounce time, the ASIC shall set the DRDx Overvoltage Warning SPI bit. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the DRDx Overvoltage Warning SPI bit is set then the DRDx Overvoltage fault is set.	1. Solenoid is commanded On 2. Power Switch is On 3. Battery voltage is within operating range.	7 counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_OVER_VOLTAGE_TC_SUPPLY2	C05D5	This monitor checks if: Defective/Missing Suppression diode Defective PCB	Polaris ASIC monitors the DRDx (driver) pin voltage. If the DRDx pin voltage exceeds 40V for longer than the DRDx overvoltage debounce time, the ASIC shall set the DRDx Overvoltage Warning SPI bit. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the DRDx Overvoltage Warning SPI bit is set then the DRDx Overvoltage fault is set.	1. Solenoid is commanded On 2. Power Switch is On 3. Battery voltage is within operating range.	7 counts	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_CC_DR1	P0606	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)	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	50 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_DUTY_CYCLE_FDBK_PLAUS_CC_DR2	P0606	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)	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	50 msec	Type A. MIL Illumination.
SOL_DUTY_CYCLE_FDBK_PLAUS_CC_DR3	P0606	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)	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	50 msec	Type A. MIL Illumination.
SOL_DUTY_CYCLE_FDBK_PLAUS_CC_DR4	P0606	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)	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	50 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_DUTY_CYCLE_FDBK_PLAUS_CC_DR5	P0606	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)	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	50 msec	Type A. MIL Illumination.
SOL_DUTY_CYCLE_FDBK_PLAUS_CC_DR6	P0606	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)	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	50 msec	Type A. MIL Illumination.
SOL_DRIVER_CURRENT_PLAUS_CC_DR1	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_DRIVER_CURRENT_PLAUS_CC_DR2	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.
SOL_DRIVER_CURRENT_PLAUS_CC_DR3	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.
SOL_DRIVER_CURRENT_PLAUS_CC_DR4	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_DRIVER_CURRENT_PLAUS_CC_DR5	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.
SOL_DRIVER_CURRENT_PLAUS_CC_DR6	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.
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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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	170 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	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 $\frac{1}{2}$ bridge pre-driver pins (PDG and PRG), (3) the ENQ digital output pin, and	• 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 usee (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_LOCK UP	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 Missing external U3 FET when external U3 FET is expected (less current delivered with internal FET) Existing U3 FET when U3 FET is not expected (Note: No system reaction required)	If the external U3 FET is present, the ASIC shall set the U3 External FET SPI bit, if not present it will clear the bit. Software sets fault if bit is opposite of what is expected.	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	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 MCU shall monitor the ASIC's Excessive Startup Time SPI flag.	• Polaris is initialized	5 msec	Type A. MIL Illumination.
SYS_ASIC_ADC_REFHIGH	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	10 counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYS_ASIC_ADC_REFMID	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_REFLOW	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	50 msec 10 Counts	Type A. MIL Illumination.
SYS_ASIC_ADC_ATTN_BIT_STUCK	P060B	This monitor checks if: • Defective system ASIC	The MCU once per power cycle commands each ASIC external ADC channel with the attenuation mode opposite of normal operation and verify that its attenuation enable feedback SPI bit is not stuck. Commanded 10 times and if 3 in a row are failed the fault is set.	Any one of the 10 ASIC external ADC channel's attenuation enable feedback SPI bits is stuck	• Polaris is initialized	Time 3 ms = Goal 3 counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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	15ms	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 (OxAA, 0x55), walking 1s and walking Os). 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	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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	1 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	90 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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-driverto 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_BFL_SWITCH_2	U3000	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 "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
BROKEN_WIRE_TEMP_FDBK_A	P0606	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.
NVM_REQ_FAILED	P062F	This monitor checks if: • Eep Driver reports JobErrorNotification, indicating that the request failed, either after it was accepted or because the module refused the request	If a user request is either rejected and the number of configured retries expired or if it was accepted and then failed, while being processed by the underlying memory stack module.	NvM_CurrentBlockInfo_t.LastResult_t != NVM_REQ_OK	Continuous failsafing	3 counts	Type A. MIL Illumination.
NVM_INTEGRITY_FAILED	P062F	This monitor checks if: • If the read for a block detects that the data and/or CRC are corrupted based on the CRC check performed after the read was finished successfully	If the processing of a read request will detect, via the CRC checking, corruption of the data and/or CRC of the block that was subject to the read operation.	NvM_CurrentBlockInfo_t.LastResult_t == NVM_REQ_INTEGRITY_FAILED	Continuous failsafing	3 counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
NVM_LOSS_OF_REDUNDANCY	P062F	This monitor checks if: If the contents are different, if the first instance becomes corrupted or if the first instance cannot be read then NvM will report this fault.	If the reading performed over a REDUNDANT block indicates the block has lost its redundancy.	one block is OK, other isn't -> block isn't redundantly stored within NV RAM. if(firstBlockDefect ^ secondBlockDefect) == TRUE	Continuous failsafing	1 count	Type A. MIL Illumination.
NVM_QUEUE_OVERFLOW	P062F	This monitor checks if: If the number of requests made to NvM exceeds the size of the queue and none of the ones in the queue finishes, NvM will not have any more space where to store the requests. In this case it will report the fault to Dem.	If a request is made that cannot be stored in the NvM queue (be it standard or immediate) as all configured queue positions of the related queue are already containing user requests.	queue was full, request to queue the next block leads to queue overflow	Continuous failsafing	1 count	Type A. MIL Illumination.
EEP_FAILURE	P062F	This monitor checks if: SPI transmission is faulty	The failure is set in case of a failed sequence due to a failure of the SPI transmission. A sequence can also fail if a transfer was rejected because of full transmit buffer.	EEP_E_CANCEL_FAILED - DEM event if a job cancelation failed EEP_E_READ_FAILED - DEM event if read job failed EEP_E_COMPARE_FAILED - DEM event if compare job failed EEP_E_TEST_COM_FAILED2 - DEM event if test communication job failed EEP_E_WRITE_FAILED - DEM event if write job failed EEP_E_ERASE_FAILED - DEM event if erase job failed	Continuous failsafing	3 counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.
SYS_ASIC_MOTOR_DIAG_ERROR_FAULT	P0606	This monitor checks if: Defective system ASIC	This failsafe monitors various error bits received via SPI from the Polaris ASIC	Fault is set when any of the following error bits are received as TRUE from the ASIC: QPD Turn-on fault SPI flag bit OPEN PRS fault SPI flag bit PRG Turn-off fault SPI flag bit QPD Turn-off fault SPI flag bit PDG Turn-off fault SPI flag bit OPEN Motor flyback fault SPI flag bit Motor Ground offset fault SPI flag bit VPR Over voltage fault SPI flag bit Motor Control Logic fault SPI flag bit	Polaris is initialized	50 msec	Type A. MIL Illumination.
SYS_ASIC_MOTOR_DIAG_WARN_FAULT	P0606	This monitor checks if: Defective system ASIC	This failsafe monitors various error bits received via SPI from the Polaris ASIC	Fault is set when: filtered system voltage > 9 Volts AND Any of the following error bits are recevied as TRUE: PRG Tum-on fault SPI flag bit PDG Tum-on fault SPI flag bit	Polaris is initialized	50 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
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.
OS_TASK_MONITOR_FAULT_COREO	P0606	This monitor checks if: Software Error Partial Microcontroller Failure	Checks to be sure that all tasks on CPUO 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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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_COREO	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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_COREO	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_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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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_COREO	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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_COREO	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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_SEVERITYX	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
CPU_FAILURE_SEVERITYY	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYS_ASIC_DRIVER_SHORT_DETECT	P0606	This monitor checks if: • Defective system ASIC • OPEN Coil Failure	• 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 OA 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.
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). (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.	• Runs during initialization	3 Counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
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_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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MULTIPLE_START UP_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_FAI LURE	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_CORE 0	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 ADCFAILURE	performed at power up	1 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.
STM_PLAUSIBILIT'Y_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 channe 1 >= 2.5%	Enabled at power up	105 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.
MICRO_CLOCK_PLAUSIBILITY_FAILURE	P0606	This monitor checks if: • Defective CPU	The ASCLIN is configured to send 7.5 msec worth of data. If it finishes either too fast, or too slow, that indicates that the PLL for the peripheral is incorrect. The fault will then be set.	Peripeheral clock dividers mismatch with System clock	Always Enabled	10 counts	Type A. MIL Illumination.
MPU_CONFIG_REGISTER_READBACK_FAILURE	P0606	This monitor checks if: • Defective CPU	After the MPU has been initialized, the registers will be checked to sure the have the correct values. If any register is incorrect, it will be rewritten and checked again. The fault will be set if the register is still incorrect.	register value is not equal to value written to it	performed at power up	1 count	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MCU_FW_CHECK_FAILURE	P0606	This monitor checks if: • Defective CPU	A list of registers is compared to a known set of values to ensure that the Infineon firmware executed correctly. If there is a mismatch, the CPU is reset, and the test is rerun. The fault is set if there is still a mismatch.	One or more registers != expected value	performed at power up	1 count	Type A. MIL Illumination.
EVADC_CONFIG_REGISTER_READBACK_FAILURE	P0606	This monitor checks if: • Defective CPU	This failsafe is to verify if the ADC GxANCFG registers' values match those configured in MCAL at power initial time. Failsafe pass if register values match the configured in MCAL, if not match allow value in MCAL to write to register once again, will set fault if not match and pass if match. Note: ADC is tied to Core CPU ID, and only used Kernels are included in failsafe.	register value is not equal to test value written to it	performed at power up	1 count	Type A. MIL Illumination.
MCU_STARTUP_FAILURE	P0606	This monitor checks if: • UCB Configuration incorrect • UCB corrupted • Micro incorrectly loading UCB values into registers	A list of of registers (all derived from UCB values) is CRCed. The resulting CRC value is compared to the expected CRC value. If there is a mismatch, the CPU is reset, and the test is rerun. The fault is set if it fails again.	Calculated CRC != Expected CRC	performed at power up	1 count	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
INTERNAL_BUS_MONITOR_CORE2_FAILURE	P0606	This monitor checks if: • CPU2 failure	At startup, the CPU internal FIFOs (Store buffers, bus interfaces), the CPU internal bus connectivity to SRI Master and Slave interfaces (Read and Write), and the CPU internal bus connectivity to the DLMU are checked. (DLMU: Direct-connected Local Memory Unit) If a failure is detected, the check is run again. The fault is set if a failure is detected twice.	CpuBusMonitor() returns FALSE	Always Enabled	1 count	Type A. MIL Illumination.
LBIST_FAILURE	P0606	This monitor checks if: • Microprocessor Failure	At powerup, the Infineon Firmware executes the LBIST. The Application code then compares the resulting LBIST signature to the expected signature. The fault is set if there is a mismatch.	LBIST signature != Expected LBIST signature	Always Enabled	1 count	Type A. MIL Illumination.
REG_MONITOR_TEST_FAILURE	P0606	This monitor checks if: • Microprocessor Failure	At powerup, the Safety Flip Flops (SFFs) used in certain functional blocks is checked. If there is a failure, the CPU is reset, and the test is rerun. The fault is set If the failure still persists after the reset.	Mtu_RegMonitorTest() returns REG_MON_TEST_FAILED (5)	Always Enabled	1 count	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MONBIST_FAILURE	P0606	This monitor checks if: • Microprocessor Failure	If the Monitor Built-In Self Test (MONBIST) returns a failure, the CPU is reset and the test is rerun. The fault is set if the MONBIST fails again.	PMS_MONBISTSTAT.B.TSTOK != MONBIST_STATUS_CHECK (1)	Always Enabled	1 count	Type A. MIL Illumination.
SFR_READBACK_FAILURE	P0606	This monitor checks if: • Microprocessor Failure	A group of safety critical registers is checked correct values. If a value is incorrect, it is updated. The fault is set if either a value could not be corrected, or there are more than 3 registers that need to be corrected.	Read register value != Expected value	Always Enabled	3 counts	Type A. MIL Illumination.
ABS_MOTOR_SUP_OPEN	P0606	This monitor checks if: Blown or removed motor supply fuse Faulty wiring harness (Motor supply from battery)	Open Supply is monitored by checking the supply feedback. Note: Fault condition will not exist until motor speed is attempted. This is due to electrolytic capacitors needed for HFMC.	VBAT_MOTOR_FBK < 4.5V	Motor control is active Motor is off for at least one second	150ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
ABS_MOTOR_OPEN	P0606	This monitor checks if: Poor contact with motor terminals. Defective motor (open motor winding). Defective motor driver (always on). Defective printen circuit board (feedback shorted high). Anything that keeps motor feedback voltage high when the motor has been commanded off and should be stationary.	Open Motor The pump motor is checked for an open circuit when the motor is commanded off. When the motor is off the motor feedback should be closed to zero volts. If the motor circuit is electrically open, the feedback should be equal to system voltage. If the pump motor feedback remains greater than 1.0 V and less than 70% of battery voltage for more than 75 msec after the motor has been commanded off, then a fault is set.	Back EMF voltage > 1.0 V AND Back EMF Voltage < 70% of Battery Voltage	Motor is not commanded on	75ms	Type A. MIL Illumination.
ABS_MOTOR_LOCKED	P0606	This monitor checks if: Defective motor (locked/seized) Resistive motor connection. Defective motor driver. Defective circuit board (feedback line open). Anything that keeps motor feedback voltage low when it is expected to be driven high by back-EMF across the rotor winding of the coasting motor. HS FET high resistance HS FET O/C, LS FET O/C or S/C PGND O/C	Locked Motor This fault can be set under the following conditions: 1. No motor open fault is detected. 2. Motor target speed is not Orpm and Motor is in Back-emf measure state, if the motor speed is less than MAX(15% of motor supply or 1V)for 200ms Counter: Count 1-up and reset motor speed is greater than MAX(15% of motor supply or 1V). Monitor Rate: 5MS	Motor terminal voltage > 1 V	Motor is commanded on ABS motor driver and supply are not open	110 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
ABS_MOTOR_DRV_OPEN	P0606	This monitor checks if: Defective motor driver.	The system uses two ADC feedbacks to test for the open motor driver fault. Motor must be commanded ON, then VBAT_MOTOR_FBK and MOTOR_FBK_A are checked to test for open driver.	VBAT_MOTOR_FBK > 4.5 V AND Motor terminal voltage < 1V	Input voltage > 50% of ignition voltage	110 ms	Type A. MIL Illumination.
PM_DRIVER_SERIAL_ERROR	C052B	This monitor checks if: SPI transfer error ASIC problem PCB problem	If there are more than 16 rising edges on SCK or if STRn goes high and there are fewer than 16 rising edges on SCK or the parity is not odd, then the write will be cancelled and the SE bit will be set to indicate a SPI transfer error. Allegro ASIC shall not set FF and SE bits from the Status register after sending a SPI message with invalid parity during Allegro self-test.	Allegro FF and SE bits from Status register = TRUE	Continuous failsafing (during Allegro self-test and eachtime a SPI message is received)	390 ms	Type A. MIL Illumination.
PM_DRIVER_OVERVOLTAGE	C052D	This monitor checks if: Defective motor driver	Faults on the external MOSFETs are determined by montioring the (S terminal - VBRG terminal) voltage and comparing it to VT (provided as the Allegro hardware configuration in the Config 0 Register). A short from the load connection to ground is determined by montioring the (S terminal -VBRG terminal) voltage and comparing it to VT (provided as the Allegro hardware configuration in the Config 0 Register). A short from the load connection to supply is determined by montioring the (LSS terminal - S terminal) voltage and comparing it to VT (provided as the Allegro hardware configuration in the Config 0 Register). The Allegro ASIC sets FF and DSO bits in the Status register if (S terminal -VBRG terminal) voltage falls below the configured threshold.	Allegro FF and DSO bits from Status register = TRUE	Power-switch self-test is completed. ENQ pin feedback is active. Allegro driver is enabled. Allegro SPI data is valid. No Allegro SPI fault present. VBAT voltage > 6.8 volts.	390 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PMJDRIVERJJNDERVOLTAGE	C052E	This monitor checks if: Defective motor driver	To ensure that the gate drive outputs (GH & GL) are operating correctly, each gate drive output is independently monitored to ensure that Vgs is sufficient to fully enhance the power MOSFET in the external bridge. The Allegro ASIC sets FF and GSU bits in the Status register if Vgs on either active gate drive output goes below Vgs Undervoltage threshold.	Allegro FF and GSU bits from Status register = TRUE	Power-switch self-test is completed. ENQ pin feedback is active. Allegro driver is enabled. Allegro SPI data is valid. No Allegro SPI fault present. VBAT voltage > 6.8 volts.	390 ms	Type A. MIL Illumination.
PM_DRIVER_VREG_OOR	C052C	This monitor checks if: ASIC problem PCB problem	The internal charge-pump regulator supplies the low-side gate driver and the bootstrap charge current. The regulated voltage Vreg is monitored to ensure that the gate drive outputs can be enabled. The Allegro ASIC sets FF and VR bits in the Status register if Vreg goes below the Vreg Undervoltage threshold, or above the Vreg Overvoltage threshold.	Allegro FF and VR bits from Status register = TRUE	Power-switch self-test is completed. ENQ pin feedback is active. Allegro driver is enabled. Allegro SPI data is valid. No Allegro SPI fault present. VBAT voltage > 6.8 volts.	390 ms	Type A. MIL Illumination.
PM_DRIVER_POWERONRESET	C052F	This monitor checks if: ASIC problem PCB problem	When the Allegro ASIC is stuck in reset due to the MMMC_UC_RESET pin being stuck high, the internal logic is prevented from operating and the Allegro sets the FF and POR bits in the Status register.	Allegro FF and POR bits from Status register = TRUE	Power-switch self-test is completed. ENQ pin feedback is active. Allegro driver is enabled. Allegro SPI data is valid. No Allegro SPI fault present. VBAT voltage > 6.8 volts.	390 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PM_DRIVER_DISABLE_PATH_FAULT	C052B	This monitor checks if: Defective motor driver.	EXT 04 Phase-state Monitor test must be performed once successfully prior to this SM. The SW performs the following sequence: 1. MMMC_ENABLE pin is set low. 2. Motor commands maximum PWM. 3. The motor supply voltage PDBAT is compared to MOTOR_FBK_A to detect a high actuated state.	Motor terminal voltage > (87% of PDBAT voltage)	Power-switch self-test is completed. ENQ pin feedback is active. Allegro driver is enabled. Allegro SPI data is valid. No Allegro SPI fault present. VBAT voltage > 6.8 volts. ABS_MOTOR_SUPPLY_VOLTAGE_RANGE_FAILURE fault is not present.	2 counts	Type A. MIL Illumination.
PM_DRIVER_TEMP_ERROR	C052B	This monitor checks if: Anything that causes the pump-motor driver to be active for an excessive (usually unintended) period of time.	The Allegro ASIC sets the FF and TW bits in the Status register if the chip temperature rises above the temperature warning threshold Tjw. The Allegro ASIC sets the FF and OT bits in the Status register if the chip termperature rises above the overtemperature threshold Tjf.	Allegro FF and OT bits from Status register = TRUE	Power-switch self-test is completed. ENQ pin feedback is active. Allegro driver is enabled. Allegro SPI data is valid. No Allegro SPI fault present. VBAT voltage > 6.8 volts.	390 ms	Type A. MIL Illumination.
PM_DRIVER_BOOTSTRAP_UNDERVOLTAGE	C052F	This monitor checks if: ASIC problem PCB problem	To ensure that the high-side gate drive output can be driven high, the bootstrap capacitor charge voltage is expected to be high. The Allegro ASIC sets FF and VBS bits in the Status register if the bootstrap capacitor voltage is below the undervoltage threshold.	Allegro FF and VBS bits from Status register = TRUE	Power-switch self-test is completed. ENQ pin feedback is active. Allegro driver is enabled. Allegro SPI data is valid. No Allegro SPI fault present. VBAT voltage > 6.8 volts.	390 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
ABS_MOTOR_SUPPLY_VOLTAGE_RANGE_FAILURE	P0606	This monitor checks if: Defective system ASIC	Within the ASIC, the PDBAT voltage shall be internally divided down and shall feed a dedicated ADC channel.	The MCU shall read the ASIC's PDBAT Voltage Result SPI field and perform a plausibility check against other battery voltage measurements read by MCU (e.g. KL30_L/V).	Polaris is initialized	15 msec	Type A. MIL Illumination.
PM_BRIDGE_MOTOR_DRIVER_OPEN	C052B	This monitor checks if: Defective motor driver.	Faults on the external MOSFETs are determined by montioring the (S terminal - VBRG terminal) voltage and comparing it to VT (provided as the Allegro hardware configuration in the Config 0 Register). A short from the load connection to ground is determined by montioring the (S terminal -VBRG terminal) voltage and comparing it to VT (provided as the Allegro hardware configuration in the Config 0 Register). A short from the load connection to supply is determined by montioring the (LSS terminal - S terminal) voltage and comparing it to VT (provided as the Allegro hardware configuration in the Config 0 Register). The Allegro ASIC sets FF and DSO bits in the Status register if (S terminal -VBRG terminal) voltage falls below the configured threshold.	Allegro FF and DSO bits from Status register = TRUE during operation of the EXT04 Phase State Operation failsafe which occurs every 500ms after a singular 5 microsecond pulse is generated by the high-side motor gate drive	Power-switch self-test is completed. ENQ pin feedback is active. Allegro driver is enabled. Allegro SPI data is valid. No Allegro SPI fault present. VBAT voltage > 6.8 volts.	5 counts	Type A. MIL Illumination.
MCP_SENSOR_CORRELATION_ERROR	C0574	This monitor checks if: electronic or mechanical fault in sensor	Pressure Sensor Output Correlation The MCP sensor has both a principle and a reference pressure feedback (redundant sensor).	Before Initialization: MCP Principle - MCP reference > 20 bar After Initialization MCP Principle - MCP reference > 10 bar OR Before Initialization: MCP Principle - MCP reference > 30 bar After Initialization MCP Principle - MCP reference > 20 bar	MCP sensor signal valid At least one MCP signal is not in saturation (one MCP raw signal < 150 bar) Emissions Rolls Test Inactive	2 s OR 400 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MCP_SENSOR_OFFSETERROR	C0574	This monitor checks if: electronic or mechanical fault in sensor	Pressure Sensor - Offset Error This diagnostic checks the sensor offset on both low pass filtered MCP principle and reference signals.	MCP principle sensor offset > 10 bar OR MCP Reference sensor offset > 10 bar	1. MCP sensor signal and vehicle speed are valid. 2. Driver is not braking for 2 s (indicated by BAS), followed by: acceleration > 0.4 m/s^2 AND accelerator position > 20 % AND vehicle speed > 7.2 kph for 1 s 3. No vehicle brake control (ABS, ESP, BOD) active	30 ms	Type A. MIL Illumination.
MCP_SENSOR_RAW_OFFSET_ERROR	C0574	This monitor checks if: Defective pressure sensor. Defective pressure sensor connector. Defective PCB. Change in wiring and/or connector resistance. Anything that causes a shift the sensor bias voltage. electronic or mechanical fault in sensor	Pressure Sensor - Raw Offset Error This diagnostic checks if the MCP (principle or reference) sensor raw signal has an offset	MCP Principle sensor offset > 50 bar OR MCP Reference sensor offset > 50 bar	MCP sensor signal and Wheel speed information is valid. Vehicle speed < 4.0 m/s Vehicle accel < -0.5 m/s^2	1 s	Type A. MIL Illumination.
MCP_SENSOR_NOT_ALIVE_ERROR	C0574	This monitor checks if: electronic or mechanical fault in sensor	Pressure Sensor - Not Alive Error This diagnostic checks if the zeroed MCP sensor principle signal can not change the value anymore.	Change in Principle sensor < 5 bar while the following are becoming true for 5 times: DRIVE State: Vx> 13 m/s DECEL state: ax < -1.5 m/s^2 for 1.5 s STOP state: vehicle stopped for 3 s	MCP sensor signal and Wheel speed information is valid, vehicle speed > 13 m/s	1 Count	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 Status Faulted = Sensor open or shorted to sensor supply (conditions for MC_PRES_SEN_OPEN_OR_SHRT_HIGH) or Sensor shorted to ground (conditions for MC_PRES_SEN_SHORTED_LOW) Fault counts toward setting each time Ohmic Faulted status changes from Passed to Faulted or from Faulted to Passed.	• 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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MCP_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.
PRESS_SENS_1_COMM_FAULT	C2A15	This monitor checks if: Electrical fault in sensor. Mechanical fault in sensor. Open or shorted signal line.	The periodically incoming fast messages of pressure sensor 1 are checked. If one of the following errors appear the fault is detected: No message received for the last 5ms. CRC of a message is invalid. A nibble value of the message is invalid. The number of received nibbles for a message is invalid. The synchronisation with the pressure sensor failed. The inverted most significant nibble does not match with the most significant nibble.	The Pressure sensor is not connecting to the SENT communication interface correctly. The Pressure sensor is not powered correctly.	Any time while system is awake Pressure sensor supply enabled	100 ms	Type A. MIL Illumination.
PRESS_SENS_1_FAST_DATA_FAULT	C2A15	This monitor checks if: Electrical fault in sensor. Mechanical fault in sensor.	The periodically incoming fast messages of the pressure sensor 1 are checked. If one of the following errors appear the fault is detected: The status nibble indicates an error. Stucked signal. Stucked signal is detected if the data counter is not incremented. The signal value is an Error code other than under voltage error	The Pressure sensor output frame reports a error code. or The Pressure sensor output raw value in decimal equals to 0. or The Pressure sensor output raw value in decimal is greater than 4088.	Any time while system is awake Pressure sensor supply enabled	100 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PRESS_SENS_1_OUT_OF_RANGE_LOW	C053E	This monitor checks if: Electrical fault in sensor. Mechanical fault in sensor. Open or shorted signal line.	The periodically incoming fast messages of the pressure sensor 1 are checked. If one of the following errors appear the fault is detected: The sensor signal is not within the defined threshold	When the Pressure sensor output raw value in decimal is not in the valid range [118, 3972], 1 <= output <118 or 3972 < output <= 4088	Any time while system is awake Pressure sensor supply enabled	100 ms	Type A. MIL Illumination.
PRESS_SENS_1_OUT_OF_RANGE_HIGH	C053F	This monitor checks if: Electrical fault in sensor. Mechanical fault in sensor. Open or shorted signal line.	The periodically incoming fast messages of the pressure sensor 1 are checked. If one of the following errors appear the fault is detected: The sensor signal is not within the defined threshold	When the Pressure sensor output raw value in decimal is not in the valid range [118, 3972], 1 <= output <118 or 3972 < output <= 4088	Any time while system is awake Pressure sensor supply enabled	100 ms	Type A. MIL Illumination.
PRESS_SENS_1_SERIAL_MSG_FAULT	C2A15	This monitor checks if: Electrical fault in sensor. Mechanical fault in sensor. Open or shorted signal line.	The periodical incoming serial messages of the sensor are checked. If one of the following errors appear the fault is detected: A received serial message got lost No serial message received for the last 18ms	The Pressure sensor is not connecting to the SENT communication interface correctly. The Pressure sensor is not powered correctly.	Any time while system is awake Pressure sensor supply enabled	100 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
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 Correctedl > 720° OR Relative SWA sensor: |Swa Turn Correctedl > 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! > 57s²	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 < 67s 7. Yaw Rate has to be > 37s once and < -37s 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 > 30007s Set previous signal for next cycle.	1. SWA is valid 2. Emissions Rolls Test Inactive	50 ms	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
LAT_SENSOR_NO1_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/s^2 OR 2. Lat Acc is constant lat acc signal < +/- 14 m/s^2 AND Vehicle Speed > 3 m/s^2	Emissions Rolls Test Inactive AND 1. Lat Acc is valid Wheel speed is valid vehicle speed > 3 m/s^2	1. 1 s 2. 100 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
LAT_SENSOR_STEPERROR	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/s^3	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/sec^2	• Lat Acc is valid • Wheel speed info is valid • Vehicle is standing still	200 ms	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
LAT_SENSOR_OFFSETERROR	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/sec^2 OR 2. 2 Continuously learned offsets > 1.8 m/sec^2 for 4 sec WHILE vehicle speed > 13.8 m/s OR driving distance > 150m before initialization OR 3. 3 Continuously learned offsets > 3 m/s^2 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/s^2 (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_GAINERROR	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/sec^2 + delta After Initialization: 2 m/sec^2 + 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 "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
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/s^2 OR 2. Long Acc is constant AND long acc signal < +/- 14 m/s^2 AND Vehicle Speed > 3 m/s^2	• 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_STEPERROR	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/s^3	• 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/s^2	• 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	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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/s^2	• 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_GAINERROR	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/s^2 AND Measured Long Acc-Estimated Long Acc > 0.8 m/s^2	• 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 "
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| < 857s AND Vehicle Speed > 3 m/s^2 2. |Yawrate| ? 1307s	• 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 "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
YAW_SENSOR_STEPERROR	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 > 8007s[2]	• 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| > 507s	• 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_OFFSETERROR	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 standstill condition) Before Initialization while driving: 2 learned offset is > 87s OR 3 Continuously learned offsets are > 57s for 1 s After Initialization while driving: 4 "extended learn" offsets are > 57s 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 "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
YAW_SENSOR_GAINERROR	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: 67s + delta After Initialization: 37s + 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 "
SYS_ASIC_VDBAT_RANGE_FAILURE	P0562	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 < 8.5V or VDBat >16.8V) continuously for 100ms then the fault is set.	8.5V < KL30_1 Supply Voltage > 16.8V	• ASIC's VDBAT Voltage Result SPI field is outside the range of 8.5 and 16.8 volts for 100msec	100ms	Type C, No MIL, "Emissions Neutral Diagnostic "
SYSTEM_VOLTAGE_LOW	P0562	This monitor checks if: • Vehicle Battery 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 "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYSTEM_VOLTAGE_EXCESSIVE_LOW	P0562	This monitor checks if: • Vehicle Battery Voltage Supply is providing excessively low voltage level. • Defective cable. • Defected printed circuit board.	Filtered system voltage < 7.5V System voltage is monitored continuously but the fault is not enabled during Engine crank. When the system voltage is continuously lower than 7.0V for more than 150 msec then the fault is set. When the system voltage is continuously greater than 7.5V for more than 150 msec then the fault is allowed to be cleared if not ignition latched.	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_VOLTAGEHIGH	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYSTEM_SELF_TE STHOLD	P0562	This monitor checks if: • Voltage Supply is providing excessively low or high voltage levels. • Defective printed circuit board.	System Self Test will not start if either of the following conditions are present: Polaris is not initialized Unfiltered System Voltage is outside the Excessive range (< 7.0V or >18.8V) If the System Self Test is delayed continuously for more than 100 msec then the fault is set.	Polaris.Resync_Seq_Error = TRUE or Unfiltered system voltage < 7.0V or Unfiltered system voltage > 18.8V	• Polaris is not initialized yet • System Voltage is outside the Excessive range (<7.0 V or >18.8V) Have not finished self-test	5 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PRIMARY_WAKEU P_LINE_STUCK_L OW	P2534	This monitor checks if: HW ignition line failure	The MCU compares the state of the Primary Wakeup Line with the Ignition switch status CAN signal from the ECM. If the Primary Wakeup Line is read as Low but Ignition switch status signal indicates RUN or CRANK for a continuous 3 sec then the fault is set. This fault is not enabled if the MISSING_BCM_FD_10_MSG CAN message fault is set.	(State of Primary Wakeup line == Not Wake) && (CAN Signal == (CRANK || RUN))	• Primary Wakeup COMMS Signal is Valid (Singal is Valid when MISSING_BCM_FD_10_MSG fault is not latched)	2s	Type B. MIL Illumination.
PRIMARY_WAKEU P_LINE_STUCK_HI GH	P2535	This monitor checks if: HW ignition line failure	The MCU compares the state of the Primary Wakeup Line with the a CAN signal from the ECM indicating whether the line is being driven high or low. If the Primary Wakeup Line is read as High but CAN message signal indicates it should be low 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 == Wake) && (CAN Signal != (CRANK II RUN))	• Primary Wakeup COMMS Signal is Valid (Singal is Valid when MISSING_PPEI_ENGINE_GENE RAL_STATUS_1 fault is not latched) •AND • Primary Wakeup Line is ON	2s	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.
SYSTEM_SELF_TEST_TIMEOUT	P0562	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 noi 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 C, No MIL, "Emissions Neutral Diagnostic "
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 KL30JNT 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 KL30JNT for a continuous 50 msec then the fault is set.	If Feedback Voltage < 90%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 KL30JNT 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 KL30JNT 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_INT	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 VA5pO 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_VCP12_U12_VOLTAGE_LOW_EXT	P0562	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 VA5pO 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 C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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_VDBAT_OVER_VOLT_FAULT	P0606	This monitor checks if: Defective system ASIC ASIC cannot regulate voltage properly	The ASIC shall detecta VDBAT overvoltage condition by monitoring the VDBAT's digital ADC result. If the VDBAT ADC result exceeds the coil supply overvoltage ADC threshold for the coil supply overvoltage debounce time, the ASIC shall disable the internal FET driver and external FET pre-driver channels, set the Coil Supply Overvoltage Fault SPI bit, and clear the CC_DRx Enable and DROx Enable SPI bits	Fault will set if the MCU receieves the Coil Supply Overvoltage Fault SPI bit as TRUE	Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_VDG_RANGE_FAULT	P0606	This monitor checks if: • Defective system ASIC	Verify that the KL30_2 Power Switch command is not stuck On. The ASIC VDG pin controls the KL30_2 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: VDG < VDBat+3V or VDG >VDBat+12V SSROFF: VDG >= 1.0V	• Polaris is initialized	100 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYS_ASIC_VBAT_SWJDVERCURRENT	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	200 ms	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.
U5ASICADCREF_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	200ms	Type A. MIL Illumination.
PWR_SUP_EXT12V_1_SHRT_TO_SUP	P0606	This monitor checks if: • Defective steering wheel angle sensor • Defective printed circuit board	The MCU provides one external 12V sensor supply for the Steering Wheel Angle Sensor. The SW monitors the supply feedback of External 12V high-side driver. The External 12V high-driver is faulted if the supply feedback is above 80% of VDBAT voltage while the driver is commanded OFF.	External 12V high-driver supply feedback >= 80% VDBAT voltage	• VDBAT voltage is above 6.5V • SAS supply (External 12V high-side driver) is disabled.	180 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PWR_SUP_EXT12V_1_SHRT_TO_GND	P0606	This monitor checks if: • Defective steering wheel angle sensor • Defective printed circuit board	The MCU provides one external 12V sensor supply for the Steering Wheel Angle Sensor. The SW monitors the supply feedback of External 12V high-side driver. The External 12V high-driver is faulted if the supply feedback is below 10% of VDBAT voltage while the driver is commanded ON.	External 12V high-driver supply feedback <= 10% VDBAT voltage	• VDBAT voltage is above 6.5V • SAS supply (External 12V high-side driver) is enabled.	180 ms	Type A. MIL Illumination.
PBJJNDERVOLTAGE	P0562	This monitor checks if: • Vehicle Battery 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 "
PB_OVERVOLTAGE	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
CAN_0_BUS_OFF_ COMMS_FAULT	U0075	This monitor checks if: • HS bus Shorted • CAN transceiver faulty	Can peripheral locks for the bit errors in transmitted messages and increments txerror counter if any error is detected	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	220 msec	Type B. MIL Illumination.
CAN_1_BUS_OFF_ COMMS_FAULT	U0073	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	220 msec	Type B. MIL Illumination.
CAN_2_BUS_OFF_ COMMS_FAULT	U0077	This monitor checks if: •Private CAN 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	220 msec	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
KEY_TABLE_NOT_PROVISIONED	U1960	This monitor checks if: • Security peripheral general key is NOT provisioned.	1) The Authoritative Counter reaches its maximum value. 2) Any single Key Slot Provision State Flag for Key 2 through Key <n> is equal to a value of 0 while the MEC is equal to 0. 3) Upon receipt of ERC_KEY_EMPTY from the security peripheral (SECP). All messages authenticated using the missing key will be invalidated. Invalidated messages are discarded without any further processing.	1) The Authoritative Counter reaches its maximum value. 2) Any single Key Slot Provision State Flag for Key 2 through Key <n> is equal to a value of 0 while the MEC is equal to 0. 3) Upon receipt of ERC_KEY_EMPTY from the security peripheral (SECP).	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V < VB < 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition • Vehicle is in logistic mode.	1 count	Type B. MIL Illumination.
SECURITYPERIPHERAL_PERFORMANCE	U1961	This monitor checks if: • Security Peripheral Performance - Performance or Incorrect Operation • Unable to generate a MAC • Unable to verify a MAC	1) If a request to the security peripheral to generate a Message Authentication Code (MAC) does not result in a response within a set amount of time*, the security peripheral is considered to have failed due to an internal error. 2) If a request to the security peripheral to verify a Message Authentication Code (MAC) does not result in a response within a set amount of time*, the security peripheral is considered to have failed due to an internal error. • The actual amount of time varies based upon security peripheral hardware used but will be less than a few seconds. • In the event the security peripheral cannot generate a MAC due to an internal error, the authenticated message shall be broadcast with a MAC equal to zero. • Failed verification means the message is discarded, no failsoft action is taken other than to set the DTC.	1) If a request to the security peripheral to generate a Message Authentication Code (MAC) does not result in a response within a set amount of time*, the security peripheral is considered to have failed due to an internal error. 2) If a request to the security peripheral to verify a Message Authentication Code (MAC) does not result in a response within a set amount of time*, the security peripheral is considered to have failed due to an internal error. * The actual amount of time varies based upon security peripheral hardware used but will be less than a few seconds.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V < VB < 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition • Vehicle is in logistic mode.	1 count	Type B. MIL Illumination.
TRNS_OIL_TMP_SIG JNVALID	U0402	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 validity bit will be checked immediately.	Transmission Shift Lever Position Validity = 1	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	1 count	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
ECM_AVH_STATUS_FAULT	C15C6	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 validity bit will be checked immediately.	AVHSwtchStats = 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	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_MSG_BODY_GEN_INFO_3	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 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
ESP_ENG_SPD_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_O == 0x02	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	1 Count	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_MSG_ACT_AXL_TORQUE	U1611	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
ACT_AXL_TORQUE-SECURITY	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 Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.
ACT_AXL_TORQUE_ARC	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. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_MSG_PPEI_STEERING_WHEEL_ANGLE	uooco	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
COMMS_SWA_CHECKSUM_FAULT	U0428	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.	The receiver shall check the checksum value with every new received frame. An incorrect checksum value will activate the fault.	• 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 8 consecutive count sequence errors. Sliding Window Fail Threshold is 8 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
COMMS_SWA_ARC_FAULT	U0428	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. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 8 consecutive count sequence errors. Sliding Window Fail Threshold is 8 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
COMMS_SWA_INVALID	U0428	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 validity bit will be checked immediately.	Steering Wheel Angle Validity = 1	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "
COMMS_SWA_MISSING_CALIBRATIONERROR	C0051	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	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "
COMMS_SWA_DATA_MASK_DUD	U0428	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module • Data mask is stuck off • Incorrect SAS installed	When the incoming message is unpacked, the validity bit will be checked immediately.	Data Mask Failure indicated if data mask in message is stuck off (equal to zero) for an extended period	• 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 count	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_GWCGM_06_MSG	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 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_GWCGM_34_MSG	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 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_MSG_AUTO_CLT_GEN_INFO	U1614	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_MSG_ALC_VEH_TOP_SPD_LIM	U0132	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
ALC_VEH_TOP_SPD_LIM_ARC	U0421	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 == 0	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
ALC_VEH_TOP_SPD_LIM_PROT_FAULT	U0421	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_MSG_BKUP_SYS_PWR_MD	U1607	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
BKUP_SYS_PWR_MD_ARC	U0447	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 == 0	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_CGM_CAN1_MSG04	U1607	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_CGM_CAN1_MSG06	U1607	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_MSG_LAT_LONG_DATA	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 100 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	100 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
LAT_LONG_DATA_SECURITY	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 Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
LAT_LONG_DATA_ARC	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. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
LLDP_LAT_ACCEL_SNSR_CORR_STS_FAULT	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 correlation status bit will be checked immediately.	Correlation Status = Unknown	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "
LLDP_LONG_ACCEL_SNSR_CORR_STS_FAULT	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 correlation status bit will be checked immediately.	Correlation Status = Unknown	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_MSG_OCCPT_RSTRNT_INFO	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 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_MSG_PST_CLSN_INFO	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 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
PST_CLSN_INFO_SECURITY	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 Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PST_CLSN_INFO_ARC	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. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_MSG_YAWRATE	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 100 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	100 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
YAW_RATE_SECURITY	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 Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
YAW_RATE_ARC	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. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
YAW_RATE_CORR_FAULT	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 correlation status bit will be checked immediately.	Correlation Status = Unknown	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_ACC_GNRL_INFO1_FCM	U0265	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_ACC_GNRL_INFO1_EOCM	U1615	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
ACC_GNRL_INFO1_SECURITY_FCM	U0566	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 Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
ACC_GNRL_INFO1_SECURITY_EOCM	U053B	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 Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
ACC_GNRL_INFO1_ARC_FCM	U0566	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. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
ACC_GNRL_INFO1_ARC_EOCM	U053B	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. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_BCM_CAN2_MSG01	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 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_CGM_CAN2_MSG03	U1608	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_CGM_CAN2_MSG02	U1608	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_BCM_CAN2_MSG04	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 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_BCM_CAN2_MSG02	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 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_BCM_CAN2_MSG03	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 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_MSG_BODY_GEN_INFO_1	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 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_MSG_BODY_VEH_SPD_CTL_RESP	U1611	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_MSG_DRVR_INTD_AXL_TQ_MN	U1611	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_MSG_DRVR_INTD_AXL_TQ_MX	U1611	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_MSG_DRVR_INTD_TQ	U1611	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_ECM_CAN2_MSG01	U1611	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_ECM_CAN2_MSG02	U1611	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_ECM_CAN2_MSG03	U1611	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
ECM_CAN2_MSG02_ARC	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 == 0	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.
ECM_CAN2_MSG02_PRTCTN_VAL	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_GWCGM_92_MSG	U1611	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_ECM_CAN2_MSG04	U1611	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
CHS_SYS_TOTAL_AXLE_TRQ_REQ_STS_FAILED	C2A07	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 torque request status will be checked immediately.	Chassis System Total Axle Torque Request Status : Request Status = 2 OR 3 OR 4 OR 5 OR 6 Following are the ENUMs for Signal CSTATRS_ReqSts $0=No_Request $1=Request_Honored $2=Lost_Arbitration $3=Serial_Data_Failure_Temporary $4=Serial_Data_Failure_Permanent $5=Control_System_Failure_Temporary $6=Control_System_Failure_Permanent	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_ECM_CAN2_MSG12	U1611	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_EOCM_EOCM_HCP1_CAN2_MSG01	U1615	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_FCM_CAN2_MSG01	U0265	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_EXT_LGT_WSH_WPR_INFO	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 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_MSG_ENGSPD	U1611	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_EOCM_GNRLJNFO1	U1615	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
EOCM_GNRL_INFO1_SECURITY	U053B	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 Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
EOCM_GNRL_INFO1ARC	U053B	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. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_FRT_TIRE_PRS	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 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_GWCGM _25_MSG	U1611	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_GWCGM _36_MSG	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 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_GWCGM _90_MSG	U1611	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_LSCMB_AUTO_BRK	U0265	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
LSCMB_AUTO_BRK_SECURITY	U0566	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 Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
LSCMB_AUTO_BRKARC	U0566	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. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_OTS_AIR_TMP	U1611	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_MSG_PRPL_STAT	U1611	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_MSG_SYS_PWR_MD	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 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYS_PWR_MD_ARC	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 == 0	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.
MISSING_TEEN_DRVR_ACTV	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 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_MSG_TRNS_EST_GR	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
TRNS_EST_GR_SECURITY	U0402	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 Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.
TRNS_EST_GR_ARC	U0402	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. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.
MISSING_ECM_TCM_CAN2_MSG01	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_ECM_TCM_CAN2_MSG02	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_MSG_VEH_MTN_INFO_1	U1611	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
VEH_MTN_INFO_1_SECURITY	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 Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
VEH_MTN_INFO_1_ARC	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. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.
MISSING_VEH_ODO_DISP_VAL	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 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_MSG_WFL_DIST	U1611	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_NODE_STATUS_CAN1_MSG01	U1607	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_BCM_GNRLJNFO1	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 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_ECM_GNRLJNFO1	U1611	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
ECM_GNRL_INFO1_ARC	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. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.
ECM_GNRL_INFO1_SECURITY	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 Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.
MISSING_ECM_GNRLJNFO2	U1611	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
ECM_GNRL_INFO2_PBP_ARC	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 == 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.	fastest maturation is 8 consecutive count sequence errors. Sliding Window Fail Threshold is 8 of 16	Type B. MIL Illumination.
ECM_GNRL_INFO2_PBP_SECURITY	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.	• GM's SUM indicates failed safety and failed security.	• 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.	fastest maturation is 8 consecutive count sequence errors. Sliding Window Fail Threshold is 8 of 16	Type B. MIL Illumination.
MISSING_EOCM_EOCM_HCP1_FCM_MSG01	U1615	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_GWCGM_51_MSG	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 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_NODE_STATUS_CAN2_MSG02	U1608	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_BCM_CAN2_MSG07	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 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2500 ms	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_NODE_STATUS_CAN2_MSG01	U1607	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 is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2500 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
NODE_STS_IPC_LCFA_FAULT	U0447	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	Node Status TCCM3 Loss of Communication Fault Active	Node Status TCCM3 Loss of Communication Fault Active	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2500 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_ROLL_RATE_INFO_MSG	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 100 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	100 msec	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
ROLL_RATE_INFO_ARC	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. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 8 consecutive count sequence errors. Sliding Window Fail Threshold is 8 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
ROLL_RATE_INFO_CHECKSUM	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. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 8 consecutive count sequence errors. Sliding Window Fail Threshold is 8 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
ECU_ID_NOT_PROGRAMMED	P0602	This monitor checks if: • ECU ID not programmed at ECU/HCU assembly plant	• This fault will be latched, if there is no valid value for Security Data in NVRAM.	NVRAM_SECURE_CODE_BLK_ID == OxFF	• Power Switch is ON	1 count	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
VCFG_OPTIONS_NOT_PROG	P0602	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The CHASSINF VCFG component extends the former Function Enable logic. It now combines EOL programming with NVRAM and CALibrations, in order to activate/enable functions, features, and subsystems. This means that functionality is present in the code, that will be suppressed until activated by the new VCFG settings.	VCFG settings are not programmed/not available Vcfg_Options_Enable[VCFG_OPTIONS_ENABLE_BYTE_CAL] == (U8)VCFG_OPTIONS_CHECKS_SOME) OR (Vcfg_Options_Enable[VCFG_OPTIONS_ENABLE_BYTE_CAL] > (U8)VCFG_OPTIONS_CHECKS_NONE	• Power Switch is ON	1 count	Type A. MIL Illumination.
VAF_CALIBRATION JNVALID	P0602	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	VAF file not configured properly	None	• Power Switch is ON	1 count	Type A. MIL Illumination.
PB_ASIC_SYNC_ERROR	U3000	This monitor checks if: Faulty PB ASIC Faulty Main Micro	This is synchronization check to verify if the PB ASIC ADC measurements are aligned with the SPI read requests. The check itself is performed internally by PB ASIC and the result is written to SPI register. In case of synchronization error a corresponding flag within the SPI register shall be set.	In case of synchronization error a corresponding flag within the SPI register shall be set.	Always while system is awake	100 ms	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PB_MOTOR_SUPPLY_OPEN_CIRCUIT_LEFT	C0616	This monitor checks if: - ECU clamp 30 supply is open.	In case the measured voltage on EPB Supply Voltage (VSBRIDGE) during KL30_V_DRV is enabled and EPB state is Apply or Release, is lower than the defined threshold the fault is detected.	Motor Supply Voltage < 2v	- Left EPB actuation (apply or release) running.	500 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_MOTOR_SUPPLY_OPEN_CIRCUIT_RIGHT	C0616	This monitor checks if: - ECU clamp 30 supply is open.	In case the measured voltage on EPB Supply Voltage (VSBRIDGE) during KL30_V_DRV is enabled and EPB state is Apply or Release, is lower than the defined threshold the fault is detected.	Motor Supply Voltage < 2v	- Right EPB actuation (apply or release) running.	500 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_SWDRV_GIO_FAULT	U3000	This monitor checks if: - Faulty PB ASIC chip	If the Capella Asic delivers fault indication flags regarding short to battery, short to ground and overtemperature and at least one of the flags is activated for longer than the specified timeout the fault will be latched.	If the Capella Asic delivers fault indication flags regarding short to battery, short to ground and overtemperature and at least one of the flags is activated for longer than the specified timeout the fault will be latched.	Ignition on	500 ms	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PB_HBRIDGE_5V_LOSS	C0616	This monitor checks if: - Internal hardware issue	While the test pulse pattern are generatedthe average of the measured voltage feedbacksduring SC-BAT and motor OC detection are stored.Out of these two samples the absolute difference is calculated. The calculated voltage then is compared against a specified threshold. If the calculated voltage is below these treshold the fault will be qualified as failed.	Motor Supply Voltage < 2v	When the system is awake and in IDLE and no external fault is currently in detection or latched	50 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_HBRIDGE_SUPPLY_DEVIATION	C0616	This monitor checks if: - Internal hardware issue	The EPB motor compares the supply voltage of the right and left H-Bridge side. If the supply voltage is within the range of 8-20V and the deviation of the voltages is greater than 12% the fault is detected.	Motor Supply Voltage < 2v	- Ignition on - Supply voltage between 8 and 20 Volt	500 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_ASIC_ADC_COUNTERERROR	C0616	This monitor checks if: - Faulty PB ASIC chip	The driver provides in addition to each ADC measurement a specific counter value. A fault is detected if the comparison of two consecutive ADC counter values does not result in deviation of 1 count.	The driver provides in addition to each ADC measurement a specific counter value. A fault is detected if the comparison of two consecutive ADC counter values does not result in deviation of 1 count.	Ignition On	10ms	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PB_ASIC_VERIFICATIONERROR	C0616	This monitor checks if: PB ASIC power supply out of range Faulty PB ASIC Faulty Main Micro	This is the PB ASIC power supply voltage check. The check itself is performed internally by PB ASIC and the result is written to SPI register. In case of voltage monitor error a corresponding bit flag within the SPI register shall be set.	Motor Supply Voltage < 2v	Always while system is awake	100 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_ASIC_SWITCH_WAKEABILITY_ERROR	C0616	This monitor checks if: Faulty PB ASIC	Capella ASIC is set to sleep mode by controling the WAU pin to 0. After sleep mode is detected the WAU pin is set to 1 to wake up the ASIC. The fault sets when the bit 2 within the Capella 8Ah register is NOT 1. Capella ASIC wakeability is unable to be controlled. The fault will also set if the PB ASIC self-test reaches timeout at 100 counts before completion	WAU pin is set to 1 and Bit 2 within the Capella 8Ah register is NOT 1 OR PB ASIC self-test does not complete within 100 counts (250ms)	System preparing for shutdown.	2.5 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_ASIC_CURRENTSENSEERROR	C0616	This monitor checks if: PB ASIC power supply out of range Faulty PB ASIC	The software cyclic tests the current amplifier measurement path. If the measured signal is not in the range of 10.5 A to 17A the fault is detected.	The software cyclic tests the current amplifier measurement path. If the measured signal is not in the range of 10.5 A to 17Athe fault is detected.	Always while system is awake	2.5 ms	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PB_HBRIDGE_SUPPLY_STUCK_ON	C0616	This monitor checks if: Faulty HBRIDGE Faulty PB ASIC Internal hardware issue, faulty current measurement path	In case the measured voltage on EPB Supply Voltage during KL30_P_DRV is enabled is ABOVE the defined threshold, the fault is detected.	In case the measured voltage on EPB Supply Voltage during KL30_P_DRV is enabled is ABOVE the defined threshold, the fault is detected.	Ignition On Once per wakeup cycle	1000 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_HBRIDGE_SUPPLY_STUCK_OFF	C0616	This monitor checks if: Faulty HBRIDGE Faulty PB ASIC Internal hardware issue, faulty current measurement path	In case the measured voltage on EPB Supply Voltage during KL30_P_DRV is enabled is BELOW the defined threshold, the fault is detected.	In case the measured voltage on EPB Supply Voltage during KL30_P_DRV is enabled is BELOW the defined threshold, the fault is detected.	Ignition On Once per wakeup cycle	1000 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_WDG_TIMEOUT_VIOLATION	C0616	This monitor checks if: Faulty PB ASIC	The fault is set if any of the following conditions occure: Number of corrupted watchdog handshakes exceeds the limit Number of invalid watchdog handshakes exceeds the limit Watchdog overflow timeout Watchdog failure	The fault is set if any of the following conditions occure: Number of corrupted watchdog handshakes exceeds the limit Number of invalid watchdog handshakes exceeds the limit Watchdog overflow timeout Watchdog failure	System awake PB ASIC initialized PB ASIC internal watchdog enabled	Immediatley	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PBC_EDIH_RUN_IN_NOT_DONE	C0616	This monitor checks if: Assembly check has not been performed yet	1)Condition : EPB complete apply & release control never been done 2)When, the error occurs, A.EPB warning lamp is On B.No functional degradation to occur It will be recovered to “Passed” immediately if EPB release is completed at once without any failure.	Assembly Test Not Done	Vehicle Power Mode: OFF, ACCESSORY, RUN, CRANK Vehicle Operating Conditions: Dynamic or Static Exceptions: None.	See Detection Rules (fault is detected by Mobis PBC)	Type C, No MIL, "Emissions Neutral Diagnostic "
PBC_SEQUENCE_MONITOR	C0616	This monitor checks if: HOST S/W error, ECU H/W problem	The fault will be set if there is a missing execution of PBC code block for over 200ms	See Detection Rules (fault is detected by Mobis PBC)	Vehicle Power Mode: OFF, ACCESSORY, RUN Vehicle Operating Conditions: Dynamic or Static Exceptions: Non-operational status.	1 event	Type C, No MIL, "Emissions Neutral Diagnostic "
PBC_ROLLAWAY_DETECTED	C0616	This monitor checks if: Wheel pulses or wheel speeds indicate vehicle movement	3)If PbcInMotorDriverStateLetf/Right is APPLY or RELEASE or FREERUN for 10sec, the error will be detected.	See Detection Rules (fault is detected by Mobis PBC)	Vehicle Power Mode: OFF, ACCESSORY, RUN Vehicle Operating Conditions: Dynamic or Static Exceptions: Non-operational status.	Detection with wheel pulse: 6 seconds, Detection with wheel speed: 2 seconds	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PBC_SYS_ACTUATION_VOLT_LO	C0616	This monitor checks if: Battery voltage supply is out of range, battery is defective, defective wiring to the EPB, defective connector of EPB.	1)While the motor is running, monitor the EPB motor voltage (PbcInMotorVoltage) in 10ms period. 2)Condition : PbcInHostAvailabilityLeft/Right is not NONE. 3)Condition : PbcInMotorDriverState is APPLY or RELEASE or FREERUN. 4)Condition : Absolute value of PbcInMotorVoltageLeft/Right is under 7V. 5)Condition : PbcInMotorDriverSupplyVoltage is between 9V and 16V, inclusive. 6)If EPB motor power is under 7V for 700ms, the error will be detected. 7)When the error occurs, A.EPB warning lamp is on. B.EPB motor stops immediately. C.EPB actuation is inhibited.	EPB Motor Power Supply < 7V	Vehicle Power Mode: OFF, ACCESSORY, RUN EPB motor host availability for Left, Right-Left or Right is NOT NONE. EPB motor driver Left/ Right state is APPLY or RELEASE or FREERUN.	700 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PBC_SYS_ACTUATION_VOLT_HI	C0616	This monitor checks if: Battery voltage supply is out of range, battery is defective, defective wiring to the EPB, defective connector of EPB.	1)While the motor is running, monitor the EPB motor voltage (PbcInMotorVoltage) in 10ms period. 2)Condition : PbcInHostAvailabilityLeft/Right is not NONE. 3)Condition : PbcInMotorDriverStateLeft/Right is APPLY or RELEASE or FREERUN. 4)Condition : Absolute value of PbcInMotorVoltageLeft/Right is over 18V. 5)Condition : PbcInMotorDriverSupplyVoltage is between 9V and 16V, inclusive. 6)If EPB motor power is over 18V for 700ms, the error will be detected. 7)When the error occurs, A.EPB warning lamp is on. B.EPB motor stops immediately. C.EPB actuation is inhibited.	EPB Motor Power Supply > 18V	Vehicle Power Mode: OFF, ACCESSORY, RUN EPB motor host availability for Left, Right-Left or Right is NOT NONE. EPB motor driver Left/ Right state is APPLY or RELEASE or FREERUN.	700 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PBC_BRAKE_POSITIONJJNKNOWN	C0616	This monitor checks if: Unexpected Powerdown, Invalid EE-brakestate data, Actuation interrupted and not resumed in time or aborted	1)The fault will be set if: A.PbcInDataStorageValidl or 2 is invalid. B.Either actuator status is UNKNOWN.	See Detection Rules (fault is detected by Mando PBC)	Vehicle Power Mode: OFF, ACCESSORY, RUN Vehicle Operating Conditions: Dynamic, static state Exceptions: Disabled by calibration, Assembly check is not done	See Detection Rules (fault is detected by Mobis PBC)	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PB_HIGH_SIDE_ENABLE_MISMATCH_FAULT	C0616	This monitor checks if: Faulty PB ASIC	A verification test is triggered when there is a request to Enable/Disable the High side enable line. In next cycle, the current High side enable line status is compared with previously requested status. If the requested and current doesn't match for predefined filter time, then this fault is reported.	A verification test is triggered when there is a request to Enable/Disable the High side enable line. In next cycle, the current High side enable line status is compared with previously requested status. If the requested and current doesn't match for predefined filter time, then this fault is reported.	Always while system is awake	100 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_ASIC_CAPELLASPIERROR	U3000	This monitor checks if: PB ASIC detects: wrong number of received clock cycles for one frame, or CRC errror, or writing reading to non existintant address	This is the PB ASIC SPI transfer check. The check itself is performed internally by PB ASIC and the result is written to SPI register. In case of SPI error(SPICLK, CRC or ADR) a corresponding bit flag within the SPI register 0x03 is set.	This is the PB ASIC SPI transfer check. The check itself is performed internally by PB ASIC and the result is written to SPI register. In case of SPI error(SPICLK, CRC or ADR) a corresponding bit flag within the SPI register 0x03 is set.	Always while system is awake	40 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_APPLY_ENABLE_MISMATCH	C0616	This monitor checks if: -short circuit to GND/BATTERY -open circuit	The enable line self test failed or the enable line does not match the desired state out of the HSB.	The enable line self test failed or the enable line does not match the desired state out of the HSB.	Ignition on	10 ms	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PB_APPLY_ENABLE_NO_CONTROL	C0616	This monitor checks if: - internal hardware issue	The hardware apply line lock mechanism is networking as designed	The hardware apply line lock mechanism is not working as designed	Ignition on	10 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_RELEASE_ENABLE_MISMATCH	C0616	This monitor checks if: -short circuit to GND/BATTERY -open circuit	The enable line self test failed or the enable line does not match the desired state out of the HSB.	The enable line self test failed or the enable line does not match the desired state out of the HSB.	Ignition on	10 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_RELEASE_ENABLE_NO_CONTROL	C0616	This monitor checks if: - internal hardware issue	The hardware release line lock mechanism is not working as designed	The hardware release line lock mechanism is not working as designed	Ignition on	10 ms	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_ASIC_STARTUPERROR	C0616	This monitor checks if: PB ASIC power supply out of range Faulty PB ASIC Faulty Main Micro	The fault is detected if: - PB ASIC internal Start-up test fails - PB ASIC internal Start-up test takes too long (>2.5ms) - initial PB ASIC configuration fails due to SPI error	The fault is detected if: - PB ASIC internal Start-up test fails - PB ASIC internal Start-up test takes too long (>2.5ms) initial PB ASIC configuration fails due to SPI error	Always while system is awake	Immediately	Type C, No MIL, "Emissions Neutral Diagnostic "
EPB_ASSIST_CURRENT_FEEDBACK_EXCEEDED	C0616	This monitor checks if: Excessive clamp force request. Ex.	Feedback current > 13.5 amps for 300 msec or Feedback current > 16.6 amps for 20 msec while the motor is being requested to apply clamp force	Feedback current > 13.5 amps for 300 msec or Feedback current > 16.6 amps for 20 msec	Runs continuusly during EPB Assist	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
EPB_ASSIST_CURRENT_FEEDBACK_IMPLAUSIBLE	C0616	This monitor checks if: Request for clamp force with no feedback	If during EPB assist active control the current feedback doesn't eceeded min current for x number of requests for activation	Feedback Current < Min Current for > 150 msec. The results in 1 count	Runs continuusly during EPB Assist	>= 4 counts	Type C, No MIL, "Emissions Neutral Diagnostic "
TASK_OVERRUN_COREO	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.
MPU_FAULT_TRW_SCSCOREO	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_SCSCORE1	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MPU_FAULT_TRW_SCSCORE2	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_COREO	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.
TEMP_SENSOR_DIODE_FAULT	P25C6	This monitor checks if: • Temperature not within acceptable range • PCB defect • ADC problem • micro problem	• The temp sensor diode feedback is monitored to check if the temperature is within the allowable range of -40 deg Celsius to 150 deg Celsius	Measured diode feedback voltage equals: Less than 0.7 volts OR Greater than 1.5 volts	• Power switch is on and Input validation for Diode temp sensor is true	60 msec	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
DIE_TEMPERATURE_CORRELATION_FAULT	P25C6	This monitor checks if: • Defective DIE temperature sensor • Defective PCB sensor (diode) • ADC fault	The main micro controller temperature feedback is compared with the dual series switching diodes. Fault is detected, if the difference between the temperatures exceeds 36.901°C.	The main micro controller temperature feedback is compared with the dual series switching diodes. Fault is detected, if the difference between the temperatures exceeds 36.901°C.	• DIE sensor measured temperature is in range	5000 msec	Type B. MIL Illumination.
MISSING_FLY_BACK_DIODE_FAULT	U3000	This monitor checks if: • Fly Back Diode is Missing	• This fault only runs if SW is compiled with DEVEL on	SW detects that a fly back diode is missing	• Power Switch is ON	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
CGM Control Module Memory Failure	B2B12	This DTC monitors for a CGM Control Module Memory Failure error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the CGM Control Module Memory Failure DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
CGM Control Module Internal Performance Failure	B2B13	This DTC monitors for a CGM Control Module Internal Performance Failure error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the CGM Control Module Internal Performance Failure DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 1 SensorA	P0016	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor A occurs during the incorrect crank position	4 cam sensor pulses less than or greater than nominal position in one cam revolution.	-10.0 Crank Degrees 10.0 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning No Active DTCs: Time since last execution of diagnostic	 Crank8ensor_FA P0340, P0341 < 1.0 seconds	2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. One sample per cam rotation	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Outside Air Temperature (OAT) Sensor Circuit Performance (OAT wired to ECM)	P0071	Detects an Outside Air Temperature (OAT) sensorthat is stuck in range. There are two components to the test: an engine off component, and an engine running component. If the engine has been off for a long enough period of time, and the coolant temperature and Intake Air Temperature (IAT) values are similar, then the air temperature values in the engine compartment of the vehicle are considered to have equalized. In this case, the engine off component of the diagnostic can be enabled. If the IAT and the OAT values are similar, then the OAT Performance Diagnostic passes. If the IAT and OAT values are not similar, the diagnostic will continue to monitor the IAT and the OAT as the vehicle starts to move. For applications that have ability to move without engaging the internal combustion	<u>**Engine Off:**</u>		Diagnostic is Enabled		Executed every 100 msec until a pass or fail decision is made	Type B, 2 Trips
			If IAT >= OAT: IAT - OAT	> 20.0 deg C	Time between current ignition cycle and the last time the engine was running	>= 28,800.0 seconds		
			If IAT < OAT: OAT - IAT	> 20.0 deg C	Engine is not running			
			If either of the following conditions are met, this diagnostic will pass:		Vehicle Speed	>= 12.4 MPH		
					Coolant Temperature - IAT	< 15.0 deg C		
			If IAT >= OAT: IAT - OAT	<= 20.0 deg C	IAT - Coolant Temperature	< 15.0 deg C		
			If IAT < OAT: OAT - IAT	<= 20.0 deg C	OAT-to-IAT engine off equilibrium counter	>= 300.0 counts		
					The "OAT-to-IAT engine off equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is off. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. The value that is added or subtracted to the counter every 100 msec is contained in table **P0071: OAT Performance Drive Equilibrium Engine Off**			
					No Active DTCs:	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		engine, the engine off test will continue. If the vehicle has been moving quickly enough for a long enough period of time, the IAT and OAT values should have reached an equilibrium. This period of time is defined by the "OAT-to-IAT engine off equilibrium counter". The "OAT-to-IAT engine off equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is off. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. While the "OAT-to-IAT engine off equilibrium counter" is counting, IAT and OAT are monitored for similarity. If they are similar, the OAT Performance Diagnostic passes. If the counter reaches an equilibrium and the IAT and OAT values are not similar, the OAT Performance Diagnostic will fail.				EngineModeNotRunTimer Error		
			Engine Running: If IAT >= OAT: IAT - OAT If IAT < OAT: OAT - IAT If either of the following conditions are met, this diagnostic will pass: If IAT >= OAT: IAT - OAT If IAT < OAT: OAT - IAT	> 20.0 deg C > 20.0 deg C <= 20.0 deg C <= 20.0 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Engine is running Vehicle Speed Engine airflow OAT-to-IAT engine running equilibrium counter The "OAT-to-IAT engine running equilibrium counter" is a counter that is incremented or decremented based on vehicle speed and engine air flow when the engine is running. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. The value that is added or subtracted to the counter every 100 msec is contained in table **P0071: OAT Performance Drive Equilibrium Engine Running** No Active DTCs:	Enabled >= 28,800.0 seconds >= 12.4 MPH >= 10.0 grams/second >= 300.0 counts VehicleSpeedSensor_FA	Executed every 100 msec until a pass or fail decision is made	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		If the engine off component of the diagnostic was enabled, but did not make a pass or fail decision, the engine running component will begin executing when the internal combustion engine starts to run. If the vehicle has been moving quickly enough for a long enough period of time, the IAT and OAT values should have reached an equilibrium. This period of time is defined by the "OAT-to-IAT engine running equilibrium counter". The "OAT-to-IAT engine running equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is running. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. While the "OAT-to-IAT engine running equilibrium counter" is counting, IAT and OAT are monitored for				IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngineModeNotRunTimer Error		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		similarity. If they are similar, the OAT Performance Diagnostic passes. If the counter reaches an equilibrium and the IAT and OAT values are not similar, the OAT Performance Diagnostic will fail.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Outside Air Temperature (OAT) Sensor Circuit Low	P0072	Detects a continuous short to ground in the Outside Air Temperature (OAT) signal circuit by monitoring the OAT sensor output resistance and failing the diagnostic when the OAT resistance is too low. The OAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A lower resistance is equivalent to a higher temperature.	Raw OAT Input	<= 46 Ohms (-150 deg C)	Diagnostic is Enabled		40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Outside Air Temperature (OAT) Sensor Circuit High	P0073	Detects a continuous open circuit in the Outside Air Temperature (OAT) signal circuit by monitoring the OAT sensor output resistance and failing the diagnostic when the OAT resistance is too high. The OAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A higher resistance is equivalent to a lower temperature.	Raw OAT Input	>= 427,757 Ohms (~-60 deg C)	Diagnostic is Enabled		40 failures out of 50 samples 1 sample every 100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Outside Air Temperature (OAT) Sensor Intermittent In-Range	P0074	Detects a noisy or erratic signal in the Outside Air Temperature (OAT) circuit by monitoring the OAT sensor and failing the diagnostic when the OAT signal has a noisier output than is expected. When the value of the OAT signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of OAT readings. The result of this summation is called a “string length”. Since the OAT signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic OAT signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current OAT reading - OAT reading from 100 milliseconds previous)	> 100 deg C 10 consecutive OAT readings	Diagnostic is Enabled		4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Rail Pressure (FRP) Too Low	P0087	Determines if rail pressure is below an absolute value.	Rail pressure	<0to15MPa (see table **P0087 Minimum rail pressure)**	Powertrain relay voltage	>= 11.0V	121 failures out of 242 samples 6.25 ms/sample	Type A, 1 Trips
					Engine running, cranking excluded, for a time	>= 30.00 s		
					No IFT running (refer to FULJFT.St)			
					Engine shut off request	== False		
					LowFuelConditionDiagnostic	== False		
					Fuel pressure estimated at high pressure pump inlet validity	== True		
					Fuel pressure estimated at high pressure pump inlet	>= 360.00 kPa		
					FuelPumpRlyCktFA	== False		
					FHP_MU_ZeroDeliveryFlt	== False		
					FHP_PR_FullDischargeFlt	== False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator 1 Performance	P0089	Determines when rail pressure is above maximum threshold when pressure is governed by Fuel Metering Unit valve.	Rail pressure	> 68 to 238 MPa (see table **P0089 Maximum rail pressure with MU)** OR 68.00 to 238.00 MPa (see table **P0089 Extended Maximum rail pressure with MU** If extended area is enabled)	Powertrain relay voltage Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl)*	>= 11.0V == True	121 failures out of 242 samples OR 121 continuous failures 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid 1 Control Circuit	P0090	This DTC detects an Open Circuit on the Fuel Metering Unit valve	Current low across High and Low Side drivers during ON state indicates an open circuit.	Impedence between High Side and Low Side pins of the Fuel Metering Unit valve > 200 kQ	Powertrain relay voltage Engine cranking Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	> 11.00V == FALSE == TRUE == FALSE	61 failures out of 122 samples 100 ms/sample if actuator is a Digital Inlet Valve, or 6.25 ms/sample if actuator is a Suction Control Valve	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid 1 Control Circuit Low Voltage	P0091	This DTC detects a short circuit to ground of the Low Side driver circuit of the Fuel Metering Unit valve	Voltage low across Low Side driver during OFF state indicates short-to-ground.	Impedence between Low Side pin of the Fuel Metering Unit valve and the controller ground < 0.5 Q.	Powertrain relay voltage Engine cranking Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	> 11.00V == FALSE == TRUE == FALSE	61 failures out of 122 samples 100 ms/sample if actuator is a Digital Inlet Valve, or 6.25 ms/sample if actuator is a Suction Control Valve	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid 1 Control Circuit High Voltage	P0092	This DTC detects a short circuit to power of the Low Side driver circuit of the Fuel Metering Unit valve	Voltage high across Low Side driver during ON state indicates short to power.	Impedence between Low Side pin of the Fuel Metering Unit valve and the controller power < 0.5 Q.	Powertrain relay voltage Engine cranking Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	> 11.00V == FALSE == TRUE == FALSE	61 failures out of 122 samples 100 ms/sample if actuator is a Digital Inlet Valve, or 6.25 ms/sample if actuator is a Suction Control Valve	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor 2 Circuit Performance (applications with IAT, IAT2 and IAT3)	P0096	Detects an Intake Air Temperature 2 (IAT2) sensor value that is stuck in range by comparing the IAT2 sensor value against the IAT and IAT3 sensor values and failing the diagnostic if the IAT2 value is more different than the IAT and IAT3 values than is expected. If the engine has been off for a long enough period of time, the air temperature values in the engine compartment of the vehicle are considered to have equalized, and the diagnostic can be enabled. The diagnostic will fail if the IAT and IAT3 values are similar, and the IAT2 value is not similar to the IAT and IAT3 values. The diagnostic will also fail if none of the three sensor values are similar to each other, and the IAT2 value is furthest from the sensor value that is in the middle of the three sensor values. This diagnostic is executed once per	**<u>Good Correlation Between IAT and IAT3</u>** ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	 > 25 deg C <= 25 deg C > 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	 > 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips
			<u>Not Good Correlation, IAT in Middle</u> Power Up IAT is between Power Up IAT2 and Power Up IAT3 AND ABS(Power Up IAT2 - Power Up IAT3) AND ABS(Power Up IAT - Power Up IAT2) > ABS(Power Up IAT - Power Up IAT3)	 > 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	 > 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		ignition cycle if the enable conditions are met.	**Not Good Correlation, IAT3 in Middle** Power Up IAT3 is between Power Up IAT and Power Up IAT2 AND ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT3 - Power Up IAT2) > ABS(Power Up IAT3 - Power Up IAT)	> 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit 2 Low (applications with LIN MAF)	P0097	Detects an erroneously low value being reported over the LIN serial connection from the Intake Air Temperature 2 (IAT2) sensor. The diagnostic monitors the IAT2 sensor output temperature and fails the diagnostic when the IAT2 temperature is too low. The IAT2 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	IAT 2 Temperature	< -60 degrees C	Diagnostic is Enabled Powertrain Relay Voltage for a time LIN Communications established with MAF No Active DTCs:	 >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit 2 High (applications with LIN MAF)	P0098	Detects an erroneously high value being reported over the LIN serial connection from the Intake Air Temperature 2 (IAT2) sensor. The diagnostic monitors the IAT2 sensor output temperature and fails the diagnostic when the IAT2 temperature is too high. The IAT2 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	IAT 2 Temperature	> 150 degrees C	Dianostic is Enabled Powertrain Relay Voltage for a time LIN Communications established with MAF No Active DTCs:	 >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor 2 Intermittent In-Range	P0099	Detects a noisy or erratic signal in the Intake Air Temperature 2 (IAT2) circuit by monitoring the IAT2 sensor and failing the diagnostic when the IAT2 signal has a noisier output than is expected. When the value of the IAT2 signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of IAT2 readings. The result of this summation is called a “string length”. Since the IAT2 signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT2 signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT2 reading - IAT 2 reading from 100 milliseconds previous)	> 80.00 deg C 10 consecutive IAT 2 readings	Diagnostic is Enabled Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Multiple Pressure Sensor Correlation Performance (3 intake air pressure sensor configuration)	P00C7	This monitor is used to identify if BARO, MAP and TCIAP pressure values are irrational when compared to each other. The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running). If the three sensors are not in agreement the monitor is not able to pinpoint the sensor(s) that is/are not working correctly and therefore indicates that there is a fault that impacts the three sensors.	Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor	> **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crankrelay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	==1.00 > 11.00 [V] < 950.00 [rpm] < 40.00 [mm^3] > 90.00 [%] > 70.00 [°C] Crank8ensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE ECT_Sensor_FA	640.00 fail counters over 800.00 sample counters sampling time is 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						==FALSE MAF_MAF_SnsrFA ==FALSE		
			Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and BARO sensor OR Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and BARO sensor OR Difference (absolute value) in measured pressure between MAP sensor and BARO sensor	> 10.0 [kPa] <= 10.0 [kPa] <= 10.0 [kPa] <= 10.0 [kPa] > 10.0 [kPa] <= 10.0 [kPa] <= 10.0 [kPa]	Time between current ignition cycle and the last time the engine was running Engine is not rotating Manifold Pressure Manifold Pressure Baro Pressure Baro Pressure TCIAP Pressure TCIAP Pressure No Active DTCs: No Pending DTCs:	> 5.0 [s] >= 50.0 [kPa] <= 115.0 [kPa] >= 50.0 [kPa] <= 115.0 [kPa] >= 50.0 [kPa] <= 115.0 [kPa] EngineModeNotRunTimer Error MAP_SensorFA AAP_SnsrFA AAP2_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP	384 fail counters over 480 sample counters sampling time is 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor	<= 10.0 [kPa]				
			AND Difference (absolute value) in measured pressure between TCIAP sensor and BARO sensor	> 10.0 [kPa]				
			OR					
			Difference (absolute value) in measured pressure between MAP sensor and BARO sensor	> 10.0 [kPa]				
			AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor	> 10.0 [kPa]				
			AND Difference (absolute value) in measured pressure between TCIAP sensor and BARO sensor	> 10.0 [kPa]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid Supply Voltage Control Circuit Low	P00C9	This DTC detects a short circuit to ground of the high side driver circuit of the Fuel Metering Unit valve	Voltage high across High Side driver of the Fuel Metering Unit valve during ON state indicates short toground	Impedence between High Side pin of the Fuel Metering Unit valve and the controller ground < 0.5 Q	Powertrain relay voltage Engine cranking Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	> 11.00V == FALSE == TRUE == FALSE	61.00 failures out of 122.00 samples 100 ms/sample if actuator is a Digital Inlet Valve, or 6.25 ms/sample if actuator is a Suction Control Valve	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid Supply Voltage Control Circuit High	POOCA	This DTC detects a short circuit to high voltage of high side driver circuit of the Fuel Metering Unit valve	Voltage low across High Side driver of the Fuel Metering Unit valve during OFF state indicates short to power	Impedence between High Side pin of the Fuel Metering Unit valve and the controller power < 0.5 Q	Powertrain relay voltage Engine cranking Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	> 11.00V == FALSE == TRUE == FALSE	61.00 failures out of 122.00 samples 100 ms/sample if actuator is a Digital Inlet Valve, or 6.25 ms/sample if actuator is a Suction Control Valve	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor 3 Circuit Performance	P00E9	Detects an Intake Air Temperature 3 (IAT3) sensor value that is stuck in range by comparing the IAT3 sensor value against the IAT and IAT2 sensor values and failing the diagnostic if the IAT3 value is more different than the IAT and IAT2 values than is expected. If the engine has been off for a long enough period of time, the air temperature values in the engine compartment of the vehicle are considered to have equalized, and the diagnostic can be enabled. The diagnostic will fail if the IAT and IAT2 values are similar, and the IAT3 value is not similar to the IAT and IAT2 values. The diagnostic will also fail if none of the three sensor values are similar to each other, and the IAT3 value is furthest from the sensor value that is in the middle of the three sensor values. This diagnostic is executed once per ignition cycle if the	**<u>Good Correlation Between IAT and IAT2</u>** ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	<= 25 deg C > 25 deg C > 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time (Engine Coolant Temp - Outside Ambient Temp) No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds <= 25.0 Deg C PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips
			<u>Not Good Correlation, IAT in Middle</u> Power Up IAT is between Power Up IAT2 and Power Up IAT3 AND ABS(Power Up IAT2 - Power Up IAT3) AND ABS(Power Up IAT - Power Up IAT3) > ABS(Power Up IAT - Power Up IAT2)	> 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		enable conditions are met.			LIN communications established with MAF			
			Not Good Correlation, IAT2 in Middle Power Up IAT2 is between Power Up IAT and Power Up IAT3 AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3) > ABS(Power Up IAT2 - Power Up IAT)	> 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit 3 Low	POOEA	Detects a continuous short to ground in the Intake Air Temperature 3 (IAT3) signal circuit by monitoring the IAT3 sensor output resistance and failing the diagnostic when the IAT3 resistance is too low. The IAT3 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A lower resistance is equivalent to a higher temperature.	Raw IAT 3 Input	< 57.94 Ohms (-150 deg C)	Diagnostic is Enabled		40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit 3 High	POOEB	Detects a continuous open circuit in the Intake Air Temperature 3 (IAT3) signal circuit by monitoring the IAT3 sensor output resistance and failing the diagnostic when the IAT3 resistance is too high. The IAT3 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A higher resistance is equivalent to a lower temperature.	Raw IAT 3 Input	> 153,665 Ohms (~-60 deg C)	Diagnostic is Enabled		40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor 3 Intermittent In-Range	POOEC	Detects a noisy or erratic signal in the Intake Air Temperature 3 (IAT3) circuit by monitoring the IAT3 sensor and failing the diagnostic when the IAT3 signal has a noisier output than is expected. When the value of the IAT3 signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of IAT3 readings. The result of this summation is called a "string length". Since the IAT3 signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT3 signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Dir calculated over And where: "Dir =ABS(current IAT3 reading - IAT 3 reading from 100 milliseconds previous)	> 80.00 deg C 10 consecutive IAT 3 readings	Diagnostic is Enabled		4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Humidity Sensor Circuit Low (applications with LIN MAF)	P00F4	Detects an eroneously low value being reported over the LIN serial connection from the humidity sensor. The diagnostic monitors the humidity sensor relative humidity output and fails the diagnostic when the humidity percentage is too low. The humidity sensor converts the capacitance across the sensor to a relative humidity. The relative humidity percentage value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	Relative Humidity	<= -6.25 %	Diagnostic is Enabled Powertrain Relay Voltage for a time LIN Communications established with MAF No Active DTCs:	 >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Humidity Sensor Circuit High (applications with LIN MAF)	P00F5	Detects an eroneously high value being reported over the LIN serial connection from the humidity sensor. The diagnostic monitors the humidity sensor relative humidity output and fails the diagnostic when the humidity percentage is too high. The humidity sensor converts the capacitance across the sensor to a relative humidity. The relative humidity percentage value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	Relative Humidity	>= 106.25 %	Diagnostic is Enabled Powertrain Relay Voltage for a time LIN Communications established with MAF No Active DTCs:	 >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Humidity Sensor Circuit Intermittent	P00F6	Detects a noisy or erratic signal in the humidity circuit by monitoring the humidity sensor and failing the diagnostic when the humidity signal has a noisier output than is expected. When the value of relative humidity in % is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of humidity readings. The result of this summation is called a “string length”. Since the humidity signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic humidity signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current Humidity reading - Humidity reading from 100 milliseconds previous)	> 80 % 10 consecutive Humidity readings	Diagnostic is Enabled Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Body Control Module (BCM) Requested MIL Illumination	POOFF	Monitors the BCM MIL request message to determine when the BCM has detected a MIL illuminating fault.	Body Control Module Emissions-Related DTC set and module is requesting MIL	Body Control Module Emissions-Related DTC set and module is requesting MIL		Time since power-up > 3 seconds	Continuous	Type X, No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Manifold Absolute Pressure (MAP) Sensor Performance (3 intake air pressure sensor configuration)	P0106	This monitor is used to identify MAP sensor internal faults (measurement with an offset o r a drift). The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running). If MAP sensor is not in agreement with the other two the monitor is able to pinpoint MAP as the faulty sensor.	Difference (absolute value) in measured pressure between MAP sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor	> **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] <= **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crankrelay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	==1.00 > 11.00 [V] < 950.00 [rpm] < 40.00 [mm^3] > 90.00 [%] > 70.00 [°C] Crank8ensor_FA ==FALSE FUL_GenericlnjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE ECT_Sensor_FA	320.00 fail counters over 400.00 sample counters sampling time is 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						==FALSE MAF_MAF_SnsrFA ==FALSE		
			MAP sensor OR MAP sensor OR Difference (absolute value) in measured pressure between MAP sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor	< 50.0 [kPa] > 115.0 [kPa] > 10.0 [kPa] > 10.0 [kPa] <= 10.0 [kPa]	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 5.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	384 fail counters over 480 sample counters sampling time is 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Manifold Absolute Pressure Sensor Circuit Low (with pull-up)	P0107	Detects a continuous short to ground in the Manifold Absolute Pressure (MAP) signal circuit by monitoring the MAP sensor output voltage and failing the diagnostic when the MAP voltage is too low. The MAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	MAP Voltage	< 3.3% of 5 Volt Range (This is equal to 7.5 kPa)	Diagnostic is Enabled		320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Manifold Absolute Pressure Sensor Circuit High (with pull-up)	P0108	Detects a continuous short to power or open circuit in the Manifold Absolute Pressure (MAP) signal circuit by monitoring the MAP sensor output voltage and failing the diagnostic when the MAP voltage is too high. The MAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	MAP Voltage	> 90.0% of 5 Volt Range (This is equal to 390.0 kPa)	Diagnostic is Enabled		320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit Performance (applications with IAT, IAT2 and IAT3)	P0111	Detects an Intake Air Temperature (IAT) sensor value that is stuck in range by comparing the IAT sensor value against the IAT2 and IAT3 sensor values and failing the diagnostic if the IAT value is more different than the IAT2 and IAT3 values than is expected. If the engine has been off for a long enough period of time, the air temperature values in the engine compartment of the vehicle are considered to have equalized, and the diagnostic can be enabled. The diagnostic will fail if the IAT2 and IAT3 values are similar, and the IAT value is not similar to the IAT2 and IAT3 values. The diagnostic will also fail if none of the three sensor values are similar to each other, and the IAT value is furthest from the sensor value that is in the middle of the three sensor values. This diagnostic is executed once per	**<u>Good Correlation Between IAT2 and IAT3</u>** ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	> 25 deg C > 25 deg C <= 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips
			<u>Not Good Correlation, IAT2 in Middle</u> Power Up IAT2 is between Power Up IAT and Power Up IAT3 AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT) > ABS(Power Up IAT2 - Power Up IAT3)	> 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		ignition cycle if the enable conditions are met.	**<u>Not Good Correlation, IAT3 in Middle</u>** Power Up IAT3 is between Power Up IAT and Power Up IAT2 AND ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT3 - Power Up IAT) > ABS(Power Up IAT3 - Power Up IAT2)	> 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >=11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit Low (applications with LIN MAF)	P0112	Detects an erroneously low value being reported over the LIN serial connection from the Intake Air Temperature (IAT) sensor. The diagnostic monitors the IAT sensor output temperature and fails the diagnostic when the IAT temperature is too low. The IAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	IAT Temperature	< -60 degrees C	Diagnostic is Enabled LIN Communications established with MAF		40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit High (applications with LIN MAF)	P0113	Detects an erroneously high value being reported over the LIN serial connection from the Intake Air Temperature (IAT) sensor. The diagnostic monitors the IAT sensor output temperature and fails the diagnostic when the IAT temperature is too high. The IAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	IAT Temperature	> 150 degrees C	Diagnostic is Enabled LIN Communications established with MAF		40 failures out of 50 samples 1 sample every 100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Intermittent In-Range	P0114	Detects a noisy or erratic signal in the Intake Air Temperature (IAT) circuit by monitoring the IAT sensor and failing the diagnostic when the IAT signal has a noisier output than is expected. When the value of the IAT signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of IAT readings. The result of this summation is called a “string length”. Since the IAT signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT reading - IAT reading from 100 milliseconds previous)	> 80.00 deg C 10 consecutive IAT readings	Diagnostic is Enabled LIN communications established with MAF		4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature Sensor Performance (Non-ATM)	P0116	This DTC detects either a biased high or low ECT (Engine Coolant temperature) sensor. This is done by comparing the ECT sensor output to two other temperature sensor outputs after a soak condition.	This sensor is compared to two other sensors for this diagnostic to function. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsrI Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsrI The comparison sensors, temperature thresholds, and aux heater effects can be looked up by finding the location associated with the physical (Temperature) sensor number. **Engine Outlet:** CeEECR_e_PhysSnsr1 Comparison sensor 1: CeEECR_e_BiasChkIntakeAirSnsr Comparison sensor 2: CeEECR_e_BiasChkOutsideAirSnsr Block Heater: CeEECR_e_AuxHeaterBiasHigh Threshold A:	50.0°C 15.8°C	Diagnostic is Enabled No Active DTC's Propulsion system Inactive timer error Sensor under diagnosis is not faulted Used comparison sensors are not currently faulted: - BiasChkCylHdCIntSnsr - BiasChkBlockClntSnsr - BiasChkEngInCIntSnsr - BiasChkEngOutCIntSnsr - BiasChkHtrCrInCIntSnsr - BiasChkHtrCrOutCInSnsr - BiasChkRadOutCIntSnsr - BiasChkBypInCIntSnsr - BiasChkEngMetalSnsr - BiasChkIntakeAirSnsr - BiasChkHumTmpSnsr - BiasChkManfldAirSnsr - BiasChkOutsideAirSnsr - BiasChkEngOilSnsr - BiasChk_EGR_UpStrmSn	OAT_PtEstFiltFA PSAR_PropSysInactveCrs_FA = FALSE EECR_EngineOutlet_CktFA EECR_CylHeadCoolant_CktFA EECR_BlockCoolant_CktFA EECR_EngineInlet_CktFA EECR_EngineOutlet_CktFA EECR_HeaterCoreInlet_CktFA EECR_HeaterCoreOutlet_CktFA EECR_RadiatorOutlet_CktFA EECR_BypassInlet_CktFA EECR_CylHeadMetal1_CktFA IAT_SensorFA HumTempSnsrFA MnfdTempSensorFA OAT_AmbientSensorFA EngOilTempFA	1 failure to set DTC 1 sec/ sample Once per valid cold start	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Threshold B: **Head Metal:** CeEECR_e_NoPhysAssgnmnt Comparison sensor 1: CeEECR_e_BiasChkNoSelection Comparison sensor 2: CeEECR_e_BiasChkNoSelection Block Heater: CeEECR_e_AuxHeaterBiasBoth Threshold A: Threshold B: A failure will be reported if any of the following conditions are met. Evaluated in order: 1) This sensor is above both comparison sensors 2) This sensor is below both comparison sensors 3) This sensor is above both comparison sensors and an aux heat source has not been detected to cause this skew 4) This sensor is below both comparison sensors and an aux heat	 40.0 °C 15.0 °C >A °C >A °C >B °C >B °C	sr - BiasChk_EGR_DwnStmSnsr - BiasChk_EGR_LowPrsSnsr - BiasChkFuelSnsr - BiasChk_EGRCoolerOutlet Comparison sensors ================= The following thresholds are based on the sensor under diagnosis **Engine Outlet:** Propulsion Off Soak Time Ambient Air Temperature **Head Metal:** Propulsion Off Soak Time Ambient Air Temperature ================= Comparison sensor 1 & 2 are not ================= Aux Heat Detection Aux heat detection can only be enabled the followina are met:	EGRTempSensorIIPSS_FA EGRTempSensorDNSS_FA LPE_TempSnsrFA HRTR_b_FuelSensor_FA_Bndl EECR_EGRCoolerOutletCoolant_FA = Availible >28,800 seconds >-20.0 °C >28,800 seconds >-20.0 °C = CeEECR_e_BiasChkNoSelection		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			source has not been detected to cause this skew		No Active DTCs At power-up a warm sensor and cool sensor are compared Warm sensor Cool sensor If the warm sensor is compared to the cool sensor Propulsion Off Soak Time Engine Off Soak Time Ambient Air Temperature There are 4 different types of aux heater detection for this application: 2x2 signature Absolute Drop IAT Drop Temperature Derivative **2x2 Signature Criteria:** The warm sensors Sensor 1: Sensor 2:	Same set as listed above and EngineModeNotRunTimer Error EngineModeNotRunTimer _FA VehicleSpeedSensor_FA CeAEHR_e_BlkHtrEngO utCIntSnsr CeAEHR_e_BlkHtrOutsid eAirSnsr >15.75 °C >21,600 seconds >21,600 seconds >-20.00 °C Disabled Enabled Disabled Disabled CeAEHR_e_BlkHtrEngO utCIntSnsr		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					The cool sensors Sensor 1: Sensor 2: A block heater will be detected if the warm sensors are within AND The cool sensors are within AND The delta between the two groups (warm/cold) **Absolute Drop Criteria:** The is monitored for a drop. The drop will be monitored for once coolant flow is AND Flow time is between AND either Engine runtime is OR Insufficent coolant flow is present for A block heater is detected if a drop is **IAT Drop Criteria:** The sensor will be used as IAT for this method	CeAEHR_e_BlkHtrEngOutClntSnsr CeAEHR_e_BlkHtrOutsideAirSnsr CeAEHR_e_BlkHtrIntakeAirSnsr 5.0 °C 5.0 °C >10.0 °C CeAEHR_e_BlkHtrEngOutClntSnsr >1.00 L/min 0.1 -17.0 seconds < 77.0 seconds >300.0 seconds >1.8 °C CeAEHR_e_BlkHtrIntakeAirSnsr		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					A block heater will be detected if:			
					IAT has a drop of during a drive defined by:	>5.0 °C		
					Drive time	>400.0 seconds		
					Vehicle speed	>24.0kph		
					Addtional drive time is provided when vehicle speed drops below above threshold as follows	0.5 times the seconds with vehicle speed below the threshold above		
					This detection method will abort if the engine is off	> 180.0 seconds		
					OR Engine runtime	> 1,800 seconds		
					Temperature Derivative Criteria:			
					Derivative will be monitored using	CeAEHR_e_BlkHtrEngOutCIntSnsr		
					Derivative will be monitored once coolant flow is	>-1.00 L/min		
					AND Flow time is between	5.0 -15.0 seconds		
					AND either Engine runtime is	< 75.0 seconds		
					OR Insufficent coolant flow is present for	>300.0 seconds		
					Derivative count will increment if derivative is	<-0.10°C/sec		
					If counts are			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					a block heater is detected =================	> 4 counts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temp Sensor Circuit Low	P0117	Circuit Continuity This DTC detects a short to ground in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ 150°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsrl Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsrl	< X Ohms X is equal to: Temp Sensor 1: 55 Ohms	Diagnostic is Enabled		5 seconds out of a 6 seconds window Continuously sampled	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temp Sensor Circuit High	P0118	Circuit Continuity This DTC detects a short to high or open in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ -60°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsrl Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsrl	> X Ohms X is equal to: Temp Sensor 1: 175,000 Ohms	Diagnostic is Enabled Engine run time OR IAT min	 > 10.0 seconds > -20.0 °C	5 seconds out of a 6 seconds window Continuously sampled	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature (ECT) Sensor Circuit Intermittent	P0119	Circuit Erratic This DTC detects large step changes in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. Allowable high and low limits are calculated for the next sample based on the previous sample and sensor time constant. If the sensor responds faster than should be possible the DTC is set.	Temperature step change: 1) postive step change is greater than calculated high limit OR 2) negitive step change is lower than calculated low limit. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsrl Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsrl The calculated high and low limits for the next reading use the following calibrations: Temperature Sensor 1: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example*****	7.4 seconds -60.0 °C 200.0 °C	Diagnostic is Enabled No Active DTC's	ECT_Sensor_Ckt_FA EECR_EngineOut_Erratic_TFTKO	5 seconds out of a 6 seconds window Continuously sampled	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			If the last temp reading was 90 °C, the Time constant was calibrated at 10 seconds, the low limit was calibrated to -80 °C and the high limit was calibrated to 200 °C the caluculated limits are 101 °C and 73 °C. The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid. *****************************					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature Below Stat Regulating Temperature	P0128	This DTC detects if the ECT (EngineCoolant temperature) does not achieve the required target temperature after an allowed energy accumulation by the engine. This can be caused by an ECT sensor biased low or a cooling system that is not warming up correctly because of a stuck open thermostat or other fault.	Energy is accumulated after the first conbustion event using Range 1, 2 or 3: If the maxium energy is greater than as shown in the supporting tables prior to the Engine outlet coolant achieving the target a fault will be indicated. **Range 1 (Primary):** Ambient air temperature is between 10.0 and 52.0 °C Engine Outlet Coolant reaches the start to open temperature of the flow control device to the radiator (ie: thermostat) minus 11.1 °C. The target temperature for this range will not drop below 70.9 ° C **Range 2 (Secondary):** Ambient air temperature is between -9.0 and 10.0 ° C Engine Outlet Coolant reaches the start to open temperature of the flow control device to the radiator (ie: thermostat) minus 27.0 °C. The target temperature for this range will not drop below 27.0 °	 **P0128 Maximum Acculated Energy - Primary** **P0128 Maximum Acculated Energy - Secondary**	Diagnostic is Enabled No DTCs Engine soak time Engine run time Engine Outlet Coolant Temperature - Range 1: - Range 2: - Range 3: Devices in main cooling circuit are not in in device control If Engine RPM is continuously greater than for this time period Distance traveled	 THMR_AWP_AuxPumpFA THMR_AHV_FA THMR_SWP_Control_FA THMR_SWP_FlowStuckOn_FA THMR_SWP_NoFlow_FA OAT_PtEstFiltFA VehicleSpeedSensor_FA EngineTorqueEstInaccurate MAF_SensorFA ETHR_CoolantEnergyModel ETHR_RemedialActionLeveil ETHR_RemedialActionLevel2 ETHR_RemedialActionLevel3 EECR_EngineOutlet_FA > 1,800.0 seconds 20.0 - 1,800.0 seconds <51.6 °C <35.6 °C <35.6 °C 8,192 rpm 5.0 seconds >2.0 km	1 failure to set DTC 1 sec/ sample Once per ignition key cycle	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			C **Range 3 (Tertiary):** Ambient air temperature is between -9.1 and -9.0 ° C Engine Outlet Coolant reaches the start to open temperature of the flow control device to the radiator (ie: thermostat) minus 27.0 °C. The target temperature for this range will not drop below 27.0 ° C	**P0128 Maximum Acculated Energy - Tertiary** This diagnostic models the net energy into and out of the cooling system during the warm-up process. The ten energy terms are: heat from combustion (with AFM correction), heat from after-run, heat loss to transmission oil, heat loss to enviroment, heat loss to cabin, heat loss to DFCO, heat loss to engine oil, heat loss to exhaust, and eat loss to autostop.	The diagnostic will abort if the temperature has dropped by after the customer has commanded the engine off Cumulative coolant flow	>5.0 °C >0.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

Fuel Temperature SensorA Performance	P0181	Determine when fuel temperature sensor is not plausible, due to offset or drift.	IF the fuel fired heater has not been active
			{
			The average for the difference in absolute value between temperature measured by the fuel filter sensor and the reference sensor is:
			}
			ELSE
			
			(see **P0181 Fuel Temperature Sensor Reference**)
				> 20.00 °C
				
				> 20.00 °C
					Engine off time
					
					Time since engine start rotating
					
					No error for Engine Not Running timer
					
					No electrical fault on the fuel filter temperature sensor
					
					No fault on the reference temperature sensor
					
					At least one valid value received from serial communication
					
					(Engine coolant temperature
					
					OR
					
					ECT_OBD_GlobalCoolTmpEnbl (refer to "OBD Coolant Enable Criteria" section))
					
					Number of acquired samples for the absolute difference between fuel filter temperature and reference temperature
					
					Fuel Filter Heater turned Off
					
					Sensor Bus Relay
						>28,800.00
						
						<1.00
						
						FTS_FTS_CktFA
						
						FTS_PlausRefSnsrFlt
						
						> -40.00
						
						< 3.00
							3.00 samples
							
							100 ms/sample
								Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					commanded on No fault on the sensor bus relay No fault in the serial communication	 SBR_RlyFA P1103		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Temperature SensorA Circuit Low	P0182	Determine when a short circuit to ground affects fuel temperature sensor.	Fuel temperature sensor output resistance	< 50 Q	Run crank voltage Run crank voltage Engine not cranking FTZM Run crank voltage Sensor Bus relay Commanded on No DTC active At least one valid value received from serial communication	> 5.0V > 11.0V > 8.00 SBR_RlyFA P1103	10 failures out of 20 samples 100 ms/samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Temperature SensorA Circuit High	P0183	Determine when a short circuit to ground affects fuel temperature sensor.	Fuel temperature sensor output resistance	> 121,865 0	Run crank voltage	> 5.0V	10 failures out of 20 samples	Type B, 2 Trips
					Run crank voltage	> 11.0V		
					Engine not cranking		100 ms/samples	
					FTZM Run crank voltage	> 8.00		
					Sensor Bus relay Commanded on			
					No DTC active	SBR_RlyFA P1103		
					At least one valid value received from serial communication			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Temperature SensorA Circuit Intermittent	P0184	Determine when fuel temperature sensor changes quicker than expected, likely due to an intermittent fault.	Fuel temperature	>(1 - a) *156 °C + (Last good sample * a) with a = e^[- (amount of consecutive bad samples * 0.01)]	Run crank voltage Run crank voltage FTZM Run crank voltage Sensor Bus relay Commanded on No DTC active At least one valid value received from serial communication	> 5.0V > 11.0V > 8.00 FTS_FTS_CktFA SBR_RlyFA P1103	10 failures out of 15 samples 100 ms/samples	Type B, 2 Trips
			Fuel temperature	<(1 -a)*-56°C + (Last good sample * a) with a = e^[- (amount of consecutive bad samples * 0.01)]	Run crank voltage Run crank voltage FTZM Run crank voltage Sensor Bus relay Commanded on No DTC active At least one valid value received from serial communication	> 5.0V > 11.0V > 8.00 FTS_FTS_CktFA SBR_RlyFA P1103	10 failures out of 15 samples 100 ms/samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Temperature Sensor B Performance	P0186	Determine when a significant offset affects the temperature sensor located in the fuel rail. The faulire criteria is performed comparing the temperature measured by sensor located in the fuel rail and the manifold temperature sensor	The difference in absolute value between temperature measured by the rail temperature sensor and the reference sensor (Manifold Temperature Sensor) is	> 20.00	Run crank voltage OR Time since engine is rotating No error for Engine Not Running timer Engine soak time No Fault Active in the Manifold Temperature Sensor MnfdTempSensorFA The diagnostic feedback protocol is providing information about rail temperature (Engine coolant temperature OR ECT_OBD_GlobalCoolTmpEnbl (refer to "OBD Coolant Enable Criteria" section)) Ambient temperature	> 5.0V < 3.00 > 28,800.00 == FALSE > -40.00 °C > KeFHPI_T_AmbTempMin	21.00 failures out of 42.00 samples 6.25 ms/samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Sensor "B" Circuit Range/ Performance	P018B	This DTC detects a fuel pressure sensor response stuck within the normal operating range using an intrusive test (as follows) a] Intrusive Test Trigger: 1] Fuel Pump Duty Cycle Clamped Time (min or max duty cycle) >= 5 sec Or 2] Fuel Pres Err Variance <= calibration value KeFDBR_cmp_FPSS_MinPres Variance ; Otherwise, Report status as Pass b] Intrusive test freq limit: 60 sec between intrusive tests that pass, c] Intrusive test Fuel Flow limit: Fuel Flow Actual < Max allowed Fuel Flow rate	Sensed fuel pressure change [absolute value, during intrusive test]	<= 30 kPa	a) Diagnostic enabled [FDBR b FPSS DiagEnbld] b) Timer Engine Running [FDBR_t_EngModeRunCoarse] c1) Fuel Flow Rate Valid c2) FDB_FuelPresSnsrCktFA c3) Reference Voltage Fault Status [DTC P0641] c4) FAB_FuelPmpCktFA c5) Fuel Control Enable Fault Active [DTC P12A6] c6) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255] c7) Fuel Pump Speed Fault Active [DTCP129F] c8) CAN Sensor Bus message $0C3 Comm Fault [CFMR_b_FTZM_Info1_UcodeCmFA DTC P165C] c9) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [CFMR_b_FTZM_Cmd1_UcodeCmFA DTC]	a) == TRUE b) >= 5.00 seconds c1)== TRUE c2) <> TRUE c3) <> TRUE c4] <> TRUE c5) <> TRUE c6) <> TRUE c7) <> TRUE c8) <> TRUE c9] <> TRUE	1 sample/ 12.5 millisec Intrusive Test Duration: Fuel Flow - related (5 to 12 sec)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					c10) Fuel Pump Duty Cycle Fault Active	c10) <>TRUE		
					c11) Sensor Configuration [FDBR_e_FuelPresSnsrConfig]	c11) == CeFDBR_e_WiredTo_FTZM		
					c12) Sensor Bus Relay On	c12) == TRUE		
					d) Emissions Fuel Level Low [Message $3FB]	d) <> TRUE		
					e) Fuel Control Enable	e) == TRUE		
					f) Fuel Pump Control State	f) == Normal Control OR == Fuel Pres Sensor Stuck Control		
					g) Instantaneous Fuel Flow [FCBR_dm_InstFuelFlow]	g) >= 0.05 gm/sec		
					h) Diagnostic System Disabled [DRER_b_DiagSysDsb]	h) <> TRUE		
					j1) Fuel Pmp Speed Command Alive Rolling Count and Checksum Error [CAN Bus B $0CE] [CFMR_b_FTZM_Cmd1_ARC_ChkErr DTC]	j1)<> TRUE		
					j2) CAN Sensor Bus message $0C3_Available	j2) == TRUE		
					j3) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and	j3) <> TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Checksum Error [CAN Bus B $0C3] [CFMR_b_FTZM_Info1_ARC ChkErr DTC]			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Sensor "B" Circuit Low	P018C	This DTC detects if the fuel pressure sensor circuit is shorted low Values are analyzed as percent of sensor reference voltage [[Abs [5.0V - SensorVoltsActual] / 5.0V] *100%]	Fuel Pressure Sensor output % [re. full range as percent of 5.0V reference]	< 4.00 % or [0 kPa gauge]	a) Diagnostic enabled [FDBR_b_FPSnsrCktLoDiagEnbl] b) Run_Crank Active [PMDR_b_RunCrankActive c) Diagnostic System Disabled [DRER_b_DiagSysDsbl] d) Pressure Sensor Configuration [FDBR_e_FuelPresSnsrConfig]	a) == TRUE b) == TRUE c) <> TRUE d1) IF calibration CeFDBR_e_WiredTo_FTZM == WiredTo ECM d2) IF NOT, then see Case2	64.00 failures/ 80.00 samples 1 sample/12.5 ms	Type B, 2 Trips
			Fuel Pressure Sensor output % [re. full range as percent of 5.0V reference]	< 4.00 % or [0 kPa gauge]	a) Diagnostic enabled [FDBR_b_FPSnsrCktLoDiagEnbl] b) Run_Crank Active [PMDR_b_RunCrankActive c) Diagnostic System Disabled [DRER_b_DiagSysDsbl] d1) Pressure Sensor Configuration [FDBR_e_FuelPresSnsrConfig] d2) Sensor Bus Relay On d3) CAN Sensor Bus message $0C3_Available d4) Fuel Pres Sensor Ref	a) == TRUE b) == TRUE c) <> TRUE d1) IF calibration CeFDBR_e_WiredTo_FTZM == WiredTo FTZM d2) == TRUE d3) == TRUE d4) <> TRUE	64.00 failures/ 80.00 samples 1 sample/12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B $0C3] [CFMR b FTZM Infol A RC ChkErr DTC]	d2) IF calibration CeFDBR_e_WiredTo_FTZM <> WiredTo FTZM, then see Casel		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Sensor "B" Circuit High	P018D	This DTC detects if the fuel pressure sensor circuit is shorted High Values are analyzed as percent of sensor reference voltage [[Abs [5.0V - SensorVoltsActual] / 5.0V] *100%]	Fuel Pressure Sensor output % [re. full range as percent of 5.0V reference]	> 96.00 % or [743 kPa ga]	a) Diagnostic enabled [FDBR_b_FPSnsrCktLoDiagEnbl] b) Run_Crank Active [PMDR_b_RunCrankActive c) Diagnostic System Disabled [DRER_b_DiagSysDsbl] d) Pressure Sensor Configuration [FDBR_e_FuelPresSnsrConfig]	a) == TRUE b) == TRUE c) <> TRUE d1) IF calibration CeFDBR_e_WiredTo_FTZM == WiredTo ECM d2) IF NOT, then see Case2	64.00 failures/ 80.00 samples 1 sample/12.5 ms	Type B, 2 Trips
			Fuel Pressure Sensor output % [re. full range as percent of 5.0V reference]	> 96.00 % or [743 kPa ga]	a) Diagnostic enabled [FDBR_b_FPSnsrCktLoDiagEnbl] b) Run_Crank Active [PMDR_b_RunCrankActive c) Diagnostic System Disabled [DRER_b_DiagSysDsbl] d1) Pressure Sensor Configuration [FDBR_e_FuelPresSnsrConfig] d2) Sensor Bus Relay On d3) CAN Sensor Bus message $0C3_Available d4) Fuel Pres Sensor Ref	a) == TRUE b) == TRUE c) <> TRUE d1) IF calibration CeFDBR_e_WiredTo_FTZM == WiredTo FTZM d2) == TRUE d3) == TRUE d4) <> TRUE	64.00 failures/ 80.00 samples 1 sample/12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B $0C3] [CFMR b FTZM Infol A RC ChkErr DTC]	d2) IF calibration CeFDBR_e_WiredTo_FTZM <> WiredTo FTZM, then see Casel		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Rail Pressure (FRP) SensorA Performance	P0191	Determine when fuel rail pressure sensor is not plausible, due to offset or drift.	Rail pressure sensor output (as percentage of supply voltage) OR Rail pressure sensor output (as percentage of supply voltage)	>12.0% <8.0%	Engine off time No error for Engine Not Running timer No engine movement detected since begin of driving cycle (Engine coolant temperature OR ECT_OBD_GlobalCoolTmpEnbl (refer to *"OBD Coolant Enable Criteria"* section)) Run crank voltage Run crank voltage An initilization time delay of 12.00 consecutive samples has been passed No active DTC:	>1,000 s >-40 °C = TRUE > 5.0V > 11.0V ECT_Sensor_FA FHP_RPS_CktFA	14 failures out of 17 samples 6.25 ms/sample	Type A, 1 Trips
			Absolute difference between rail pressure #1 (first trace) and rail pressure #2 (second trace)	>25.0 MPa	**Rail Pressure Sensor Configuration** Starter motor is not engaged OR Starter motor has been engaged for a time	= CeFHPG_e_RPS_DoubleTrack >15,000 s	14 failures out of 17 samples 6.25 ms/sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR			
					Run crank voltage	> 8.4 V		
					No active DTC:	FHP_RPS_CktFA FHP_RPS2_CktFA P0194		
					The diagnostic feedback protocol is in the state outputting the redundant pressure information			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Rail Pressure (FRP) SensorA Circuit Low Voltage	P0192	Determine when a short circuit to ground affects fuel rail pressure sensor.	Fuel rail pressure sensor output (as percentage of supply voltage)	< 4.0%	(Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage An initilization time delay of 12.00 consecutive samples has been passed	 > 15,000 s > 8.4 V)	15 failures out of 30 samples OR 15 continuous failures out of 30 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Rail Pressure (FRP) SensorA Circuit High Voltage	P0193	Determine when a short circuit to voltage affects fuel rail pressure sensor.	Fuel rail pressure sensor output (as percentage of supply voltage)	> 96.0%	(Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage An initilization time delay of 12.00 consecutive samples has been passed	 > 15,000 s > 8.4 V)	15 failures out of 30 samples OR 15 continuous failures out of 30 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Coolant Temperature Dropped Below Diagnostic Monitoring Temperature	P01F0	This DTC detects an unexplained cooling system cool down below the OBD monitoring threshold during normal operating conditions. This check is run throughout the key cycle.	Engine outlet coolant temperature drops below for an unexpected reason	< 69.9 Deg C	Diagnostic is Enabled		48 seconds out of a 60 seconds window	Type B, 2 Trips
					No Active DTC's	ECT_Sensor_Ckt_FA VehicleSpeedSensor_FA OAT_PtEstFiltFA THMR AWP AuxPumpFA THMR_AHV_FA THMR_SWP_Control_FA EngineTorqueEstInaccurate ECT_Sensor_Perf_FA THMR_SWP_NoFlow_FA THMR_SWP_FlowStuckOn_FA		
					Engine Runtime	>20.0 seconds		
					Distance traveled this key cycle	>2.0 km		
					Ambient air pressure	> 55.0 kPa		
					Ambient air temperature	> -9.0 Deg C		
					**************************			
					Engine coolant temperature At least once during the key cycle	> 70.9 Deg C		
					**************************			
					Heat to coolant	> **P01F0 - Heat To Coolant Min 2D**		
					DFCO time	< 0.0 seconds		
					RPM	< 8,192		
					Active Fuel Management			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					is not in	Half Cylinder Mode		
					Actual flow rate	<70.00		
					Engine flow rate	<80.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger/ Supercharger "A" Overboost Condition	P0234	This monitor detects failures in the charging air system such to not fulfill the request of boost pressure in the intake manifold. It works only in steady state closed loop pressure control zone. The DTC checks a permanent negative control deviation of the boost pressure indicating an overboost condition. This monitor is used to detect any malfunction in the boost pressure system causing the vehicle's emissions to exceed the limits. The aim of the overboost pressure monitor is to detect obstructions in the exhaust pipe. The boost pressure is usually controlled by the VGT vanes. The intake manifold pressure is also affected by the throttle valve and the HP EGR valve position changes. The aim of this procedure is to identify a limitation of the VGT vanes (equal to an obstruction) that leads to exceed the emission limits.	Boost pressure tracking error(difference between the desired boost pressure and the measured pressure at intake manifold by MAP sensor) lower than a threshold. If throttle control is active: The setpoint used for closed loop control is the conversion of the desired upstream throttle boost pressure (target) in desired intake boost pressure. The conversion of the setpoint is done calculating the pressure drop over the throttle valve that is strictly dependent on the valve position. If throttle control is NOT active: The setpoint used for closed loop control is the intake manifold pressure: in this situation the diagnostic monitors the boost pressure closed loop control tracking error.	If throttle control is active (Refer to "Other AIOR DSL flags" Free Form): < (**P0234: Negative boost deviation threshold (throttle control active)** [kPa] X **P0234: Overboost barometric correction**) If throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form): < (**P0234: Negative boost deviation threshold (throttle control not active)** [kPa] X **P0234: Overboost barometric correction**)	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Difficult launch NOT detected Boost Pressure Control Closed Loop active No active transition from a combustion mode to another one Outside Air Temperature in range Desired Boost Pressure steady state: BstDes-BstDes_Old	1.00==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "LDT_DifficultLaunchActive" Free Form Refer to "Boost Control in Closed Loop" Free Form ==TRUE > -20.00 [°C] AND <55.00 [°C] >-5 [kPa/s] AND < 4 [kPa/s] >1,300.00 [rpm] AND <2,200.00 [rpm]	400 fail counters over 500 sample counters sampling time is 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Engine speed in range			
					Desired intake Boost pressure in range	> **P0234: Minimum boost pressure for overboost monitor enabling** [kPa] AND **P0234: Maximum boost pressure for overboost** **<monitor enabling** [kPa]		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	>60 [°C] ==TRUE <130 [°C]		
					Ambient Air Pressure in range	>70 [kPa] AND <110 [kPa]		
					Throttle Valve position	>=85.00 [%] if throttle control is active (Refer to "Other AICR DSL flags" Free Form) >=75.00 [%] if throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form)		
						AIC_BstSysDiagDenomDsbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No active DTCs All enabling conditions last for a time	==FALSE > **P0234: Overboost monitor delay timer** [S]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger/ Supercharger "A" Underboost Condition	P0299	This monitor detects failures in the charging air system such to not fulfill the request of boost pressure in the intake manifold. It works only in steady state closed loop pressure control zone. The DTC checks a permanent positive control deviation of the boost pressure indicating an underboost condition. This monitor is used to detect any malfunction in the boost pressure system causing the vehicle's emissions to exceed the limits. The aim of the underboost pressure monitor is to detect leakages in the pipe after the compressor or in the intake/exhaust manifold. The boost pressure is usually controlled by the VGT vanes. The intake manifold pressure is also affected by the throttle valve and the HP EGR valve position changes. The aim of this procedure is to identify a limitation of the VGT vanes (equal to a leakage) that leads to exceed the emission	Boost pressure tracking error(difference between the desired boost pressure and the measured pressure at intake manifold by MAP sensor) higher than a threshold. If throttle control is active: The setpoint used for closed loop control is the conversion of the desired upstream throttle boost pressure (target) in desired intake boost pressure. The conversion of the setpoint is done calculating the pressure drop over the throttle valve that is strictly dependent on the valve position. If throttle control is NOT active: The setpoint used for closed loop control is the intake manifold pressure: in this situation the diagnostic monitors the boost pressure closed loop control tracking error.	If throttle control is active (Refer to "Other AIOR DSL flags" Free Form): > (**P0299: Positive boost deviation threshold (throttle control active)** [kPa] X **P0299: Underboost barometric correction**) If throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form): > (**P0299: Positive boost deviation threshold (throttle control not active)** [kPa] X **P0299: Underboost barometric correction**)	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Difficult launch NOT detected Boost Pressure Control Closed Loop active No active transition from a combustion mode to another one Outside Air Temperature in range Desired Boost Pressure steady state: BstDes-BstDes_Old	**P0234, P0299: Boost pressure control deviation enabling** ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "LDT_DifficultLaunchActive" Free Form Refer to "Boost Control in Closed Loop" Free Form ==TRUE > -20.00 [°C] AND <55.00 [°C] >-5 [kPa/s] AND < 4 [kPa/s]	400.00 fail counters over 500.00 sample counters sampling time is 25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		limits.			Engine speed in range	>1,200.00 [rpm] AND <2,000.00 [rpm]		
					Desired intake Boost pressure in range	> **P0299: Minimum boost pressure for underboost monitor enabling** [kPa] AND < **P0299: Maximum boost pressure for underboost monitor enabling** [kPa]		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	>60 [°C] ==TRUE <130 [°C]		
					Ambient Air Pressure in range	> 70 [kPa] AND <110 [kPa]		
					Throttle Valve position	>=85.00 [%] if throttle control is active (Refer to "Other AICR DSL flags" Free Form) >=75.00 [%] if throttle control is NOT active (Refer to "Other AICR DSLflaas" Free Form)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No active DTCs	AIC_BstSysDiagDenomDsbl ==FALSE		
					All enabling conditions last for a time	> **P0299: Underboost monitor delay timer** [S]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Random Misfire Detected	P0300	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring various terms derived from crankshaft velocity. The rate of misfire over an interval is compared to both emissions and catalyst damaging thresholds. The pattern of crankshaft acceleration after the misfire is checked to differentiate between real misfire and other sources of crank shaft noise. Emissions Neutral Default Action: If consumed Emissions Neutral Default DTCs from other subsystems are set: Ignore Rough Road, Traction, Stability, and Antilock brake signals. If default action not activated, Misfire Monitor could complete less frequently or inaccurately. Default Action Latched for duration of Trip Default Action: If Misfire P030x sets on some hybrid applications, the isolation damper	Crankshaft Deceleration Value(s) vs. Engine Speed and Engine load The equation used to calculate deceleration value is tailored to specific vehicle operating conditions. The selection of the equation used is based on the 1st single cylinder continuous misfire threshold tables encountered that are not max of range. If all tables are max of range at a given speed/load, that speed load region is an ***Undetectable region*** see Algorithm Description Document for additional details. SINGLE CYLINDER CONTINUOUS MISFIRE((Medres_Decel Medres_Jerk OR (Medres_Decel Medres_Jerk OR (Lores_Decel Lores_Jerk OR (Lores_Decel Lores_Jerk OR RevBalanceTime)	- see details of thresholds on Supporting Tables Tab **> RufSCD_Decel** AND **> RufSCD_Jerk)** **> SCD.Decel** AND **> SCD_Jerk)** **> RufCyl_Decel** AND **> RufCyl.Jerk)** **> CylModeDecel** AND **> CylModeJerk)** **>RevMode_Decel**	Engine Run Time Engine Coolant Temp Or If ECT at startup Then System Voltage + Throttle delta - Throttle delta Early Termination option: (used on plug ins that may not have enough engine run time at end of trip for normal interval to complete.)	> 2 crankshaft revolution "ECT" If OBD Max Coolant Achieved = FALSE -9 °C < ECT Or if OBD Max Coolant Achieved = TRUE -9 °C < ECT < 128 °C < -9 °C If OBD Max Coolant Achieved = FALSE 21 °C < ECT If OBD Max Coolant Achieved = TRUE 21 °C < ECT < 128°C 9.00 < volts < 32.00 < 100.00% per 25 ms < 100.00% per 25 ms Not Enabled	Emission Exceedence = any (5) failed 200 rev blocks out of (16) 200 rev block tests Failure reported for (4) Exceedence in 1st (16) 200 rev block tests, or (4) Exceedences thereafter. OR when Early Termination Reporting = Enabled and engine rev > 1,000 revs and < 3,200 revs at end of trip	Type B, 2 Trips (Mil Flashes with Catalyst damage level of Misfire)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		between engine and transmission can go into extreme resonance. Default action is to move rpm out of the resonance zone. If default action not activated, significant hardware damage could occur rendering vehicle inoperable.	****************************** **This Feature only used on Diesel engines** Combustion Modes that force selection of Idle Tables ****************************** Other patterns of misfire use adjustments to the single cylinder continuous misfire threshold tables: RANDOM MISFIRE Use random misfire thresholds If no misfire for (Medres_Decel AND Medres_Jerk) OR (Medres_Decel AND Medres_Jerk) OR (Lores_Decel AND Lores_Jerk)	************************** **This Feature only used on Diesel engines** **CombustModeIdleTbl** in Supporting Tables ************************** > 3 Engine Cycles **> RufSCD_Decel * Random_SCD_Decel** **>RufSCD_Jerk * Random_SCD_Jerk** **>SCD_Decel * Random_SCD_Decel** **> SCD_Jerk * Random_SCD_Jerk** **> RufCyl_Decel * RandomCylModDecel** **> RufCyl_Jerk * RandomCylModJerk**			any Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage. Catalyst Failure reported with (1 or 3) Exceedences in FTP, or(1) Exceedence outside FTP. Continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			OR (Lores_Decel AND Lores_Jerk)	> CylModeDecel * RandomCylModDecel > CylModeJerk * RandomCylModJerk				
			OR RevBalanceTime	> RevMode_Decel * RandomRevModDecl				
			PAIRED CYLINDER MISFIRE If a cylinder & it's pair are above PAIR thresholds (Medres_Decel AND Medres_Jerk)	> RufSCD_Decel * Pair_SCD_Decel > RufSCD_Jerk * Pair_SCD_Jerk				
			OR (Medres_Decel AND Medres_Jerk)	>SCD_Decel * Pair_SCD_Decel > SCD_Jerk * Pair_SCD_Jerk				
			OR (Lores_Decel AND Lores_Jerk)	> RufCyl_Decel * PairCylModeDecel > RufCyl.Jerk * PairCylModeJerk				
			OR (Lores_Decel AND Lores_Jerk)	> CylModeDecel * PairCylModeDecel > CylModeJerk * PairCylModeJerk				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			OR (Revmode Active AND (within one engine cycle: 2nd largest Lores_Decel)	**> CylModeDecel * PairCylModeDecel**				
			BANK MISFIRE Cylinders above Bank Thresholds	>= 2 cylinders				
			(Medres_Decel	**> RufSCD_Decel * Bank_SCD_Decel**				
			AND Medres_Jerk)	**> RufSCD_Jerk * Bank_SCD_Jerk**				
			OR (Medres_Decel	**>SCD_Decel * Bank_SCD_Decel**				
			AND Medres_Jerk)	**> SCD_Jerk * Bank_SCD_Jerk**				
			OR (Lores_Decel	**> RufCyl_Decel * BankCylModeDecel**				
			AND Lores_Jerk)	**> RufCyl.Jerk * BankCylModeJerk**				
			OR (Lores_Decel	**> CylModeDecel * BankCylModeDecel**				
			AND Lores_Jerk)	**> CylModeJerk * BankCylModeJerk**				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CONSECUTIVE CYLINDER MISFIRE 1st cylinder uses single cyl continuous misfire thresholds; 2nd Cylinder uses: (Medres_Decel AND Medres_Jerk) OR (Medres_Decel AND Medres_Jerk) OR (Lores_Decel AND Lores_Jerk) OR (Lores_Decel AND Lores_Jerk)	**> RufSCD_Decel * ConsecSCD_Decel** **> RufSCD_Jerk * ConsecSCD_Jerk** **>SCD_Decel * ConsecSCD_Decel** **> SCD_Jerk * ConsecSCD_Jerk** **> RufCyl_Decel * ConsecCylModDecel** **> RufCyl.Jerk * ConsecCylModeJerk** **> CylModeDecel * ConsecCylModDecel** **> CylModeJerk * ConsecCylModeJerk**				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CYLINDER DEACTIVATION MODE (Active Fuel Managment) AFM: SINGLE CYLINDER CONTINUOUS MISFIRE (CylAfterDeacCyl_Decel AND CylAfterDeacCyl_Jerk) OR (CylBeforeDeacCy1Decel AND CylBeforeDeacCyl_Jerk) AFM: RANDOM MISFIRE Use random misfire thresholds If no misfire for (CylAfterDeacCyl_Decel AND CylAfterDeacCyl_Jerk) (CylBeforeDeacCy1Decel AND	**> CylModeDecel * ClyAfterAFM_Decel** **> CylModeJerk * CylAfterAFM_Jerk** **> CylModeDecel * CylBeforeAFM_Decel** **> CylModeJerk * ClyBeforeAFM_Jerk** > 3 Engine Cycles **> CylModeDecel * ClyAfterAFM_Decel * RandomAFM_Decl** **> CylModeJerk * CylAfterAFM_Jerk * RandomAFM_Jerk** **> CylModeDecel * CylBeforeAFM_Decel * RandomAFM_Decl**				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CylBeforeDeacCyl_Jerk)	**> CylModeJerk * ClyBeforeAFM_Jerk * RandomAFM_Jerk**				
			OR IF option Crank based IMEP estimate is Enabled	Not Enabled				
			Msfire Percent Emission Failure Threshold	> 3.81 % P0300				
			Misfire Percent Catalyst Damage	> **Catalyst_Damage_Misfire_Percentage** in Supporting Tables whenever secondary conditions are met.				
			When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	< 0 FTP rpm AND < 0 FTP % load				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(at low speed/loads, one cylinder may not cause cat damage) Engine Speed Engine Load Misfire counts	> 8,191 rpmAND > 199 % load		
					Engine Speed	450 < rpm < ((Engine Over Speed Limit) - 250) OR 3,200) Engine speed limit is a function of inputs like Gear and temperature see **EngineOverSpeedLimit** in supporting tables	4 cycle delay	
					No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensor_TFTKO CrankSensor_FA CamLctnIntFA CamLctnExhFA CamSensorAnyLctnTFTK 0	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					P0315 & engine speed Fuel Level Low Cam and Crank Sensors Misfire requests TCC unlock Fuel System Status Active FuelManagement Undetectable engine speed and engine load region Abusive Engine Over Speed Below zero torque (except CARB approved 3000 rpm to redline triangle.) Below zero torque: TPS Vehicle Speed	AnyCamPhaser_FA AnyCamPhaser_TFTKO AmbPresDfltdStatus > 1,000 rpm LowFuelConditionDiagnostic in sync with each other Not honored because Transmission in hot mode or POPD intrusive diagnostic running # Fuel Cut Transition in progress ***Undetectable region*** from Malfunction Criteria > 8,192 rpm **< ZeroTorqueEngLoad** or **<ZeroTorqueAFM** if AFM is active in Supporting Tables < 100.0% (< 100.0% in AFM) >318mph (>318mph AFM)	4 cycle delay 500 cycle delay 4 cycle delay 4 cycle delay 4 cycle delay 0 cycle delay 4 cycle delay 0 cycle delay 4 cycle delay 4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					NEGATIVE TORQAFM If deactivated cylinders appear to make power, torque is negative:			
					DeactivatedCyl_Decel AND	**<DeacCylInversionDecel**	0 cycle delay	
					DeactivatedCyl_Jerk AND	**<DeacCylInversionJerk**		
					# of Deact Cyls Inverted	> 4 cylinders		
					Manual Trans	Clutch shift	4 cycle delay	
					Accel Pedal Position AND Automatic transmission shift	> 97.00 %	4 cycle delay	
					After Fuel resumes on Automatic shift containing Fuel Cut		2 Cylinder delay	
					Delay if PTC engaged	Enabled	4 cycle delay	
					Delay if error in indices of buffered data is detected and delay is enabled	Delay Enabled	3 cycle delay	
					Delay if IMEP calculation	initializing on startup or running resets (expires before rpm enablement)	4 cycle delay	
					******************************	******************************	*******************	
					This Feature only used on Diesel engines			
					Combustion Mode	**= InfrequentRegen** value in Supporting Tables	4 cycle delay	
						IF TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Driver cranks before Wait to Start lamp extinguishes Brake Torque ******************************	 > 199.99% Max Torque ******************************	**WaitToStart** cycle delay 4 cycle delay *******************	
					DRIVELINE RING FILTER After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early. Filter Driveline ring: Stop filter early:	**> "Ring Filter"** # of engine cycles after misfire in Supporting Tables **> "Number of Normals"** # of engine cycles after misfire in Supporting Tables tab		
					ABNORMAL ENGINE SPEED OSCILLATION: (checks each "misfire" candidate in 100 engine Cycle test to see if it looks like some disturbance like rough road (abnormal).) Used Off Idle, and while not shifting, TPS Engine Speed Veh Speed Auto Transmission	 > 199 % > 1,000 rpm > 3 mph not shifting		
					indivdual candidate deemed abnormal if number of consecutive decelerating			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					cylinders after "misfire": (Number of decels can vary with misfire detection equation) Consecutive decels while in SCD Mode Cyl Mode Rev Mode	**> Abnormal SCD Mode** **> Abnormal Cyl Mode** **> Abnormal Rev Mode** in Supporting Tables		
					At the end of 100 engine cycle test, the ratio of abnormal/candidate is checked to confirm if real misfire is present within the 100 engine cycles, abnormal candidates/ total candidates	>0.50 ratio	discard 100 engine cycle test	
					MISFIRE CRANKSHAFT PATTERN RECOGNITION checks each "misfire" candidate in 100 engine Cycle test to see if overall crankshaft pattern looks like real misfire (recognized), or some disturbance like rough road (unrecognized). At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present within the 100 engine cycles.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Typically used for checking a single misfire per engine cycle but can support some other patterns on some packages Pattern Recog Enabled: Pattern Recog Enabled during Cylinder Deac Pattern Recog Enabled consecutive cyl pattrn Engine Speed Veh Speed The 1st check for "recognized" is the 1st fired cylinder after the misfire candidate should both accelerate and jerk an amount based acceleration and jerk of Single Cylinder Misfire thresholds in effect at that speed and load. (CylAfter_Accel AND CylAfter_Jerk) Addtionally, the crankhaft is checked aaain a small	Enabled Not Enabled Enabled 580 < rpm < 6,800 > 0.0 mph > Misfire_ decel * **1st_FireAftrMisfr_Acel** > Misfire_Jerk * **1st_FireAftrMisfr_Jerk** Or if AFM mode is active: > Misfire_ decel * **IstFireAftrMisAcelAFM** > Misfire_Jerk * **IstFireAfterMisJerkAFM**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					calibratible number of cylinders later to see if the distrubance is still large like rough road, or has calmed down like real misfire. The size of disturbance is compared to a multiplier times the ddtjerk value used to detect misfire at that speed and load. If there is repetitive misfire on consecutive engine cycles, the expected snap is adjusted due to the higher expected disturbance.	3 Cylinders		
					Num of Cylinders after misfire to start check of crankshaft snap			
					"misfire" recognized if: Crankshaft snap after: isolated "misfire"	< Misfire_Jerk * **SnapDecayAfterMisfire**		
					repetative "misfire"	< Misfire_Jerk * **SnapDecayAfterMisfire * RepetSnapDecayAdjst** in Supporting Tables		
					At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present.	>0.60		
					Ratio of Unrecog/Recog		discard 100 engine cycle test	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					****************************** NON-CRANKSHAFT BASED ROUGH ROAD: Rough Road Source ****************************** IF Rough Road Source = WheelSpeedInECM (Wheel speed noise OR ABS = OR Traction = OR Vehicle Stability) = AND No Emission Neutral Default Action DTCs ****************************** IF Rough Road Source = "FromABS" (RoughRoad = OR ABS = OR Traction = OR Vehicle Stability) = AND No Emission Neutral Default Action DTCs ****************************** IF Rough Road Source = "TOSS" TOSS dispersion	****************************** Disabled CeRRDR_e_None ****************************** **> WSSRoughRoadThres** active active active ABS Failed Vehicle Dynamics Control System Status Driven Wheel Rotation Status Non Driven Wheel Rotation Status ****************************** detected active active active ABS Failed Vehicle Dynamics Control System Status ****************************** **>TOSSRoughRoadThres** in supporting tables Transmission Output Shaft Angular Velocity Validity	******************* ******************* discard 100 engine cycle test ******************* discard 100 engine cycle test ******************* discard 100 engine cycle test	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND No Active DTCs ***************************** Default Action Isolator Resonance Default Action Option ***************************** If Isolator Resonance Option Enabled AND Misfire P030xTFTKO	TransmissionEngagedState_FA (Auto Trans only) ClutchPstnSnsr FA (Manual Trans only) ***************************** Not Enabled ***************************** Set engine speed limits: 0 < Eng RPM < 9,000	4 cycle delay ****************** ******************	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position System Variation Not Learned	P0315	This DTC determines if the crankshaft sensor learn values that are stored in memory are valid. The angle between each tooth of the reluctor wheel is learned, and the sum of all angles together should sum to 360° (one revolution of the reluctor wheel). Default values, or corrupted values will not sum to 360°.	The Crankshaft target wheel should be 360 degrees around in circumferance. Loss or controller non-volitile memory or an error in memory will cause the values of individual teeth learn to be defaulted or incorrect. Set the DTC if the Differance between the sum of the reluctor wheel's teeth and 360 degrees is greater than:	> 0.001 degrees	OBD Manufacturer Enable Counter	MEC = 0	0.50 seconds Frequency Continuous100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position (CKP) SensorA Circuit	P0335	Determines if a fault exists with the crank position sensor signal	Time since last crankshaft position sensor pulse received	>= 4.0 seconds	Starter engaged AND (cam pulses being received OR (MAF SensorFA AND Engine Air Flow	 = FALSE > 2.0 grams/second))	Continuous every 100 msec	Type A, 1 Trips
			No crankshaft pulses received	>= 0.1 seconds	Engine is Running Starter is not engaged		Continuous every 12.5 msec	
			No crankshaft pulses received		Engine is Running OR Starter is engaged No DTC Active:	 P0340 P0341	2 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position (CKP) SensorA Performance	P0336	Determines if a performance fault exists with the crank position sensor signal	Time in which 10 or more crank re-synchronizations occur	< 10.0 seconds	Engine Air Flow Cam-based engine speed No DTC Active:	>= 2.0 grams/second > 450 RPM P0335	Continuous every 250 msec	Type A, 1 Trips
			No crankshaft synchronization gap found	>= 0.4 seconds	Engine is Running Starter is not engaged		Continuous every 12.5 msec	
			Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Starter engaged AND (cam pulses being received OR (MAF_SensorFA AND Engine Air Flow	= FALSE > 2.0 grams/second))	Continuous every 100 msec	
			Crank pulses received in one engine revolution OR Crank pulses received in one engine revolution	< 1 > 65,535	Engine is Running OR Starter is engaged No DTC Active:	P0340 P0341	8 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	Determines if a fault exists with the cam position bank 1 sensor A signal	Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse	>= 5.5 seconds >= 4.0 seconds	Starter engaged AND (crank pulses being received OR (MAF SensorFA AND Engine Air Flow	= FALSE > 2.0 grams/second))	Continuous every 100 msec	Type A, 1 Trips
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged		Continuous every 100 msec	
			No camshaft pulses received during first 24 MEDRES events (There are 24 MEDRES events per engine cycle		Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	CrankSensor_FA	Continuous every MEDRES event	
			The number of camshaft pulses received during 100 engine cycles	= 0	Crankshaft is synchronized No DTC Active:	CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Camshaft Position (CMP) Sensor Performance Bank 1 SensorA	P0341	Determines if a performance fault exists with the cam position bank 1 sensor A signal	The number of camshaft pulses received during first 24 MEDRES events is OR (There are 24 MEDRES events per engine cycle)	< 4 > 6	Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	CrankSensor_FA	Continuous every MEDRES event	Type A, 1 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	Crankshaft is synchronized No DTC Active:	CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation (EGR) Flow insufficient (Model Based)	P0401	This monitor detects failures in the air system such to not fulfill the request of mass air flow through the intake circuit. This monitor is used to detect any malfunction in the air system that leads to lower HP EGR rate causing the vehicle's emissions to exceed the OBD limits. The aim of the HP EGR flow monitor is to detect HP EGR obstructions (insufficient HP EGR flow). The HP EGR flow depends on several variables like the HP EGR valve position, intake manifold pressure, exhaust pressure, HP EGR cooler (if present) outlet temperature. The aim of this procedure is to identify a limitation of the HP EGR (equal to an obstruction) that leads to exceed the OBD limits.	Mean residual error: residual error average. Residual error = difference between the punctual residual and threshold (depends on air ambient pressure and temperature, engine speed and load). Punctual residual = difference between estimated air mass provided by MAF (difference between estimated cylinder nominal total flow and estimated HP and LP EGR total flows) and fresh air measured by MAF sensor.	< 0	Calibration on diagnostic enabling	**P0401: Insufficient HP EGR flow monitor enabling** ==TRUE	Residual error average over 100.00 sample counters:	Type B, 2 Trips
					Engine Running	==TRUE	sampling time is 25 ms	
					Cranking ignition in range	Battery voltage > 11.00 [V]		
					PT Relay voltage in range	Powertrain relay voltage > 11.00 [V]		
					Air Control is Active (air control in closed loop)	Refer to "Air Control Active" Free Form		
					Desired EGR rate	> 0 [%]		
					Engine speed is steady state: |RPM-RPM_old| in range, with hysteresis	TRUE if <= 30 [rpm], FALSE if > 50.00 [rpm]		
					for a minimum number of samples	> 20 [counts]		
					Fuel request is steady state: |FUEL-FUEL_old| in range, with hysteresis	TRUE if <= 0.50 [mm^3], FALSE if > 1.00 [mm^3]		
					for a minimum number of samples	> 20 [counts]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					HP EGR flow request is steady state: |HPFLOW-HPFLOW_old| in range, with hysteresis	TRUE if <= 20.00 [mg], FALSE if > 30.00 [mg]		
					for a minimum number of samples	> 30.00 [counts]		
					No active transition from a combustion mode to another one	==TRUE		
					Outside Air Temperature	> -12.00 [°C]		
					Ambient Pressure	> 69.60 [kPa]		
					Engine Coolant Temperature OR OBD Coolant Enable Criteria	> 60.00 [°C] ==TRUE		
					Desired HP EGR flow	> **P0401: Minimum desired HP EGR flow** [mg]		
					Desired fuel quantity	> **P0401: Insufficient HP EGR flow Min fuel enabling condition** [mm^31		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						AND < **P0401: Insufficient HP EGR flow Max fuel enabling condition** [mm^3]		
					Outside air temperature in range	Condition must be TRUE. Refer to "P0401, P0402: Outside air temperature" Free Form		
					Desired LP EGR split	< 1.00		
					Boost Control is Active or in open loop	Refer to "Boost Control in Closed Loop" Free Form		
					Cylinder nominal total flow estimation is valid	== TRUE		
					HP EGR total flow estimation is valid	== TRUE		
					LP EGR total flow estimation is valid	== TRUE		
					All enabling conditions last for a time	>= 7.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation (EGR) Flow Excessive (Model Based)	P0402	This monitor detects failures in the air system such to not fulfill the request of mass air flow through the intake circuit. This monitor is used to detect any malfunction in the air system that leads to higher HP EGR rate causing the vehicle's emissions to exceed the OBD limits. The aim of the HP EGR flow monitor is to detect HP EGR leakages (excessive HP EGR flow). The HP EGR flow depends on several variables like the HP EGR valve position, intake manifold pressure, exhaust pressure, HP EGR cooler (if present) outlet temperature. The aim of this procedure is to identify a limitation of the HP EGR (equal to a leakage) that leads to exceed the OBD limits.	Mean residual error: residual error average. Residual error = difference between the punctual residual and threshold (depends on air ambient pressure and temperature, engine speed and load). Punctual residual = difference between estimated air mass provided by MAF (difference between estimated cylinder nominal total flow and estimated HP and LP EGR total flows) and fresh air measured by MAF sensor.	> 0	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Air Control is Active (air control in closed loop) Desired EGR rate Engine speed is steady state: |RPM-RPM_old| in range, with hysteresis for a minimum number of samples Fuel request is steady state: |FUEL-FUEL_old| in range, with hysteresis for a minimum number of samples	**P0402: Excessive HP EGR flow monitor enabling** ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "Air Control Active" Free Form > 0 [%] TRUE if <= 30 [rpm], FALSE if > 50.00 [rpm] >20 [counts] TRUE if <= 0.50 [mm^3], FALSE if > 1.00 [mm^3] > 20 [counts]	Residual error average over 350.00 sample counters: sampling time is 25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					HP EGR flow request is steady state: |HPFLOW-HPFLOW_old| in range, with hysteresis	TRUE if <= 20.00 [mg], FALSE if > 30.00 [mg]		
					for a minimum number of samples	> 30.00 [counts]		
					No active transition from a combustion mode to another one	==TRUE		
					Outside Air Temperature	> -12.00 [°C]		
					Ambient Pressure	> 69.60 [kPa]		
					Engine Coolant Temperature OR OBD Coolant Enable Criteria	> 60.00 [°C] ==TRUE		
					Desired HP EGR flow	**P0402: Maximum <desired HP EGR flow** [mg] >		
					Desired fuel quantity	**P0402: Excessive HP EGR flow Min fuel enabling condition** [mm^3] AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						< **P0402: Excessive HP EGR flow Max fuel enabling condition** [mm^3]		
					Outside air temperature in range	Condition must be TRUE. Refer to "P0401, P0402: Outside air temperature" Free Form		
					Boost Control is Active or in open loop	Refer to "Boost Control in Closed Loop" Free Form		
					Cylinder nominal total flow estimation is valid	== TRUE		
					HP EGR total flow estimation is valid	== TRUE		
					LP EGR total flow estimation is valid	== TRUE		
					All enabling conditions last for a time	>= 2.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensor2 Ckt Range/ Performance	P040B	Determines the EGR temperature Sensor 2 has not moved enough since start after an allowed amount of EGR flow consumed by engine following a long enough soak.	After an allowed amount of EGR flow consumed by engine following a long enough soak, the Down Stream Temperature sensor has not change enough.	Absolute error between current temperature and Initial temperature <= **Down Stream Stk Temp Vrtn**	Monitor Enable Condition AND Diagnosis System Disabled AND Ignition In Range AND Run Crank Time AND Engine Crank Low Time Error	1.00 == == FALSE == TRUE >28,800.00 == TRUE == FALSE	Cumulative EGR Flow <= 5,000.00 Function Task: 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensor2 Ckt Low	P040C	Diagnose the EGR Down Stream Temperature sensor circuit low if the feedback of the Down Stream temp sensor is below allowed operating range the sensor is faulted.	The ECM detects that the measured resistance of the temperature sensor is out of range low.	< 159.00 [Ω]	Monitor Enable Condition AND System supply voltage AND Ignition In Range AND Engine Mode Crank AND Diagnosis System Disabled	1.00 == TRUE > 11.00 == TRUE == TRUE == FALSE == FALSE	16 failures out of 25 samples Function Task: 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensor2 Ckt High	P040D	Diagnose the EGR Down Stream Temperature sensor circuit high if the feedback of the Down Stream temp sensor is above allowed operating range the sensor is faulted	The ECM detects that the measured resistance of the temperature sensor is out of range high.	Measured Resistance of the Temperature sensor > 885.00 Q impedance	Monitor Enable Condition AND System supply voltage AND Ignition In Range AND Engine Mode Crank AND Diagnosis System Disabled	1.00 == TRUE > 11.00 == TRUE == TRUE == FALSE == FALSE	16 failures out of 25 samples Funtion Task: 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensor2 Ckt Intermittent/ Erratic	P040E	Detects a temperature sensor that is showing erratic or intermittent temperature readings. The temperature feedback is monitored in a 100 ms time loop. If the temperature is changing more than an allowed amount per loop the sensor is determined to be erratic.	The absolute value of the loop to loop (100 m s / sample) resistance change of the temperature sensor is greater than the allowed rate of change.	Delta change > 25.00 Q impedance	Monitor Enable Condition AND Ignition In Range AND System supply voltage AND Diagnosis System Disabled AND Engine Mode Crank	1.00 == TRUE == TRUE > 11.00 == TRUE == FALSE == FALSE	20 failures out of 30 samples Function task: 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensori Ckt Range/ Performance	P041B	Determines the EGR temperature Sensor 1 has not moved enough since start after an allowed amount of EGR flow consumed by engine following a long enough soak.	After an allowed amount of EGR flow consumed by engine following a long enough soak, the Up Stream Temperature sensor has not change enough.	Absolute error between current temperature and Initial temperature > **UP Stream Stk Temp Vrtn**	Monitor Enable Condition Diagnosis System Disable AND RunCrankIgnInRange RunCrankLowfor a calibratable time AND RunCrankLowTimeErr	1.00 == FALSE ==TRUE >= 28,800.00 == TRUE == FALSE	Function Task: 100 ms/sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensori Ckt Low	P041C	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes.The monitor compares the EGRT raw value (resistance value or a temperature value in case of digital sensor) with a minimum threshold.	**Analog Sensor:** The monitor compares the EGRT 1 raw value (resistance value) with a minimum threshold; if this threshold is overcome, a OOR Low error is detected. **Digital termocouple sensor:** The monitor compares the EGRT 1 raw value (temperature value) with a minimum threshold;	< 10.00 [0] < -72.80 [°C]	Monitor Enable Condition AND RunCrankIgnInRange AND Egine Mode Crank AND Diagnosis System Disabled AND RunCrankActive NAC10 Fault	1.00 == TRUE == FALSE == FALSE == TRUE == FALSE	16 failures out of 25 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensori Ckt High	P041D	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes.The monitor compares the EGRT raw value (resistance value or a temperature value in case of digital sensor) with a maximum threshold.	**Analog Sensor:** The monitor compares the EGRT 1 raw value (resistance value) with a maximum threshold; if this threshold is overcome, a OOR Hgh error is detected. **Digital termocouple sensor:** The monitor compares the EGRT 1 raw value (temperature value) with a maximum threshold	> 860.00 [Q] > 1,289.85 [°C]	Monitor Enable Condition AND RunCrankIgnInRange AND Egine Mode Crank AND Diagnosis System Disabled AND RunCrankActive NAC10 Fault	1.00 == TRUE == FALSE == FALSE == TRUE == FALSE == FALSE == FALSE	16 failures out of 25 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensori Ckt Intermittent/ Erratic	P041E	Detects a temperature sensor that is showing erratic or intermittent temperature readings. The temperature feedback is monitored in a 100 ms time loop. If the temperature is changing more than an allowed amount per loop the sensor is determined to be erratic.	1.00 The absolute value of the loop to loop (100 m s / sample) resistance change of the temperature sensor is greater than the allowed rate of change.	==TRUE than DiffTemp > 100.00 else DiffRes> 190.00	Monitor Enable Condition AND RunCrankIgnInRange AND RunCrankActive AND Diagnosis System Disabled AND Engine Mode Crank	1.00 == TRUE == TRUE == FALSE == FALSE	20 failures out of 30 samples Function Task: 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Warm Up Catalyst Efficiency Below Threshold Bank 1	P0421	The Catalyst (CC DOC) monitor only runs during DPF regeneration and compares the CC DOC released oxidation heat and the post-injected fuel quantity both evaluated inside a determined portion of the DPF regeneration itself. This comparison (ratio) produces an Aging Index that shall be greater than the efficiency threshold, in case of fresh (efficient) Catalyst. If, instead, the so calculated Aging Index is below the efficiency threshold, the diagnosis reports fail because the Catalyst is too much damaged to play well its role (conversion inefficiency detected) and shall be replaced. It is needed that post-injection is enabled during CC DOC monitor in order to produce enough exothermic heat across the Catalyst to evaluate the component conversion efficiency in a reliable way.	Catalyst Aging Index < Threshold If - Catalyst EWMA filter enabling calibration = TRUE AND - Catalyst conversion inefficiency previously detected (Catalyst Fault Active = TRUE) Then: Catalyst Aging Index < Repass Threshold If the rich combustion monitor has been enabled (refer to 'P0421 - Warm Up Catalyst Efficiency Below Threshold Bank 1 (OBD2, Rich combustion based monitor)' section of this document) together with the DPF regeneration portion AND If the DOC heat up phase, identified by the condition of DOC downstream temperature greater than a calibratabe threhsold during DPF regeneration for a minimum calibratable debounce time, can not be reached AND The DPF regeneration monitor portion has run	Aging Index < 0.15 [value] If EWMA Enbl Cal = 1.00 [Boolean] AND Catalyst FA = CAT_CatSysEffLoB1_FA Then: Aging Index < 0.15 [value] Catalyst monitor slection = CeCATD_e_RgnCatMontr Combustion mode = DPF regeneration AND DOC downstream temperature lower than a certain temperature for a debounce time DPF regeneration test	Rich combustion based monitor with DPF regeneration portion OR DPF regeneration based monitor enabled AND No active DTCs: AND - Catalyst up temperature sensor not in fault (Fault Flag = FALSE) AND - Catalyst down temperature sensor not in fault (Fault Flag = FALSE); Temperature Learning concluded: - Number of elapsed samples (task time = 100 [ms]) equal to calibration; Catalyst monitor status is DISABLED if: - DPF regeneration disabled OR	Catalyst monitor slection = CeCATD_e_RgnCatMontr AND ReportingEnabled= 1.00 [Boolean] AND Cat Up Temp Snsr Flt = NOT (EGT_SnsrCatUpFlt) AND Cat Dwn Temp Snsr Flt = NOT (EGT_SnsrCatDwnFlt); Samples nr. = 10.00 [Counter]; Catalyst monitor status is DISABLED if: DPF_DPF_St = SootLoading [Enumerative] OR	Task Time = 100 [ms] If - Catalyst EWMA filter enabling cailibration = FALSE (EWMA Enbl Cal = 1.00 [Boolean]) Then: 2 trips (with malfunction) to set DTC (Type B) If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 1.00 [Boolean]) AND - EWMA status = EWMA Standard Then: 1 trip (with malfunction) to set DTC (Type A)	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		EWMA Filtering functionality (including Fast Initial Response (FIR), Rapid Response (RR) and EWMA Standard) is supported by the Catalyst (CC DOC) monitor.	reporting a test FAIL, then this latter is considered to make a report, converting the test result through a dedicated map (to bring in the same range of the rich combustion based monitor) and comparing it with the same threshold mentioned above.	fail if test result < 0.00 DPF regeneration portion test result converted through **DPFtoRichConversion**	- Injection system in fault (Fault Flag = TRUE) OR - Ambient temperature information in fault (Fault Active = TRUE) OR - Catalyst up exhaust flow estimation in fault (Fault Flag = TRUE) OR Ambient pressure lower than calibration OR Ambient temperature lower than calibration OR - Catalyst monitor already performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) OR HC unloading enabled; Catalyst monitor status	Injection System Flt = FUL_GenericInjSysFlt OR Amb Temp FA = CAT_OutsideTempFA OR Cat Up Exh Flow Flt = EXF_TotExhCatUpFlt OR Amb Press < 69.90 [KPa] OR Amb Temp < 253.00 [K] OR Catalyst monitor already performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] OR HCI_DeHC_ExhInjDsbl = TRUE [Boolean];	If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 1.00 [Boolean]) AND - EWMA status = Fast Initial Response (FIR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard - 2.00 [Counter] elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA Standard If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 1.00 [Boolean]) AND	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					can move from DISABLED to TRIGGERED if: - DPF regeneration enabled AND - Injection system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND -Ambient conditions always satisfied while engine running: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND	Catalyst monitor status can move from DISABLED to TRIGGERED if: DPF_DPF_St # SootLoading [Enumerative] AND Injection System Flt = NOT (FUL.GenericInjSysFlt) AND Amb Temp FA = NOT (CATjDutsideTempFA) AND Cat Up Exh Flow Flt = NOT (EXF_TotExhCatUpFlt) AND Ambient conditions always satisfied while engine running: Amb Press > 70.00 [KPa] AND Amb Temp > 253.00 [K]	- EWMA status = Rapid Response (RR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard - 1 trip (with no mulfunction) to report pass - 2.00 [Counter] elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA Standard	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					- Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) AND - If DPF regeneration has been interrupted in previous driving cycle or in current driving cycle Then: Engine coolant temperature lower than calibration AND - Catalyst up exhaust temperature (by sensor) lower than calibration AND HC unloading disabled; Catalyst monitor status can move from TRIGGERED to ENABLED (oxidation heat release integrator and post injected fuel inteqrator are both	AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] AND If Interrupted DPF regeneration counter > 0 [Counter] Then: Eng Cool Temp < 60.00 [°C] AND CatUpTempSnsr< 973.00 [K]; AND HCI_DeHC_ExhlnjDsbl = FALSE [Boolean]; Catalyst monitor status can move from TRIGGERED to ENABLED (oxidation heat release integrator and post injected fuel inteqrator are both		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enabled) if: - DPF regeneration enabled AND - Injection system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND -Ambient conditions always satisfied while engine running: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND - Catalyst monitor not yet performed successfully in	enabled) if: DPF_DPF_St # SootLoading [Enumerative] AND Injection System Fit = NOT (FUL_GenericlnjSysFlt) AND Amb Temp FA = NOT (CATjDutsideTempFA) AND Cat Up Exh Flow Fit = NOT (EXF_TotExhCatUpFlt) AND -Ambient conditions always satisfied while engine running: Amb Press > 70.00 [KPa] AND Amb Temp > 253.00 [K] AND Catalyst monitor not yet performed successfully in current drivinq cycle		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					current driving cycle (Catalyst monitor shall run only once per driving cycle) AND - Catalyst up exhaust temperature (by sensor) higher than calibration AND - Post injection enabled AND - Catalyst up exhaust flow estimation in range AND - Catalyst up exhaust temperature (by sensor) in range AND - Post injection fuel rate in range AND - Consecutive time in which Post Injection Fuel rate is lower than a threshold is less than a calibration AND HC unloading disabled;	(Catalyst monitor shall run only once per driving cycle) [Boolean] AND CatUpTempSnsr> 453.00 [K] AND FUL_PostEnbl = TRUE [Boolean] AND 30.00 < Cat Up Exh Flow < 250.00 [g/s] AND 523.00 < Cat Up Temp Snsr [K] < 688.00 AND 0.00 < Post Inj Fuel Qnty [g/s] < 10.00 AND Post Inj Fuel Qnty [g/s] < 0.00 for less than 0.00 [s] AND HCI_DeHC_Exhlnjdsbl = FALSE [Boolean]; Oxidation heat release intearator and Dost		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Oxidation heat release integrator and post injected fuel integrator are both frozen if: - Engine not running OR - Catalyst up exhaust flow estimation out of range OR - Catalyst up exhaust temperature (by sensor) out of range OR - Post injection fuel rate out of range OR - Consecutive time in which Post Injection Fuel rate is lower than a threshold is more than a calibration Catalyst monitor status can move from ENABLED	injected fuel integrator are both frozen if: - Engine not running OR Cat Up Exh Flow [g/s] < 30.00 OR Cat Up Exh Flow > 250.00 [g/s] OR Cat Up Temp Snsr [K] < 523.00 OR Cat Up Temp Snsr [K] > 688.00 OR Post Inj Fuel Qnty [g/s] < 0.00 OR Post Inj Fuel Qnty [g/s] > 10.00 OR Post Inj Fuel Qnty [g/s] < 0.00 for more than 0.00 [S]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(oxidation heat release integrator and post injected fuel integrator are both enabled) to DONE (integrators are stopped and the ratio between the total integrated oxidation heat and the total integrated injected fuel is performed with the consequent creation of the Catalyst Aging Index to be compared with the Fault Threshold --> Diagnostic test evaluation trigger) if: - DPF regeneration enabled AND - Injection system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND -Ambient conditions	Catalyst monitor status can move from ENABLED (oxidation heat release integrator and post injected fuel integrator are both enabled) to DONE (integrators are stopped and the ratio between the total integrated oxidation heat and the total integrated injected fuel is performed with the consequent creation of the Catalyst Aging Index to be compared with the Fault Threshold --> Diagnostic test evaluation trigger) if: DPF_DPF_St # SootLoading [Enumerative] AND Injection System Fit = NOT (FUL_GenericlnjSysFlt) AND Amb Temp FA = NOT (CATjDutsideTempFA) AND Cat Up Exh Flow Fit = NOT (EXF_TotExhCatUpFlt)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					always satisfied while engine running: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND - Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) AND - Integrated post injected fuel quantity higher than curve AND HC unloading disabled	AND -Ambient conditions always satisfied while engine running: Amb Press > 70.00 [KPa] AND Amb Temp > 253.00 [K] AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] AND Intgr Post Inj Fuel Qnty > **CatCrtdMaxFuel** [g] AND HCI_DeHC_ExhlnjDsbl = FALSE [Boolean]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Main Catalyst Efficiency Below Threshold Bank 1	P0422	The Second Catalyst (UF DOC) monitor only runs during DPF regeneration and compares the UF DOC released oxidation heat and the exhaust-injected fuel quantity (by HCI) both evaluated inside a determined portion of the DPF regeneration itself. This comparison (ratio) produces an Aging Index that shall be greater than the efficiency threshold, in case of fresh (efficient) Second Catalyst. If, instead, the so calculated Aging Index is below the efficiency threshold, the diagnosis reports fail because the Second Catalyst is too much damaged to play well its role (conversion inefficiency detected) and shall be replaced. It is needed that exhaust-injection (by HCI) is enabled during UF DOC monitor in order to produce enough exothermic heat across the Second Catalyst to evaluate the component conversion efficiency in a reliable way.	Second Catalyst Aging Index < Threshold If - Second Catalyst EWMA filter enabling calibration = TRUE AND - Second Catalyst conversion inefficiency previously detected (Second Catalyst Fault Active = TRUE) Then: Second Catalyst Aging Index < Repass Threshold	Aging Index < 0.63 If EWMA Enbl Cal = 1.00 [Boolean] AND Second Catalyst FA = CAT_Cat2_SysEffLoB1_FA Then: Aging Index < 0.69 [Curve]	- Second Catalyst monitor enabling calibration = TRUE AND No active DTCs: - Second Catalyst up temperature estimation not in fault (Fault Flag = FALSE) AND - Second Catalyst down temperature sensor not in fault (Fault Flag = FALSE); Temperature Learning concluded: - Number of elapsed samples (task time = 100 [ms]) equal to calibration; Second Catalyst monitor status is DISABLED if: - DPF regeneration disabled OR - HCI system in fault (Fault Flag = TRUE) OR - Ambient temperature information in fault (Fault Active = TRUE) OR - Second Catalyst up exhaust flow estimation in	Monitor Enbl Cal = 1.00 [Boolean] AND Cat2 Up Temp Estim Flt = NOT (EGT_TempCat2_UpFlt) AND Cat2 Dwn Temp Snsr Flt = NOT (EGT_SnsrCat2_DwnFlt); Temperature Learning concluded: Samples nr. = 10.00 [Counter]; Second Catalyst monitor status is DISABLED if: DPF_DPF_St = SootLoading [Enumerative] OR HCI System Flt = HCI_GenericShtOffReq OR Amb Temp FA = CAT_OutsideTempFA OR Cat2 Up Exh Flow Flt = EXF_TotExhCat2_UpFlt	Task Time = 100 [ms] If - Second Catalyst EWMA filter enabling cailibration = FALSE (EWMA Enbl Cal = 1.00 [Boolean]) Then: 2 trips (with malfunction) to set DTC (Type B) If - Second Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 1.00 [Boolean]) AND - EWMA status = EWMA Standard Then: 1 trip (with malfunction) to set DTC (Type A) If - Second Catalyst EWMA filter enabling	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		EWMA Filtering functionality (including Fast Initial Response (FIR), Rapid Response (RR) and EWMA Standard) is supported by the Second Catalyst (UF DOC) monitor.			fault (Fault Flag = TRUE) OR -Ambient conditions not always satisfied while engine running: Ambient pressure lower than calibration OR Ambient temperature lower than calibration OR - Second Catalyst monitor already performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) OR HC unloading enabled; Second Catalyst monitor status can move from DISABLED to TRIGGERED if: - DPF regeneration enabled AND - HCI system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Second Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND	OR -Ambient conditions not always satisfied while engine running: Amb Press < 69.90 [KPa] OR Amb Temp < 253.00 [K] OR Second Catalyst monitor already performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) [Boolean] OR HCI_DeHC_ExhlnjDsbl = TRUE [Boolean]; Second Catalyst monitor status can move from DISABLED to TRIGGERED if: DPF_DPF_St # SootLoading [Enumerative] AND HCI System Fit = NOT (HCI_GenericShtOffReq) AND Amb Temp FA = NOT (CATjDutsideTempFA) AND Cat2 Up Exh Flow Fit = NOT (EXF_TotExhCat2_UpFlt) AND Ambient conditions	cailibration = TRUE (EWMA Enbl Cal = 1.00 [Boolean]) AND - EWMA status = Fast Initial Response (FIR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard - 2.00 [Counter] elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA Standard If - Second Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 1.00 [Boolean]) AND - EWMA status = Rapid Response (RR) Then: - 1 trio (with	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Ambient conditions always satisfied while engine running: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND - Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) AND - If DPF regeneration has been interrupted in previous driving cycle or in current driving cycle Then: Engine coolant temperature lower than calibration AND - Second Catalyst up exhaust temperature (by estimation) lower than calibration; Second Catalyst monitor status can move from TRIGGERED to ENABLED (oxidation heat release integrator and exhaust injected fuel (by HCI) integrator are both enabled) if: - DPF regeneration enabled	always satisfied while engine running: Amb Press > 70.00 [KPa] AND Amb Temp > 253.00 [K] AND Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) [Boolean] AND If Interrupted DPF regeneration counter > 0 [Counter] Then: Eng Cool Temp < 60.00 [°C] AND Cat2 Up Temp Estim < 773.00 [K]; Second Catalyst monitor status can move from TRIGGERED to ENABLED (oxidation heat release integrator and exhaust injected fuel (by HCI) integrator are both enabled) if: DPF_DPF_St # SootLoading [Enumerativel	malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard - 1 trip (with no mulfunction) to report pass - 2.00 [Counter] elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA Standard	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND - HCI system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Second Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND Ambient conditions always satisfied while engine running: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND - Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) AND - Second Catalyst up exhaust temperature (by estimation) higher than calibration AND - Exhaust injection (by HCI) enabled AND	AND HCI System Fit = NOT (HCI_GenericShtOffReq) AND Amb Temp FA = NOT (CATjDutsideTempFA) AND Cat2 Up Exh Flow Fit = NOT (EXF_TotExhCat2_UpFlt) AND Ambient conditions always satisfied while engine running: Amb Press > 70.00 [KPa] AND Amb Temp > 253.00 [K] AND Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) [Boolean] AND Cat2 Up Temp Estim > 423.00 [K] AND HCIJnjReleaseSt = TRUE [Boolean] AND Cat2 Uo Exh Flow in		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					- Second Catalyst up exhaust flow estimation included in a defined range AND - Exhaust injection fuel flow quantity (by HCI) included in a defined range - Catalyst upstream temperature included in a defined range Oxidation heat release integrator and exhaust injected fuel (by HCI) integrator are both frozen if: - Engine not running OR - HC injection is disabled Second Catalyst monitor status can move from ENABLED (oxidation heat release integrator and exhaust injected fuel (by HCI) integrator are both enabled) to DONE (integrators are stopped and the ratio between the total integrated oxidation heat and the total integrated injected fuel is performed with the consequent creation of the Second Catalyst Aging Index to be compared with the Fault Threshold --> Diagnostic test evaluation trigger) if: - DPF regeneration	range between 35.00 AND 250.00 [g/s] AND Exh Inj Fuel Qnty (by HCI) in range between 0.08 AND 1.00 [g/s] Catalyst upstream temperature in range between 225.00 AND 405.00 [°C] Oxidation heat release integrator and exhaust injected fuel (by HCI) integrator are both frozen if: - Engine not running OR - HC injection is disabled Second Catalyst monitor status can move from ENABLED (oxidation heat release integrator and exhaust injected fuel (by HCI) integrator are both enabled) to DONE (integrators are stopped and the ratio between the total integrated oxidation heat and the total integrated injected fuel is performed with the consequent creation of the Second Catalyst Aging Index to be compared with the Fault Threshold --> Diagnostic test evaluation trigger) if: DPF_DPF_St # SootLoading [Enumerative] AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enabled AND - HCI system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Second Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND Ambient conditions always satisfied while engine running: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND - Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) AND - Integrated exhaust injected fuel quantity (by HCI) higher than curve.	HCI System Fit = NOT (HCI_GenericShtOffReq) AND Amb Temp FA = NOT (CATjDutsideTempFA) AND Cat2 Up Exh Flow Fit = NOT (EXF_TotExhCat2_UpFlt) AND Ambient conditions always satisfied while engine running: Amb Press > 70.00 [KPa] AND Amb Temp > 253.00 [K] AND Second Catalyst monitor not yet performed successfully in current driving cycle (Second Catalyst monitor shall run only once per driving cycle) [Boolean] AND Intgr Exh Inj Fuel Qnty (by HCI) > 48.00 [g].		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 1 Performance (For use on vehicles with a single fuel tank)	P0461	This DTC will detect a primary fuel tank level sensor stuck in-range.	a) Sensed fuel volume change is b) while engine fuel consumption is	a) < 3 liters b) > 19.80 liters	1. Diagnostic is Enabled 2. Engine Operational State	 2. == Running	250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 1 Circuit Low Voltage (For use on vehicles with a fuel float connected to an FTZM)	P0462	This DTC will detect a primary fuel tank sensor out-of-range low.	Fuel level Sender % of 5V range	< 10%	a) Diagnostic is Enabled b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	b) == True c) == True d) <> True	40 failures out of 50 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 1 Circuit High Voltage (For use on vehicles with a fuel float connected to an FTZM)	P0463	This DTC will detect a primary fuel tank level sensor out-of-range high.	Fuel level Sender % of 5V range	> 60 %	a) Diagnostic is Enabled b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	b) == True c) == True d) <> True	40 failures out of 50 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan 1 Relay Control Circuit Open (Output Driver Monitor) (Not used on EREV/ PHEVZ HEV)	P0480	Diagnoses the cooling fan 1 relay control low side driver circuit for circuit faults	Voltage low during driver off state (indicates open circuit)	Open Circuit: > 200 K Q impedance between signal and controller ground	Powertrain Relay Voltage	Voltage > 11.0 volts	50 failures out of 63 samples 100 ms /sample	Type B, 2 Trips Note: In certain controllers P0691 may also set (Fan 1 Short to Ground).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan System Performance [EV Engine Driven Fans Only]	P0483	The fan diagnostic is performed when the fan clutch is commanded ON. The fan is considered ON when the fan control PWM output duty cycle is greater than a calibration. A failure is indicated if there is a large difference between the actual fan speed and the commanded speed. This is a type "B" diagnostic that uses an Exponentially Weighted Moving Average [EWMA] approach with weighting factors based on operating conditions. Before the diagnostic reports a PASS or FAIL, all the weighting factors combined must exceed a calibration indicating enough reliable data has been collected.	Fan speed weighted filtered residual speed (measured - commanded) must be above the lower threshold and below the upper threshold	less than -470 rpm and greater than 500 rpm	a] Diagnostic Enabled b] Fan commanded on c] Fan at min duty cycle d] Intake Air Temp Fault Active e] Enginer Arbitrated Fault Active f] Output Driver Fault Active g] Fan Speed Sensor Circuit Fault Active h] Intake Air Temperature i] System Voltage j] Ambient Air Pressure defaulted k] Ambient Air Pressure l] Outside Air Temperature m] Fan Drive Speed (input shaft speed) n] Fan rate of speed change o] Engine coolant temperature	1.00 [True if 1; False ifO] b] =TRUE c] d] = FALSE e] = FALSE f]= FALSE g]= FALSE h] >=-20.00 deg C i]>= 11.00V j]= FALSE k] > 74.00 kPa l] >=-20.00 deg C m] >= 400 & <= 5,320 rpm n] <2,000.00 rpm/sec o] >= 69 deg C	When the filtered total weighting factor (see tab P0483 Weighted Filtered Factor) exceeds 0.60 the diagnostic is ready to report	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan Speed High [EV Engine Driven Fans Only]	P0495	The purpose of this diagnostic is to detect a clutch that is providing too much engagement. The measured fan speed is compared to a drag speed table based on input shaft speed. A failure will be indicated if the measured fan speed is above the drag speed in the table for a calibrated number of samples. This is a type "B" diagnostic that uses a X/Y approach	Measured fan speed must be less than the speed high limit (drag speed)	>= Speed High Limit [Supporting Table] **P0495 Threshold [EV Fans Only]**	a] Diagnostic Enabled b] Fan speed c] Clutch Pumped Out d] Intake Air Temp Fault Active e] Enginer Arbitrated Fault Active f] Output Driver Fault Active g] Fan Speed Sensor Circuit Fault Active h] Intake Air Temperature i] System Voltage j] Ambient Air Pressure defaulted k] Ambient Air Pressure l] Fan Commanded off	a =] 1 [True if 1; False if 0] b] >= 1,600 rpm c] = TRUE d] = FALSE e] = FALSE f]= FALSE g]= FALSE h] >=-20.00 deg C i]>= 11.00 j] = FALSE k > 74.00 i) = TRUE	800 failures out of 1,000 samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankcase Ventilation System Disconnected	P04DB	The Crankcase Ventilation System Disconnected Diagnostic monitors the performance of the Positive Crankcase Ventilation (PCV) System. After the enable conditions are met, this monitor will will evaluate the signal of the Crankcase Ventilation Pressure sensor. This sensor is mounted in the PCV hose between the crankcase and the engine induction system. During normal operation, the sensor will see a pressure drop that varies in conjunction with the engine airflow. Additionally, the sensor will see pressure pulses as the cylinders go up and down in the crankcase. This monitor evaluates both the signal offset based on the pressure drop, and the signal noise based on the pressure pulses. The product of the	ScaledSignalLo * ScaledNoiseLo or ScaledSignalHi * ScaledNoiseHi Where ScaledSignalLo = Where ScaledNoiseLo = Where ScaledSignalHi =	< 1.30 kPa* kPa > 15.00 kPa* kPa Average Crankcase Ventilation Pressure Signal value calculated over the sample period and normalized as a function of engine air flow based on table **P04DB: Crankcase Pressure Signal Normalization for Air Flow, low case** 0.00 kPa is subtracted from the normalized value. The absolute value of the result is taken to get the final ScaledSignalLo. Average Crankcase Ventilation Pressure Signal delta calculated over the sample period and normalized as a function of engine speed based on table **P04DB: Crankcase Pressure Noise Normalization for Engine Speed, low case** Average Crankcase Ventilation Pressure	Diagnostic is Enabled Outside Air Temperature Engine Coolant Temperature Barometric Pressure Stability conditions: Engine Air Flow Engine Air Flow Engine Vacuum Engine Vacuum Engine Speed Engine Speed Maximum Engine Air Flow - Minimum Engine Air Flow over the sample period Engine Manifold Pressure (MAP) Transient Active MAP Transient Delay MAP Transient Active = TRUE when: Engine Speed Engine Speed MAP Delta over 100 msec MAP Transient Delay = TRUE for a period of time after MAP Transient Active becomes FALSE. This time is determined	 >= -20.0 Degrees C >= 63.0 Degrees C >= 69.6 kPa >= 125.0 Grams/Second <= 295.0 Grams/Second >= -168.0 kPa <= -10.0 kPa >= 1,450 RPM <= 2,800 RPM <= 20.0 Grams/Second = FALSE = FALSE > 500 RPM < 2,300 RPM > MAP Transient Delta Threshold which is a function of engine speed based on table **P04DB: MAP Transient Delta Threshold**	The DTC will fail immediately if the malfunction criteria are met	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		signal offset and signal noise is compared to a calibration threshold during certain engine operating conditions. If this product is between two failure thresholds, the system is operating as expected, and the monitor passes. If the product is outside of the two failure thresholds, the system is disconnected, and the monitor fails.	Where ScaledNoiseHi = The Crankcase Ventilation Pressure Sensor is sampled every 3.125 msec to calculate ScaledSignalLo/Hi and ScaledNoiseLo/Hi. ScaledSignalLo/Hi and ScaledNoiseLo/Hi values are accumulated over a period of 1.0 Seconds.	Signal value calculated over the sample period and normalized as a function of engine air flow based on table **P04DB: Crankcase Pressure Signal Normalization for Air Flow, high case** 0.00 kPa is subtracted from the normalized value. The absolute value of the result is taken to get the final ScaledSignalHi. Average Crankcase Ventilation Pressure Signal delta calculated over the sample period and normalized as a function of engine speed based on table **P04DB: Crankcase Pressure Noise Normalization for Engine Speed, high case**	as a function of the maximum MAP Delta measured while MAP Transient Active = TRUE, and is based on table **P04DB: MAP Transient Delay Active Time** --------------------------- Time that stability conditions must be met prior to sampling data Data is sampled over a period of time Stability conditions must continue to be met as the data sample is collected. A data sample may accumulate data from multiple sample windows. <u>DTCs Active:</u> <u>DTCs Pending:</u>	------------------------------- = 0.5 Seconds = 1.0 Seconds MAF_SensorFA MAP_SensorFA OAT_PtEstFiltFA AmbPresDfltdStatus ECT_Sensor_FA PCV_Sensor_FA PCV_Sensor_Circuit_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankcase Ventilation Hose Connection Sensor Circuit Low	P04E2	Detects a continuous open or short to ground in the Crankcase Ventilation Pressure signal circuit by monitoring the Crankcase Ventilation Pressure sensor output voltage and failing the diagnostic when the Crankcase Ventilation Pressure voltage is too low. The Crankcase Ventilation Pressure sensor is a pressure transducer which outputs a voltage proportional to the gauge pressure between the crankcase ventilation hose and the atmosphere.	Crankcase Ventilation Pressure Sensor Voltage	<= 1.0% of 5 Volt Range (This is equal to -6.13 kPa)	Diagnostic is Enabled		320 failures out of 400 samples 1 sample every 3.125 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankcase Ventilation Hose Connection Sensor Circuit High	P04E3	Detects a continuous short to power in the Crankcase Ventilation Pressure signal circuit by monitoring the Crankcase Ventilation Pressure sensor output voltage and failing the diagnostic when the Crankcase Ventilation Pressure voltage is too high. The Crankcase Ventilation Pressure sensor is a pressure transducer which outputs a voltage proportional to the gauge pressure between the crankcase ventilation hose and the atmosphere.	Crankcase Ventilation Pressure Sensor Voltage	>= 99.0 % of 5 Volt Range (This is equal to 6.13 kPa)	Diagnostic is Enabled		320 failures out of 400 samples 1 sample every 3.125 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankcase Ventilation Hose Connection Sensor Range/ Performance	P04FB	Detects a performance failure in the Crankcase Ventilation Pressure sensor, such as when the sensor value is stuck in range. If the engine has been off for a sufficient amount of time, the pressure in the crankcase ventilation system will equalize to atmospheric pressure. The Crankcase Ventilation Pressure sensor value is checked to see if it is within the normal expected range around the expected value of 0 kPa. If it is not, the Crankcase Ventilation Pressure performance diagnostic will fail. The Crankcase Ventilation Pressure sensor is a pressure transducer which outputs a voltage proportional to the gauge pressure between the crankcase ventilation hose and the atmosphere.	Crankcase Ventilation Pressure OR Crankcase Ventilation Pressure	>= 0.63 kPa <= -0.63 kPa	Diagnostic is Enabled Engine is not rotating (Time since engine has stopped rotating OR Outside Ambient Temperature) Engine Coolant Temperature <u>DTCs Active:</u>	**P04FB : Pressure Sensor Equilibrium >= Time** seconds >=-20.00 deg C >= 70.0 deg C PCV_Sensor_Circuit_FA ECT_Sensor_FA EngineModeNotRunTimer Error	320 failures out of 400 samples 1 sample every 3.125 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Low Engine Speed Idle System	P0506	This DTC indicates that actual engine speed is lower than desired engine speed at idle so that it is out of speed control capability. Testing is performed when basic conditions are met. If filtered engine speed error exceeds a calibrated threshold for a calibrated duration, code is set. This testing is performed continuously per trip if basic conditions are met	Filtered Engine Speed Error. It is calculated with a calibrated filter coefficient Filter coefficient	> 91.00 rpm 0.00300	Baro Coolant Temp Engine run time Ignition voltage Time since gear change Time since a TCC mode change IAT Vehicle speed Commanded RPM delta Idle time For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 70 kPa > 60 °C > 30 sec 32 > volts > 11 > 3 sec > 3 sec > -20 °C < 1.24 mph, 2kph < 25 rpm > 5 sec > 68.00 pct < 25.00 pct PTC not active Transfer Case not in 4WD LowState	Diagnostic runs in every 12.5 ms loop Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Off-vehicle device control (service bay control) must not be active.		
						following conditions not TRUE: (VeTESR_e_EngSpdReqIntvType = CeTESR_e_EngSpdMinLimitAND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion)		
						Clutch is not depressed		
					No active DTCs	TC_BoostPresSnsrFA ECT_Sensor_FA EnginePowerLimited EGRValveCircuit.FA EGRValvePerformance_FA IAT_SensorCircuitFA EvapFlowDuringNonPurge_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA FuelInjectorCircuit_FA MAF_SensorFA EngineMisfireDetected_FA IgnitionOutputDriver_FA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA FuelLevelDataFault LowFuelConditionDiagnostic Clutch Sensor FA AmbPresDfltdStatus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P2771		
					All of the above met for Idle time	> 5 sec		
						The diagnostic does not run during autostop as engine is shutdown during that time (occurs in a hybrid or 12v start stop vehicle)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
High Engine Speed Idle System	P0507	This DTC indicates that actual engine speed is higher than desired engine speed at idle so that it is out of speed control capability. Testing is performed when basic conditions are met. If filtered engine speed error exceeds a calibrated threshold for a calibrated duration, code is set. This testing is performed continuously per trip if basic conditions are met	Filtered Engine Speed Error. It is calculated with a calibrated filter coefficient	< -182.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
					Coolant Temp	> 60 °C	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
			Filter coefficient	0.00300				
					Engine run time	> 30 sec		
					Ignition voltage	32 > volts > 11		
					Time since gear change	> 3 sec		
					Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	< 1.24 mph, 2kph		
					Commanded RPM delta	< 25 rpm		
					For manual transmissions: Clutch Pedal Position	> 68.00 pct		
					or Clutch Pedal Position	< 25.00 pct		
						PTC not active		
						Transfer Case not in 4WD LowState		
						Off-vehicle device control (service bay control) must not be active.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						following conditions not TRUE: (VeTESR_e_EngSpdReqIntvType = CeTESR_e_EngSpdMinLimitAND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion)		
						Clutch is not depressed		
					No active DTCs	TC_BoostPresSnsrFA ECT_Sensor_FA EnginePowerLimited EGRValveCircuit.FA EGRValvePerformance_FA IAT_SensorCircuitFA EvapFlowDuringNonPurge_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA FuelInjectorCircuit_FA MAF_SensorFA EngineMisfireDetected_FA IgnitionOutputDriver_FA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA FuelLevelDataFaultLow FuelConditionDiagnostic Clutch SensorFA AmbPresDfltdStatus P2771		
					All of the above met	> 5 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					for Idle time	The diagnostic does not run during autostop as engine is shutdown during that time (occurs in a hybrid or 12v start stop vehicle)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan Speed Sensor Circuit [EV fan]	P0526	This diagnostic is a rationality check of the fan speed feedback ciruit. The fan speed sensor should have a RPM output greater than zero when the engine is running. If the fan speed sensor output is below a cal for a period of time, a failure (P0526) is indicated. This is a "B" type diagnostic that uses an x/y detection.	Fan_RPM_Measured must stay above this RPM count in order for the fan speed feedback circuit to be considered operational	>=4.00 rpm	a] Diagnostic Enabled b] Speed Sensor Faults c] Output Driver Faults d] System Voltage e] Min Fan Speed Threshold f] Time fan must be above the min fan speed threshold before diagnostic enabled and counter can be incremented	a] 1 [True if 1; False ifO] b] = FALSE c]] = FALSE d] >= 11.0 volts e] >= 39.00 rpm f] >= 2.00 rpm	250.00 failures out of 300.00 samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System Voltage Low	P0562	Detects a low 12V battery system. This diagnostic reports the DTC when battery voltage is low. Monitoring occurs when the engine speed is above a calibrated value.	System voltage low	Battery voltage <= 9.00	System voltage low diag enable = TRUE Run Crank voltage Engine speed >=	1.00 Voltage >5.00 volts 400.00	400 failures out of 500 samples 12.5 ms /sample	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System Voltage High	P0563	Detects a high 12V battery system. This diagnostic reports the DTC when battery voltage is high.	System voltage high	Battery voltage >= 18.00	System voltage high diag enable = TRUE Run Crank voltage	1.00 Voltage >5.00 volts	400 failures out of 500 samples 12.5 ms /sample	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Mutil-Functon Switch Circuit Switch Bank 1	P0564	Detect when cruise control multi-function switch circuit (analog) voltage is in an invalid range. "When the BCM tells the ECM that the cruise control analog input voltage is in an invalid range, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	Cruise Control analog circuit voltage must be "between ranges" for greater than a calibratable period of time over a sample period.	The cruise control analog voltage A/D count ratio is considerred to be "between ranges" when the ratio is measured in the following ranges: 0.28 -0.31, 0.415-0.445, 0.585-0.615 0.78-0.81, 1.005- 1.035	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	indicate failure for 0.50 seconds over the sample period / 25.00 seconds.	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control On Switch Circuit Switch Bank 1 or 2	P0565	Detects a failure of the cruise on/off switch in a continously applied state "When the BCM tells the ECM that the cruise control analog input voltage is in the Momentary Cruise On/ Off range for too long, the code is set and cruise control is disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for vehicles with a momentary on/off cruise switch architecture.	Cruise Control On switch remains applied for greater than a calibratable period of time over a sample period.	fail in the applied state for greater than 89.00 seconds over the sample period of 99.00 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail for greater than 89.00 seconds/ 99.00 seconds	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Resume Circuit Switch Bank 1 or 2	P0567	Detects a failure of the cruise resume switch in a continously applied state "When the BCM tells the ECM that the cruise control analog input voltage is in the Resume range for too long, the code is set and cruise control is disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	Cruise Control Resume switch remains applied for greater than a calibratable period of time over a sample period.	fail in the applied state for greater than 89.00 seconds over the sample period of 99.00 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail for greater than 89.00 seconds/ 99.00 seconds	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Set Circuit Switch Bank 1 or 2	P0568	Detects a failure of the cruise set switch in a continously applied state "When the BCM tells the ECM that the cruise control analog input voltage is in the Set range for too long, the code is set and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	Cruise Control Set switch remains applied for greater than a calibratable period of time over a sample period	fail in the applied state for greater than 89.00 seconds over the sample period of 99.00 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail for greater than 89.00 seconds/ 99.00 seconds	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Cancel Switch Circuit Switch Bank 1 or 2	P056C	Detects a failure of the cruise cancel switch in a continously applied state "When the BCM tells the ECM that the cruise control analog input voltage is in the Cancel range for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for vehicles with a momentary on/off cruise switch architecture.	Cruise Control Cancel switch remains applied for greater than a calibratable period of time over a sample period	fail in the applied state for greater than 89.00 seconds over the sample period of 99.00 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail for greater than 89.00 seconds/ 99.00 seconds	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Brake Pedal Position Sensor Circuit Range/ Performance	P057B	This diagnostic monitors the Brake Pedal Position Sensor for a stuck in range failure	Brake pedal position sensor movement diagnostic cal is enabled 1.00	True	Diagnostic is enabled. Brake Pedal Position Sensor Circuit Range / Performance Diagnostic Enable	1.00 ignition voltage > 10.00		MIL: Type A, 1 Trips
			Calculated EWMA value must be greater than calibratable theshold after calibratable number of tests have completed to report a "test passed" for P057B	EWMA value looked up in supporting table **P057B KtBRKI_K_FastTestPointWeight** P057B as a function of calculated brake pedal position delta EWMA value is > 0.80	calculated brake pedal position delta sample counter > 250.00 for fast test OR calculated brake pedal position delta sample counter > 1,000.00 for slow test	calculated brake pedal position delta > 3.33 OR (for slow test) shift lever has been in park once this key cycle vehicle speed >= 8.00 accelerator pedal position < 5.00	total number of EWMA tests > 20.00	
			Calculated EWMA Value must be less than calibratable threshold after calibratable number of tests have completed to report a "test failed" for P057B. This test runs once per key cycle	EWMA value looked up in supporting table **P057B KtBRKI_K_CmpltTestPointweight** P057B as a function of calculated brake pedal position delta EWMA value is less thatn 0.40	no DTC's active (P057C, P057D)	shift lever has been in park once this key cycle vehicle speed >= 8.00 accelerator pedal position < 5.00	total number of EWMA tests > 2.00	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Brake Pedal Position Sensor Circuit Low	P057C	detects short to ground for brake pedal position sensor	If x of y samples are observed below failure threshold, default brake pedal position to zero percent and set DTC.	5.00	Diagnostic is enabled. Brake Pedal Position Sensor Low Voltage Diagnostic Enable	1.00	20.00 / 32.00 counts	MIL: Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Brake Pedal Position Sensor Circuit High	P057D	detects open circuit for brake pedal position sensor	If x of y samples are observed above failure threshold, default brake pedal position to zero percent and set DTC	95.00	Diagnostic is enabled. Brake Pedal Position Sensore High Voltage Diagnostic Enable	1.00	20.00/ 32.00 counts	MIL: Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Brake Pedal Position Sensor Circuit Intermittent/ Erratic	P057E	detects noisy / erratic ouput for brake pedal position sensor	If x of y samples are observed above failure threshold, default brake pedal position to zero percent and set DTC	15.00	Diagnostic is enabled. Brake Pedal Position Sensor Circuit Intermittent / Erratic Diagnostic Enable	1.00	5.00/ 20.00 counts	MIL: Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Multi-function Circuit Low Voltage Bank 1	P0580	detects short to ground failure for cruise control multi-function switch circuit (analog) voltage When the BCM tells the ECM that the cruise control analog input voltage is too low for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for vehicles with a momentary on/off cruise switch architecture. For certain vehicles (GM Global A), this also accounts for Open Circuit failure on cruise multi-function switch circuit.	Cruise Control analog circuit voltage must be in an "Short To Ground" range for greater than a calibratable period of time over a sample period.	The cruise control analog voltage A/D count ratio is considerred to be "short to ground when the ratio is measured in the following rangs: 0-0.185	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	indicate failure for 2.00 seconds / 25.00 seconds.	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Multi-function Circuit High Voltage Bank 1	P0581	detects short to power failure for cruise control multi-function switch circuit (analog) voltage When the BCM tells the ECM that the cruise control analog input voltage is too high for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for vehicles with a momentary on/off cruise switch architecture.	Cruise Control analog circuit voltage must be in an "Open Short To Ground" range for greater than a calibratable period of time over a sample period.	The cruise control analog voltage A/D count ratio is considered to be "short to power" when the ratio is measured in the following range: 1.005- 1.035	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	indicate failure for 2.00 seconds / 25.00 seconds.	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Multi-Function Input B Circuit Bank 2	P0589	Detect when cruise control multi-function switch circuit B (analog) voltage is in an invalid range When the BCM tells the ECM that the cruise control analog input voltage is detected Out of Range for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	Cruise Control analog circuit B voltage must be "between ranges" for greater than a calibratable period of time over a sample period..	The cruise control analog voltage A/D count ratio is considerred to be "between ranges" when the ratio is measured in the following ranges: 0.28 -0.31, 0.415-0.445, 0.585-0.615, 0.78-0.81	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	indicate failure for 0.50 seconds / 25.00 seconds.	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Multi-Function Input B Circuit Low Bank 2	P0592	detects short to ground failure for cruise control multi-function switch circuit B (analog) voltage. When the BCM tells the ECM that the cruise control analog input voltage is detected too lowfor too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	Cruise Control analog circuit B voltage must be in an "Open Short To Ground" range for greater than a calibratable period of time over a sample period.	The cruise control Circuit B analog voltage A/D count ratio is considered to be "open short to groun"d when the ratio is measured in the following rangs: 0-0.185	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	indicate failure for 2.00 seconds / 25.00 seconds.	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Multi-Function Input B Circuit High Bank 2	P0593	detects short to power failure for cruise control multi-function switch circuit B (analog) voltage. When the BCM tells the ECM that the cruise control analog input voltage is detected too high for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	Cruise Control analog circuit B voltage must be in a "Short To Power" range for greater than a calibratable period of time over a sample period.	The cruise control Circuit B analog voltage A/D count ratio is considered to be "short to power" when the ratio is measured in the following range: 1.005- 1.035	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	indicate failure for 2.00 seconds/ 25.00 seconds.	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Active Grill Air Shutter A Performance /Stuck OFF	P059F	A2-part diagnostic. Part 1 continuously monitors for failure to achieve a commanded shutter actuator position [Suspect Stuck Condtion] when X failures occur in Y samples after an electronic command latency delay. A Part 1 failure result then enables Part 2 which makes a fixed number of repeat attempts to reach the commanded postion [ReTry to clear obstruction]. The DTC is set when the calibrated fault threshold count of repeat attempts is reached without achieving the original commanded shutter position. Retry attempts will continue until the commanded position is achieved or the trip ends.	[Smart Shutter Actuator 1 Position Response **OR** Shutters Not Initialized **OR** The absolute difference between Smart Shutter Actuator 1 Position Response and Shutter response and Commanded Position percent] **AND** Shutter 1 Diagnostic Delay Threshold count	[Indeterminate **OR** = TRUE **OR** > 5.00] **AND** Counter > 109.00 counts	a. Command ShutterI Enable. b. ShutterI Performance Diagnostic Enabled c. Off Vehicle Communication Service Request Diagnostic Enabled Any of the following conditions are met: d. Run Crank Active All of the following conditions are met: e. Run Crank Active f. Command On and Key Off g. ECU Awake h. Run Crank Voltage in Range i. Ignition Powertrain Relay Voltage in Range j. Actuator Initialization Complete Any of the following conditions are met k. If Enabled, performance diagnostics will be enabled even in the	a. = TRUE b. = Enabled c. = TRUE d. =TRUE e. = FALSE f. =TRUE g. =TRUE h. >=11.00 AND <= 32.00 i. >= 11.00 AND <= 32.00 j. =TRUE k. = Disabled	0.1 seconds out of a 0.1 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					presence of a communication fault. All of the following conditions are met: l. LIN communication NOT faulted.(DTC: U028400, U058500) m. No LIN communication Fault Pending n. LIN communication Data is Ready	l. = TRUE m. =TRUE n. =TRUE		
			Shutter 1 Performance Test count	= 5.00 counts	a. Command ShutterI Enable. b. ShutterI Performance Diagnostic Enabled c. Off Vehicle Communication Service Request Diagnostic Enabled Any of the following conditions are met: d. Run Crank Active All of the following conditions are met: e. Run Crank Active f. Command On and Key Off	a. = TRUE b. = Enabled c. = TRUE d. =TRUE e. = FALSE f. =TRUE	1-5 actuator cycles [1 cycle typically requires 10-25 seconds]	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					g. ECU Awake h. Run Crank Voltage in Range i. Ignition Powertrain Relay Voltage in Range j. Actuator Initialization Complete Any of the following conditions are met k. If Enabled, performance diagnostics will be enabled even in the presence of a communication fault. All of the following conditions are met: l. LIN communication NOT faulted.(DTC: U028400, U058500) m. No LIN communication Fault Pending n. LIN communication Data is Ready	g. = TRUE h. >=11.00 AND <= 32.00 i. >= 11.00 AND <=32.00 j. =TRUE k. = Disabled l. = TRUE m. =TRUE n. =TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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.	
				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 Ilium.
Control Module Not Programmed	P0602	This DTC will be stored if the ECU is a service part that has not been programmed.	Service (reflash) controller calibration present	= 1		none	Diagnostic runs at powerup and once per second continuously after that	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
ECM 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 Ilium.
ECM RAM Failure	P0604	Indicates that the ECM 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 >=	254 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 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 Ilium.
Internal ECM Processor Integrity Fault	P0606	Indicates that the ECM 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	8,192 milliseconds	Type A, 1 Trips
			MAIN processor receives seed in wrong order			always running	255 / 18 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: 1 (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 >=	3.00		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 150 milliseconds continuous; 50 ms/count in the ECM main processor	
			MAIN processor DMA transfer from Flash to RAM has 1 failure			Test is Enabled: 0 (If 0, this test is disabled)	variable, 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 Ilium.
			Safety critical software is not executed in proper order.	>= 1 incorrect sequence.		Test is Enabled: **P0606 PFM_Enable f (Loop Time)** (If 0, this test is disabled)	Fail Table, f(Loop Time). See supporting tables: **P0606 PFM Sequence Fail f (Loop Time)** / Sample Table, f (Loop Time)See supporting tables: **P0606 PFM Sequence Sample f(Loop Time)** counts 50 ms/count in the ECM main processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal ECM Processor Integrity Performance	P0607	Indicates that the ECM has detected an internal processor integrity performance.	Performs the failure diagnostic for the offline and online BIST results.			Test is enabled: 1 . (If 0, this test is disabled)	5 counts background task/ 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 Ilium.
ANDRADC Fault	P060B	Indicates that the ECM has detected an ANDR ADC Fault.	Resistance deviation percent >	6.00 %	Run/Crank Voltage >	7.00 V	2 / 14 counts or 1.75 seconds continuous; 250 ms/count in the ECM main processor	Type A, 1 Trips
			Resistance deviation percent >	6.00 %	Run/Crank Voltage >	7.00 V	2 / 14 counts or 1.75 seconds continuous; 250 ms/count in the ECM main processor	
			Resistance deviation percent >	6.00 %	Run/Crank Voltage >	7.00 V	2 / 14 counts or 1.75 seconds continuous; 250 ms/count in the ECM main processor	
			Resistance deviation percent >	6.00 %	Run/Crank Voltage >	7.00 V	2 / 14 counts or 1.75 seconds continuous; 250 ms/count in the ECM main processor	
			Resistance deviation percent >	6.00 %	Run/Crank Voltage >	7.00 V	2 / 14 counts or 1.75 seconds continuous; 250 ms/count in the ECM main processor	
			Resistance deviation percent >	6.00 %	Run/Crank Voltage >	7.00 V	2 / 14 counts or 1.75 seconds continuous; 250 ms/count in the ECM main processor	
			Resistance deviation	6.00 %	Run/Crank Voltage >	7.00 V	2 / 14 counts or	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			percent >				1.75 seconds continuous; 250 ms/count in the ECM main processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Redundant Memory Performance (Diesel)	P060C	Detect Processor Calculation faults due to RAM corruptions, ALU failures and ROM failures For all of the following cases: If the individual diagnostic threshold is equal to 2048 ms, this individual case is not applicable. If any of the following cases are X out of Y diagnostics and the fail (x) is greater than the sample (Y), this individual case is also not applicable.	Torque Learn offset is out of bounds given by threshold range	High Threshold 0.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	Type A, 1 Trips
			Commanded Predicted Engine Torque and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 2,300.00 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Rate limited vehicle speed and its dual store do not equal	N/A		Time since first CAN message with vehicle speed >= 0.500 sec	10/40 counts; 25.0msec/count	
			Commanded engine torque due to fast actuators and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 463 ms continuous, 0.5 down time multipier	
			Commanded engine torque due to slow actuators and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 463 ms continuous, 0.5 down time multipier	
			TOS to wheel speed conversion factor is out of bounds given by threshold range	High Threshold: 1.10 T/C Range Hi	Ignition State	Accessory, run or crank	255/6 counts; 25.0msec/count	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				0.10 T/C Range Lo Low Threshold: 1.10 T/C Range Hi 0.10 T/C Range Lo				
			Driver progression mode and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Predicted torque for uncorrected zero pedal determination is greater than calculated limit.	Table, f(Engine, Oil Temp). **P060C_Speed Control External Load f(Oil Temp, RPM)** **+** 181.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Engine Predicted Request Without Motor is greater than its redundant calculation plus threshold	4,096.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Immediate Request Without Motor is greater than its redundant calculation plus threshold	180.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 163 ms continuous, 0.5 down time multipier	
			Positive Torque Offset is greater than its redundant	181.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			calculation plus threshold OR Positive Torque Offset is less than its redundant calculation minus threshold				ms continuous, 0.5 down time multipier	
			Total Axle Torque Constraint is greater than	-500.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, down time multipier 0.5	
			Total Axle Torque Constraint is less than	500.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, down time multipier 0.5	
			Commanded Predicted Engine Request is greater than its redundant	4,096.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			calculation plus threshold				down time multipier0.5	
			Commanded Hybrid Predicted Crankshaft Request is greater than its redundant calculation plus threshold	4,096.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Commanded Hybrid Immediate Crankshaft Request is less than its redundant calculation minus threshold	4,096.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Commanded Immediate Engine Request is greater than its redundant calculation plus threshold	181.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (event based) calculation not equal its redundant calculation	N/A		Engine speed greater than Orpm	Up/down timer 163 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing timing (event based) calculation not equal its redundant calculation	N/A		Engine speed greater than Orpm	Up/down timer 163 ms continuous, 0.5 down time multioier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Idle speed control calculated predicted minimum torque request exceeds calculated torque limit	Minimum value **P060C_Speed Control External Load f(Oil Temp, (RPM)** , **P060C_Speed Control External Load Max f(Vehicle Speed, RPM) + P060C_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)**) + 181.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit	Minimum value (**P060C_Speed Control External Load f(Oil Temp, RPM)** , **P060C_Speed Control External Load Max f(Vehicle Speed, RPM) +**	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				P060C_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)) + 181.00 Nm				
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	2,300.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Driver Immediate Request is less than its redundant calculation minus threshold	2,300.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 75 ms continuous, 0.5 down time multipier	
			Commanded Immediate Response Type is set to Inactive	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded Immediate Response Type is set to Inactive	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Commanded Immediate Response Type is set to Inactive	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,000 ms continuous, 0.5 down time multipier	
			Difference between Cruise Axle Torque Arbitrated Request and Cruise Axle Torque Request exceeds threshold	86.25 Nm		Cruise has been engaged for more than 4.00 seconds	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Desired engine torque request greater than redundant calculation plus threshold	180.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Absolute difference of adjustment factor based on temperature and its dual store above threshold	550.50 m/s	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			1. Absolute difference of redundant calculated engine speed above threshold	500 RPM		Engine speed greater than 0 RPM	Up/down timer 163 ms continuous, 0.5 down time multipier	
			After throttle blade pressure and its dual store do not match	500 RPM		Engine speed greater than 0 RPM	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Speed Control's Predicted Torque	N/A	Ignition State	Accessory, run or crank	Up/down timer 2 48	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Request and its dual store do not match				ms continuous, 0.5 down time multipier	
			Engine oil temperature and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 213 ms continuous, 0.5 down time multipier	
			Absolute difference of the rate limited pre-throttle pressure and its redundant calculation greater than threshold	101.32 kpa	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Difference of base friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 181.00 Nm Low Threshold	Ignition State	Accessory, run or crank	Up/down timer 463 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				-181.00 Nm				
			AC friction torque is greater than commanded by AC control software or less than threshold limit	High Threshold 35.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 463 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Generator friction torque is out of bounds given by threshold range	High Threshold 181.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 213 ms continuous, 0.5 down time multipier	
			1. Difference of reserve torque value and its redundant calculation exceed threshold OR 2. Reserve request does not agree with operating conditions or Difference of final predicted torque and its redundant calculation exeed threshold OR 3. Rate of change of reserve torque exceeds threshold, increasing direction only OR 4. Reserve enaine toraue	1.180.00 Nm 2. N/A 3.180.00 Nm 4.180.00 Nm	3. &4.: Ignition State	1. &2.: Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 181.00 Nm 3. &4.: Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			above allowable capacity threshold					
			Engine Vacuum and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Absolute difference of the calculated Intake Manifold Pressure during engine event versus during time event is greater than threshold	Table, f(Desired Engine Torque). See supporting tables: **P060C_Delta MAP Threshold f(Desired Engine Torque)**		Engine speed >0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Min. Axle Torque Capacity is greater than threshold	0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Driver Predicted Request is greater than its redundant calculation plus threshold OR Driver Predicted Request is less than its redundant calculation minus	2,300.00 Nm 3,450.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 75 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			threshold					
			Total Driver Predicted Request is greater than its redundant calculation plus threshold OR Total Driver Predicted Request is less than its redundant calculation minus threshold	2,300.00 Nm 3,450.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Predicted torque for zero pedal determination is greater than calculated limit.	Table, f(Oil Temp, RPM, Vehicle Speed). See supporting tables: min **P060C_Speed Control External Load f(Oil Temp, (RPM)** , Sum (	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				P060C_Speed Control External Load Max f(Vehicle Speed, RPM) **P060C_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)** ,) + 181.00 Nm				
			Commanded Predicted Axle Torque and its dual store do not match	1 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Rate limited cruise axle torque request and its dual store do not match within a threshold	86.25 Nm	Ignition State	Accessory, run or crank	Up/down timer 163 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			1. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its redundant calculation is out of bounds given by threshold range OR 2. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its dual store do not equal OR 3. Absolute difference of Calculated accelerator pedal position and its dual store do not equal	1. 3.50 % 2. N/A 3. N/A	Ignition State	Accessory, run or crank	Up/down timer 475.00 475.00 ms continuous, 0.5 down time multipier	
			1. Absolute difference of Calculated accelerator pedal position oomponootod for oarpot	1.3.50 % 2.	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			learn and error conditions and its redundant calculation is out of bounds given by threshold range OR 2. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its dual store do not equal OR 3. Absolute difference of Calculated accelerator pedal position and its dual store do not equal	N/A 3. N/A			down time multipier	
			Commanded axle torque is greater than its redundant calculation by threshold	2,300.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Commanded axle torque is less than its redundant calculation by threshold	3,450.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded axle torque is greater than its redundant calculation by threshold OR Commanded axle torque is less than its redundant calculation by threshold	2,300.00 Nm 3,450.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,000 ms continuous, 0.5 down time multipier	
			Commanded axle torque is greater than its redundant calculation by threshold OR Commanded axle torque is less than its redundant calculation by threshold	2,300.00 Nm 3,450.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,000 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Commanded axle torque is greater than its redundant calculation by threshold OR Commanded axle torque is less than its redundant calculation by threshold OR Secondary Torque Fill is above Driver Intended Torque greater than a threshold	2,300.00 Nm 3,450.00 Nm 0.00 second	Ignition State	Accessory, run or crank	Up/down timer 500 ms continuous, 0.5 down time multipier	
			Commanded distribution axle torque is greater than its redundant calculation by threshold OR Commanded distribution axle torque is less than its redundant calculation by threshold	2,300.00 Nm 3,450.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 500 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Secondary axle torque Request is not equal to its redundant calculation		Ignition State	Accessory, run or crank	Up/down timer 500 ms continuous, 0.5 down time multipier	
			Commanded axle torque is less than its redundant calculation by threshold	2,300.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			AC friction torque is greater than commanded by AC control software	40.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (time based) calculation does not equal its redundant calculation	N/A		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Transmission Torque Request cacluations do not equal their dual stores	N/A		Run or Crank = TRUE > 0.50 s	16/32 counts; 25.0msec/count	
			Pedal learns and their redundant calculation do not equal		Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Calculated or Commanded Engine to Axle ratio is lower than a threshold -OR- Engine to Axle Offset is greater than a threshold	0.9 4,096.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175.00 ms continuous, 0.5 down time multipier	
			Difference between Cruise Arbritration Request and its redundant calcultion exceeds a threshold -OR- Difference between Cruise Accleration Request and its redundant calcultion	86.25 Nm 0.05 KPH/Second	Ignition State	Accessory, run or crank	Up/down timer 500.00 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			exceeds a threshold					
			Difference between commanded Engine Torque and its redundant calcultion is greater than a threshold -OR- Difference between commanded Engine Torque and its redundant calcultion is less than a threshold	4,096.00 Nm 3,450.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,047.97 ms continuous, 0.5 down time multipier	
			Idle Creep Axle Torque is greater than -AND- Vehicle Speed is greater than	160.00 Nm 50.00 kph	Ignition State Accelerator pedal	Accessory, run or crank not applied	Up/down timer 2,000.00 ms continuous, 0.5 down time multipier	
			Actual Axle Torque is greater than a threshold -AND- Vehicle Speed is greater than	Table, f(Vehicle Speed). See supporting tables: **P060C_RoadLoad f (Vehicle Speed)** 50.00 kph	Ignition State Accelerator pedal	Accessory, run or crank not applied	Up/down timer 2,000.00 ms continuous, 0.5 down time multipier	
			Actual Axle Torque is greater than a threshold -AND- Vehicle Speed is greater than	Table. f(Vehicle Speed).Table, f(Vehicle Speed). See supporting tables: **P060C_RoadLoad f (Vehicle Speed)** minus Nm **P060C_DecOffset_f (Vehicle Speed)** 50.00 kph	Ignition State Accelerator pedal Coastdown Error	Accessory, run or crank not applied not active	Up/down timer 2,000.00 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			(Idle Creep Axle Torque is greater than -OR- Actual Axle Torque is greater than a threshold -OR- Actual Axle Torque is greater than a threshold) -AND- Vehicle Speed is greater than	160.00 Nm Table, f(Vehicle Speed). See supporting tables: **P060C_RoadLoad f (Vehicle Speed)** Table. f(Vehicle Speed).Table, f(Vehicle Speed). See supporting tables: **P060C_RoadLoad f (Vehicle Speed)** minus **P060C_DecOffset_f (Vehicle Speed)** Nm 50.00 kph	Ignition State Accelerator pedal Remedial Action	Accessory, run or crank not applied is active	Up/down timer 2,000.00 ms continuous, 0.5 down time multipier	
			Creep Coast Axle Torque is out of bounds given by threshold range	High Threshold 2,300.00 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Positive Torque Offset is greater than its redundant calculation plus threshold OR Positive Torque Offset is less than its redundant calculation minus threshold	181.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Requested fuel mass is greater or equal to its [illegible]	15.47 mg	Engine running [illegible]		Up/down timer 462.50 ms continuous,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			threshold		No cranking phase No fuel cut off request		0.5 down time multiplier	
			Engine friction torque is greater than its redundant calculation plus threshold OR Engine friction torque is lower than its redundant calculation minus threshold	181.00 Nm 181.00 Nm	Engine running		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			High Pressure Pump Torque Load is greater than threshold OR High Pressure Pump Torque Load is lower than threshold	181.00 Nm 0.00 Nm	Engine running		Up/down timer 475.00 ms continuous, 0.5 down time multiplier	
			Pumping Losses is lower than threshold OR Pumping Losses rate of change signal greater than P2D2 threshold	0.00 Nm/task_100ms 22.63 Nm	Engine running		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Start Up Engine Friction Compensation rate of change haherthan a threshold AND Start Up Engine Friction	90.50 Nm/task_12.5 131.00 Nm	Engine running		Up/down timer 87.50 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Compensation higher than threshold					
			Limited Immediate Indicated Torque request is greater than its redundant calculation plus threshold	181.00 Nm	Engine running		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Active damping torque reduction greater than threshold OR Active damping torque reduction lower than threshold	181.00 Nm -181.00 Nm	Engine running		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	
			Fuel volume request greater than its redundant calculation plus threshold	18.22 mm3	Engine running No rich combustion mode		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Absolute value of the sum of the Fuel Volumes in the pulse train minus Fuel Volume Request minus Main Correction greater than threshold	18.22 mm3	Engine Running No rich combustion mode Main pulse quantity already compensated with main correction is greater than or equal to zero		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	
			Cumulative Programmed Energizing Time greater then its redundant calculation plus threshold (Note: when an emission test is perfoimed OR	167.08 us additional value for emission tests.	Engine running		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CSERS test is performed the threshold is incremented by a further value)	0.00 us				
			Cumulative Desired Energizing Time greater than its redundant calculation plus threshold (Note: when an emission test is performed OR CSERS test is performed the threshold is incremented by a further value)	167.08 us additional value for emission tests: 0.00 us	Engine Running		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	
			Difference between Fuel Rail Pressure Event Based Signal and Fuel Rail Pressure Time Based signal higher than threshold OR Difference between Fuel Rail Pressure Event Based Signal and Fuel Rail Pressure Time Based signal lower than threshold	300.00 MPa -40.00 MPa	Engine running Delta Filtered Pressure value lower than AND Delta Filtered Pressure value greater than	 1,880.25 MPa/s -3,582.25 MPa/s	Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Absolute difference between Main Correction and its redundant calculation greater than or equal to threshold	18.22 mm3	Engine running No rich combustion mode		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	
			Cylinder Balancing Fuel Quantity Compensation converted in Energizing	**P060C_CB safety deadband threshold f (Fuel Rail Pressure)**	Engine running		Up/down timer 462.50 ms continuous,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Time greater than its redundant calculation plus threshold OR (only if cylinder balancing detected a fault) Cylinder Balancing Fuel Quantity Compensation converted in Energizing Time greater than threshold	us **P060C_CB safety deadband threshold f (Fuel Rail Pressure)** us			0.5 down time multiplier	
			Absolute value of the difference between the calculated EIA compensation and its redundant calculation greater than threshold	**P060C.EIA safety deadband threshold f (Fuel Rail Pressure)** us	Engine cranking or engine running		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	
			Absolute value of the difference between the calculated EIA compensation and its redundant calculation greater than threshold	18.22 mm3	Engine cranking or engine running		Up/down timer 162.50 ms continuous, 0.5 down time multiplier	
			Absolute value of the weighted delta energizing time greater then threshold	**P060C_SQA safety deadband threshold f (Fuel Rail Pressure)** us	Ignition State	Accessory, run or crank	Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Oil Pump Low Pressure Offset Friction greater then zero OR Oil Pump Low Pressure Offset Friction lower then	 -20.00 Nm	Engine running		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			threshold					
			Rate of change on fuel mass compensaton for coolant temperature greater than P2D2 threshold	77.35 mg/sec	Engine running No rich combustion mode No cranking phase No fuel cut off request		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Rate of change on fuel mass compensaton for air temperature greater than P2D2 threshold	77.35 mg/sec	Engine running No rich combustion mode No cranking phase No fuel cut off request	Accessory, run or crank	Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Absolute value of fuel mass compensated for vehicle speed greater than threshold	7.74 mg	Engine running No rich combustion mode No cranking phase No fuel cut off request	Accessory, run or crank	Up/down timer 162.50 ms continuous, 0.5 down time multiplier	
			Injector Valve Closing Adjustment energizing time correction greater then threshold OR Injector Valve Closing Adjustment energizing time correction lower then threshold	**P060C_VCA safety max deadband threshold f(Fuel Rail Pressure)** us **P060C_VCA safety min deadband threshold f(Fuel Rail Pressure)** us	Engine Cranking or engine running		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Desired Immediate Indicated torque greater then its redundant calculation plus threshold	181.00 Nm	Engine running		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			rate of change on pumping losses friction due to exhaust brake actuation higher than rate limit OR Pumping losses friction outside min/max authority	Rate of change limit: 0.00 Nm Min: 0.00 Nm Max: 368.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475.00 ms continuous, 0.5 down time multiplier	
			Exhaust Brake Torque Capacity less then Threshold	0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475.00 ms continuous, 0.5 down time multiplier	
			Combustion Mode Arbitration Winner is higher than the maximum expected combustion mode OR Previous Combustion Mode Arbitration Winner is higher than the maximum expected combustion mode OR		Engine cranking or engine running		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Combustion Mode Arbitration Winner is equal to Previous Combustion Mode Arbitration Winner and not equal to Normal combustion Mode					
			The sum of Low, Middle and High Barometric Correction Factors greater than 1		Engine cranking or engine running		Up/down timer 1,962.50 ms continuous, 0.5 down time multiplier	
			Energizing Time correction for Injector Body Temperature greater then threshold	**P060C_IBT safety deadband threshold f (Fuel Rail Pressure)**	Engine Cranking or engine runnig		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			cumulative DT absolute difference beetween secured DT and Programmed DT greater than threshold (torque forming pulses only)	50.00 us	Engine Cranking or engine runnig		Up/down timer 200.00 ms continuous, 0.5 down time multiplier	
			cumulative SOI absolute difference beetween secured SOI and Programmed SOI greater than threshold (torque forming pulses only)	2.00 Degrees	Engine Cranking or engine runnig		Up/down timer 200.00 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Absolute value of the difference between the calculated EIA(VSI specific) compensation and its redundant calculation greater than threshold	**P060C_EIAVSI safety deadband threshold f (Fuel Rail Pressure)**	Engine cranking or engine running		Up/down timer 200.00 ms contiuous, 0.5 down time multiplier	
			Fuel mass compensated for exhaust gas tempearture outside min/max autorithy	-7.75 mg 7.75 mg	Engine running No rich combustion mode No cranking phase No fuel cut off request	Accessory, run or crank	Up/down timer 500.00 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 B, 2 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 Ilium.
VIN Not Programmed or Mismatched - Engine Control Module (ECM)	P0630	This DTC checks that the VIN is correctly written	At least one of the programmed VIN digits	Is not a valid ASCII character	OBD Manufacturer Enable Counter	= 0	250 ms / test Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
5 Volt Reference #1 Circuit	P0641	Detects a continuous or intermittent short on the 5 volt reference circuit #1 by monitoring the reference percent Vrefl and failing the diagnostic when the percent Vrefl is too low or too high or if the delta between the filtered percent Vrefl and non-filtered percent Vrefl is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vrefl < or ECM percent Vrefl > or the difference between ECM filtered percent Vrefl and percent Vrefl > (100% corresponds to 5.5 Volt)	88.64 % Vrefl 93.18% Vrefl 0.90 % Vrefl	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 >6.41 Volts = 25.00 Seconds = FALSE >8.41 Volts = TRUE	19/39 counts; or 187.5000 ms continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Unauthorized Software Calibration Detected	P064F	This DTC indicates that the ECU software has an invalid MACT (Message Authentication Code Table)	The MACT embedded in the ECU software is invalid	Invalid MACT	Calibration enable	= 1 Boolean	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
5 Volt Reference #2 Circuit	P0651	Detects a continuous or intermittent short on the 5 volt reference circuit #2 by monitoring the reference percent Vref2 and failing the diagnostic when the percent Vref2 is too low or too high or if the delta between the filtered percent Vref2 and non-filtered percent Vref2 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref2 < or ECM percent Vref2 > or the difference between ECM filtered percent Vref2 and percent Vref2 > (100% corresponds to 5.5 Volt)	88.64 % Vref2 93.18% Vref2 0.90 % Vref2	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 >6.41 Volts = 25.00 Seconds = FALSE >8.41 Volts = TRUE	19/39 counts; or 187.5000 ms continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Power Relay Control Circuit	P0685	Detects an open circuit in the Powertrain Relay driver. This diagnostic reports the DTC when an open circuit failure is present. Monitoring occurs when the output is powered off. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	Open Circuit: > 200 K 0 ohms impedance between output and controller ground	Powertrain relay Open circuit diagnostic diagnostic enable = TRUE Run/Crank Voltage	1.00 Voltage >11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0686 may also set (Powertrain Relay Control Short to Ground).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Power Relay Control Circuit Low Voltage	P0686	Detects a short to ground in the Powertrain Relay low side driver. This diagnostic reports the DTC when a short to ground failure is present. Monitoring occurs when the output is powered off. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver off 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.	Short to ground: < 0.5 Ω impedance between output and controller ground	Powertrain relay Low Side driver short to ground diagnostic diagnostic enable = TRUE Run/Crank Voltage	1.00 Voltage >11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0685 may also set (Powertrain Relay Control Open Circuit).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Power Relay Control Circuit High Voltage	P0687	Detects a short to power in the Powertrain Relay low side driver. This diagnostic reports the DTC when a short to power failure is present. Monitoring occurs when the output is powered off. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	Short to power: < 0.5 Q impedance between output and controller power	Powertrain relay Low Side driver short to power diagnostic enable = TRUE Run/Crank Voltage	1.00 Voltage >11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Power Relay Feedback Circuit Low Voltage	P0689	Detects low voltage in the control module relay feedback circuit. This diagnostic reports the DTC when low voltage is present. Monitoring occurs when run crank voltage is above a calibrated value.	Control module relay feedback circuit low voltage	Powertrain relay voltage <=5.00	Powertrain relay short low diagnostic enable Run Crank voltage Powertrain relay state	= 1.00 >9.00 = ON	5 failures out of 6 samples 1000 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Power Relay Feedback Circuit High Voltage	P0690	Detects higher than expected voltage in the powertrain relay feedback circuit. This diagnostic reports the DTC when higher than expected voltage is present. For example, the powertrain relay could be stuck on. Monitoring occurs when the relay is commanded "off' for a calibrated duration.	Powertrain Relay Voltage	>= 4.00 volts will increment the fail counter	Powertrain relay high voltage feedback circuit diagnostic enable = TRUE Powertrain relay commanded “OFF” No active DTCs:	1.00 >=2.00 seconds PowertrainRelayStateOn_FA	50 failures out of 63 samples 100ms /Sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan 1 Relay Control Circuit Low Voltage (Output Driver Monitor)	P0691	Diagnoses the cooling fan 1 relay control low side driver circuit for circuit faults	Voltage low during driver off state (indicates short-to-ground)	Short to ground: < 0.5 Ω impedance between signal and controller ground	Powertrain Relay Voltage	Voltage > 11.0 volts	50 failures out of 63 samples 100 ms /sample	Type B, 2 Trips Note: In certain controllers P0480 may also set (Fan 1 Open Circuit).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan 1 Relay Control Circuit High Voltage (ODM)	P0692	Diagnoses the cooling fan 1 relay control low side driver circuit for circuit faults	Voltage high during driver on state (indicates short to power)	Short to power: < 0.5 Q impedance between signal and controller power	Powertrain Relay Voltage	Voltage > 11.0 volts	50 failures out of 63 samples 100 ms /sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
5 Volt Reference #3 Circuit	P0697	Detects a continuous or intermittent short on the 5 volt reference circuit #3 by monitoring the reference percent Vref3 and failing the diagnostic when the percent Vref3 is too low or too high or if the delta between the filtered percent Vref3 and non-filtered percent Vref3 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref3 < or ECM percent Vref3 > or the difference between ECM filtered percent Vref3 and percent Vref3 > (100% corresponds to 5.5 Volt)	88.64 % Vref3 93.18% Vref3 0.90 % Vref3	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 >6.41 Volts = 25.00 Seconds = FALSE >8.41 Volts = TRUE	19/39 counts; or 187.5000 ms continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
5 Volt Reference #4 Circuit	P06A3	Detects a continuous or intermittent short on the 5 volt reference circuit #4 by monitoring the reference percent Vref4 and failing the diagnostic when the percent Vref4 is too low or too high or if the delta between the filtered percent Vref4 and non-filtered percent Vref4 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref4 < or ECM percent Vref4 > or the difference between ECM filtered percent Vref4 and percent Vref4 > (100% corresponds to 5.5 Volt)	88.64 % Vref4 93.18% Vref4 0.90 % Vref4	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 >6.41 Volts = 25.00 Seconds = FALSE >8.41 Volts = TRUE	19/39 counts; or 187.5000 ms continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Control Module (TCM) Requested MIL Illumination	P0700	Monitors the TCM MIL request message to determine when the TCM has detected a MIL illuminating fault.	Transmission Control Module Emissions-Related DTC set and module is requesting MIL	Transmission Control Module Emissions-Related DTC set and module is requesting MIL		Time since power-up > 3 seconds	Continuous	Type A, No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module System Voltage Performance (Only on applications that use an FTZM)	P1002	Detects low system voltage performance of the fuel pump driver control module system. This diagnostic reports the DTC when the absolute value of the difference between the fuel pump driver battery voltage and the fuel pump driver run/crank voltage exceeds a calibrated value.	Fuel Pump Driver Control Module Run Crank voltage low and high	ABS (Fuel Pump Driver Control Module Battery voltage - Fuel Pump Driver Control Module Run Crank voltage) > 3.00	Fuel Tank Zone Module (FTZM) is present on vehicle Fuel Pump Driver Control Module System Voltage Performance diagnostic is enabled Fuel Tank Zone Module (FTZM) serial messages are available FTZM Run Crank Active is TRUE Starter motor not engaged Sensor Bus relay is commanded ON	= 1	100 failures out of 125 samples 12.5 ms /sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module Reset Error	P1005	This DTC monitors for a reset error in the Fuel Pump Driver Control Module	If the received value for the time since the last FPDCM reset has reset and the newly received value or previous value is	<=0.50 seconds	DTC is enabled	Enabled	Diagnostic runs in 50 ms loop.	Type A, 1 Trips
			for	>=2.00 counts	Sensor bus relay	On		
			out of total samples	>=400.00 counts	Battery voltage	> 11.00 Volts		
					P1000	Not active		
					U18A2	Not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module Ignition Switch Run/ Start Position Circuit High (Only on applications that use an FTZM)	P1007	Detects high voltage of the fuel pump driver control module ignition switch circuit. This diagnostic reports the DTC when the fuel pump driver control module ignition switch circuit voltage exceeds a calibrated value.	Fuel Pump Driver Control Module Ignition switch Run/Start position circuit high	FTZM Run Crank Active is TRUE	Fuel Tank Zone Module (FTZM) is present on vehicle Fuel Pump Driver Control Module Ignition Switch Run/Start Position Circuit High diagnostic is enabled Fuel Tank Zone Module (FTZM) serial messages are available Run Crank Active Sensor Bus relay is commanded ON	 = 1 = FALSE	200 failures out of 250 samples 50 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Phase U-V-W Circuit Open	P1029	This DTC detects if any of the 3phase fuel pump control circuits is Open [system configuration "Brushless"] The diagnostic can detect open circuit faults when the fuel pump is not rotating. In the "stopped" state, small currents are injected into each motor phase circuit pair by an internal fixed source and corresponding back-EMF voltage is monitored. A fault is reported when the monitored voltage falls into a specific range [adjusted for source voltage]. This process is completed in less than 1 millisecond. The FTZM ERFS control samples back-Electromotive Force [EMF] for zero voltage-level crossings as a detection method to enable closed loop control brushless commutation. Back EMF is an electrical characteristic of the inactive phase of the 3-phase signal wherein only 2 phases are	Phased-pair circuit voltage	3V <= V [back-EMF] <= 6V	a) Sensed fuel pump speed b) Device configuration FCBR_e_ChassisFuelPressSysType c) Diagnostic Enabled - KeFABR_b_OpenCktDiagEnbl d) CAN Sensor Bus message $3EC_Avail e) Sensor Bus Relay On f) Sensor Bus B Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr]	a) == 0 RPM b) CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys c) == TRUE d) == TRUE e) == TRUE f) <> TRUE	40.00 failures / 80.00 samples 1 sample / 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		active at any moment. Brushless fuel pump speed is inferred using the rate of zero-crossings detection and number of motor pole-pairs. Speed is reported to the ECM as serial data every 10 milliseconds. This open circuit diagnostic follows "smart device" Component Technical Specifications.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Phase U-V-W Circuit Low	P102A	This DTC detects if the fuel pump control circuit is shorted to low [Short to Ground] The diagnostic detects short-to-ground faults using 2 methods depending on whether the fuel pump is rotating. 1) In the "rotating" state, voltage drop across each phase-pair high-side drive is monitored, or 2) in the "stopped" state, small currents are injected into each motor phase circuit pair	Phased-pair circuit voltage Difference	Vdelta > 0.145 V	a) Device configuration FCBR_e_ChassisFuelPressSysType b) Diagnostic KeFABR b GshtCktDiag Enbl c) CAN Sensor Bus message $3EC_Avail d) Sensor Bus Relay On e) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr]	a) == CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys b) == TRUE c) == TRUE d) == TRUE e) <> TRUE	40.00 failures / 80.00 samples 1 sample / 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		by an internal fixed source and corresponding back-EMF voltage is monitored. A fault is reported when the monitored voltage falls into a specific range [adjusted for source voltage]. The FTZM ERFS control samples back-Electromotive Force [EMF] for zero voltage-level crossings as a detection method to enable closed loop control brushless commutation. Back EMF is an electrical characteristic of the inactive phase of the 3-phase signal wherein only 2 phases are active at any moment. Brushless fuel pump speed is inferred using the rate of zero-crossings detection and number of motor pole-pairs. Speed is reported to the ECM as serial data every 10 milliseconds. This open circuit diagnostic follows "smart device" Component Technical Specifications.	Phased-pair circuit voltage	V [back-EMF] >= 6 V	a) Sensed fuel pump speed b) Device configuration FCBR_e_ChassisFuelPressSysType c) Diagnostic KeFABR_b_GshtCktDiagEnbl d) CAN Sensor Bus message $3EC_Avail e) Sensor Bus Relay On f) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr]	a) == 0 RPM b) == CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys c) == TRUE d) == TRUE e) == TRUE f) <> TRUE	40.00 failures / 80.00 samples 1 sample / 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Phase U-V-W Circuit High	P102B	This DTC detects if the fuel pump control circuit is shorted to high voltage [Short to Battery] The diagnostic detects short-to-battery faults using 2 methods depending on whether the fuel pump is rotating. 1) In the "rotating" state, voltage drop across each phase-pair low-side current shunt is monitored, or 2) in the "stopped" state, small currents are injected	Phased-pair circuit voltage Difference	Vdelta > 0.4 V	a) Device configuration FCBR_e_ChassisFuelPressSysType b) Diagnostic KeFABR_b_PshtCktDiagEnbl c) CAN Sensor Bus message $3EC_Avail d) Sensor Bus Relay On e) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr]	a) == CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys b) == TRUE c) == TRUE d) == TRUE e) <> TRUE	40.00 failures/ 80.00 samples 1 sample / 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		into each motor phase circuit pair by an internal fixed source and corresponding back-EMF voltage is monitored. A fault is reported when the monitored voltage falls into a specific range [adjusted for source voltage]. The FTZM ERFS control samples back-Electromotive Force [EMF] for zero voltage-level crossings as a detection method to enable closed loop control brushless commutation. Back EMF is an electrical characteristic of the inactive phase of the 3-phase signal wherein only 2 phases are active at any moment. Brushless fuel pump speed is inferred using the rate of zero-crossings detection and number of motor pole-pairs. Speed is reported to the ECM as serial data every 10 milliseconds. This open circuit diagnostic follows "smart device" Component Technical Specifications.	Phased-pair circuit voltage	V[backEMF] > 6 V	a) Sensed fuel pump speed b) Device configuration FCBR_e_ChassisFuelPresSysType b) Diagnostic KeFABR_b_PshtCktDiagEnbl c) CAN Sensor Bus message $3EC_Avail d) Sensor Bus Relay On e) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr]	a) == 0 RPM b) == CeFCBR_e_DSL_ECM_FTZM_BLDC_Sys b) == TRUE c) == TRUE d) == TRUE e) <> TRUE	40.00 failures/ 80.00 samples 1 sample / 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Injection Valve Supply Voltage Circuit Low Bank 1 Unit 1	P1048	This diagnosis verifies if a DEF dosing valve high side short to ground occurred	HWIO interface DEFMV_ENABLE_GROUND_SHORT = Fault	VeHWIO_e_DEFMV_Enbl_Gsht == CeSCRR_e_Fault	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage HWIO interface DEFMV_ENABLE_GROUND_SHORT different from INDETERMINATE	1.00 > 11.00 [V]	30.00 failures out of 60.00 samples Time basis = 100ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Injection Valve Supply Voltage Circuit High Bank 1 Unit 1	P1049	This diagnosis verifies if a DEF dosing valve high side short to power occurred	HWIO interface DEFMV_ENABLE_POWER_SHORT = Fault	VeHWIO_e_DEFMV_Enbl_Psht == CeSCRR_e_Fault	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage HWIO interface DEFMV_ENABLE_POWER_SHORT different from INDETERMINATE	1.00 > 11.00 [V]	30.00 failures out of 60.00 samples Time basis = 100ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Injector Temperature - Exhaust Gas Temperature Not Plausible	P10D1	This monitor measures the coil temperature of the DEF injector, and compare it to with reference temperature after long soak.	Difference between coil temperature and reference temperature greater than calibratable value.	**> P10D1_CoilTempRatTempRef**	Test enabled by calibration (TRUE->Enable False -> Disable) DEF Injector Fault State (No fault on injector) Powertrain relay in range Long Engine off soak period has elapsed (sec) Service Test Run/Crank is Active Engine in Cranking Phase Powertrain Relay in-Range Diag System Disable This diagnosti has already run and completed Coil Temperature Estimation Available	1.00 == FALSE == TRUE >= 28,800.00 == FALSE == TRUE == FALSE == TRUE == FALSE == FALSE == TRUE	Single decision criteria. Function Task: 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module 5V Reference 2 Circuit	P1177	This DTC monitors for an error in the Fuel Pump Driver Control Module 5V Reference 2 Circuit	Raw Fuel Pump Driver Control Module 5V Reference 2 is or Raw Fuel Pump Driver Control Module 5V Reference 2 is or Absolute difference of the filtered Fuel Pump Driver Control Module 5V Reference 2 and Raw Fuel Pump Driver Control Module 5V Reference 2 is For a non-continuous failure of out of For a continuous failure of	>92.25 Percent <87.75 Percent > 99.00 Percent 40.00 counts 80.00 counts 0.20 seconds	Diagnostic is enabled Run/Crank Ignition Voltage U0076 PT Sensor Bus Relay Communication with the Fuel Tank Zone Module is not lost	Enabled >=11.00 Volts Is not active Commanded on (if present)	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Over Temperature	P1255	To detect if an internal fuel pump driver over-temperature condition exists under normal operating conditions. The FTZM ERFS control may adjust the PWM slew rate or frequency as a self-protection method, but may not reduce pump rotational speed or impact pumping performance in any way due to an over-temperature condition.	Fuel Pump Driver Temperature	T > 160 degC	a) Diagnostic enabled [KeFABR b OvertempDiagEnbl] b) Sensor Bus Relay On c) CAN Sensor Bus message $3EC_Available d) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr]	a) == TRUE b) == TRUE c) == TRUE d) <> TRUE	5.00 failures/ 10.00 samples 1 sample / 100 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Rail Pressure (FRP) Sensor B Circuit Low Voltage	P127C	Determine when a short circuit to ground affects fuel rail pressure (secondary) sensor.	Fuel rail pressure sensor output (as percentage of supply voltage)	< 4.0 %	**Rail Pressure Sensor Configuration** Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage An initilization time delay of 12.00 consecutive samples has been passed Diagnostic feedback protocol is not in the *check low state*	= CeFHPG_e_RPS_Double Track > 15,000 s > 8.4 V	15 failures out of 30 samples OR 15 continuous failures out of 30 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Rail Pressure (FRP) Sensor B Circuit High Voltage	P127D	Determine when a short circuit to voltage affects fuel rail pressure (secondary) sensor.	Fuel rail pressure sensor output (as percentage of supply voltage)	> 96.0%	**Rail Pressure Sensor Configuration** Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage An initilization time delay of 12.00 consecutive samples has been passed Diagnostic feedback protocol is not in the *check high* state	= CeFHPG_e_RPS_Double Track > 15,000 s > 8.4 V	15 failures out of 30 samples OR 15 continuous failures out of 30 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module System Ignition Switch Run/ Start Position Circuit Low (Only on applications that use an FTZM)	P129D	Detects low voltage of the fuel pump driver control module ignition switch circuit. This diagnostic reports the DTC when the fuel pump driver control module ignition switch circuit voltage is below a calibrated value.	Fuel Pump Driver Control Module Ignition switch Run/Start position circuit low	FTZM Run Crank Active is FALSE	Fuel Tank Zone Module (FTZM) is present on vehicle Fuel Pump Driver Control Module Ignition Switch Run/Start Position Circuit High diagnostic is enabled Fuel Tank Zone Module (FTZM) serial messages are available Run Crank Active Sensor Bus relay is commanded ON	 = 1 = TRUE	40 failures out of 50 samples 50 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module Fuel Pump Speed Signal Incorrect	P129F	FTZM ERFS control samples back-Electromotive Force [EMF] for zero voltage-level crossings as a detection method to enable closed loop control brushless commutation. Back EMF is an electrical characteristic of the inactive phase of the 3-phase signal wherein only 2 phases are active at any moment. Brushless pump speed is inferred using rate of zero-crossings detection and number of motor pole-pairs. Speed is reported to the ECM as serial data every 10 millisecs. Diagnostic software [FABR ring] calculates the error between the commanded, arbitrated fuel pump speed [FCBR ring] and the FTZM sensed fuel pump speed. The error is filtered and evaluated against calibratable threshold limits to determine pass/fail status. Any failure that exists on the fuel pump output circuit (3 phases) will be manifested in a Fuel Pump Speed	Sensed Filtered Fuel Pump Speed Error	> Speed Error Low Threshold [Supporting Table] **P129F Threshold Low** OR < Speed Error High Threshold [Supporting Table] **P129F Threshold High**	a) Diagnostic Enabled FABR Speed Rationality Diagnostic b) CAN Sensor Bus message $0CB_Available c) FABR Fuel Control Enable Fault Active d) Fuel Pmp Speed Command Alive Rolling Count and Checksum Error [CAN Bus B $0CE] [CFMR_b_FTZM_Cmd1_ARC_ChkErr] e) FABR Fuel Pump Ckt FA f) FABR Driver OverTemp FA g) Run_Crank input Voltage h) Sensor Bus Relay On j) CAN Sensor Bus message $0CB Data Fault [CFMR_b_FTZM_Info8_ARC_ChkErr] k) CAN Sensor Bus message $0CB Comm Fault [CFMR_b_FTZM_Info8_UcodeCmFA] l) Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [CFMR_b_FTZM_Cmd1_UcodeCmFA] m) Timer - FABR Rising Edge Diagnostic Delay n) Timer - FABR Falling Edge Diagn Delay	a) == TRUE b) == TRUE c) <> TRUE d) <> TRUE e) <> TRUE f) <> TRUE g) > 9.00 volts h) == TRUE j) <> TRUE k) <> TRUE l) <> TRUE m) > 2.30 seconds n) > 0.90 seconds	1 sample / 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Rationality Diagnostic fault. Reported fuel pump speed data will only be consumed in this same diagnostic.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module Enable Circuit Performance	P12A6	The purpose of the Fuel Pump Driver Control Module Enable Circuit Performance diagnostic is to detect if the state of the fuel control enable circuit is valid. This is done by comparing the fuel control enable circuit state [high or low] sensed by the Fuel Tank Zone Module device to the commanded state of the fuel control enable signal from the ECM [in serial data]. When the sensed state does not match the commanded state, the fail counter increments.	Sensed Fuel Control Enable circuit state [Fuel Tank Zone Module device]	<> Fuel Control Enable Active command [serial data]	a) Diagnostic enabled [KeFABR_b_FuelCntrlEnblDiagEnbl] b) Sensor Bus message $0CC Fuel Pump Command Message Signal Counter Incorrect [CFMR_b_FTZM_Info2_ARC_ChkErr] c) CAN Sensor Bus message $OCC_Available d) Sensor Bus Relay On e) Timer [FABR t RunCrankActive]	a) == TRUE b) <> TRUE c) == TRUE d) == TRUE e) >= 0.51 seconds	40.00 failures / 80.00 samples 1 sample / 12.5 millisec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
DOC Warm-Up monitor (WARM TEST)	P138C	Diagnostic monitors the system to verify that the DOC Warm-up Mode is performed correctly. While V3 is active, if a failure or a deterioration causes the vehicle's emissions to exceed the applicable OBD II NMHC+NOx or CO thresholds or the applicable OBD II PM threshold, this DTC will be set.	The test is performed in three steps: 1. The reference energy WPA is compared to a specific threshold. Once it reaches this threshold: 2. A comparison is performed between the reference energy WPA and the corresponding reference energy BPU. If the difference between the WPA and the BPU is over a certain value: 3. The measured energy is compared to a third threshold. If the measured energy is over the threshold the test passes, otherwise the test fails. (All these values 1. 2. 3. are based on the DOC outlet temperature, specified below each threshold)	1. > **WarmTestTargetEnergy** [J] **WarmTestExhaustTempAxis** [°C] 2. > **WarmTestMinEnergyDiffernce** [J] **WarmTestExhaustTempAxis** [°C] 3. > **WarmTestEnergyThreshold** [J] **WarmTestExhaustTempAxis** [°C]	1. Test enabled by calibration 2. CSERSNOT active 3. DOC Warm-Up Mode active (NOT in cold condition) 4. Outside Air Temperature 5. Ambient Pressure	1. ==1.00 2. see logic above (cold test) 3. Current Comb Mode == DOC Warm Up Mode 4. > -11.90 [°C] 5. >69.10 [KPa]	Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			When 0.00 is active, EWMA filter will be applied to energy measued as described below. EWMA (Exponentially Weighted Moving Average) filter description: (Filtered Test Value @ time t) = k*(Test Value @ timet) + (1 - k)*(Filtered Test Value @ time t-1) After a Clear Code or a Expendable NVM event, the filter is initialized to 0.00 and the filter status is "FIR" (Fast Initial Response). During "FIR" phase, the filter coefficient is k equal to 1.00 "FIR" phase ends if a fail is reported or after 2.00 Filtered Test Values in "FIR". At the end of "FIR" phase, filter status is moved to "Standard". During "Standard" phase, the filter coefficient is k equal to 1.00 Filter status can be moved to "RR" (Rapid Response) if the following					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			entry conditions are satisfied: (Test Value @ time t) higher than 0.00 AND (Filtered Test Value @ time t-1) lower than 0.00 AND (Test Value @ time t) - (Filtered Test Value @ time t-1) higher than 0.00 When "RR" phase is entered, the filter is initialized to 0.00 During "RR" phase, the filter coefficient is k equal to 1.00 . "RR" phase ends if a fail is reported or after 2.00 Filtered Test Values in "RR"or if the following exit condition is satisfied: (Test Value @ time t) - (Filtered Test Value @ time t-1) lower than 0.00 At the end of "RR" phase, filter status is moved back to "Standard".					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
DOC Warm-Up monitor (COLD TEST)	P138F	Diagnostic monitors the system to verify that the DOC Warm-up Mode is performed correctly. While V3 is active, if a failure or a deterioration causes the vehicle's emissions to exceed the applicable OBD II NMHC+NOx or CO thresholds or the applicable OBD II PM threshold, this DTC will be set.	The test is performed in three steps: 1. The reference energy WPA is compared to a specific threshold. Once it reaches this threshold: 2. A comparison is performed between the reference energy WPA and the corresponding reference energy BPU. If the difference between the WPA and the BPU is over a certain value: 3. The measured energy is compared to a third threshold. If the measured energy is over the threshold the test passes, otherwise the test fails. (All these values 1. 2. 3. are based on the DOC outlet temperature, specified below each threshold)	1. > **ColdTestTargetEnergy** [J] **ColdTestExhaustTempAxis** [°C] 2. > **ColdTestMinEnergyDifference** [J] **ColdTestExhaustTempAxis** [°C] 3. > **ColdTestEnergyThreshold** [J] **ColdTestExhaustTempAxis** [°C]	1. Test enabled by calibration 2. CSERS active Based on following conditions (AND logic): - DOC Warm-up Mode (V3) active; - Soak time above a calibratable threshold - Engine Coolant Temperature below a calibratable threshold (based on OAT) 3. Outside Air Temperature 4. Ambient Pressure	1. ==1.00 2. == Current Comb Mode == DOC Warm Up Mode 21,600.00 -5.00 (based on OAT: -20.00) 3. > -11.90 [°C] 4. >69.10 [KPa]	Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			When 0.00 is active, EWMA filter will be applied to energy measued as described below. EWMA (Exponentially Weighted Moving Average) filter description: (Filtered Test Value @ time t) = k*(Test Value @ timet) + (1 - k)*(Filtered Test Value @ time t-1) After a Clear Code or a Expendable NVM event, the filter is initialized to 0.00 and the filter status is "FIR" (Fast Initial Response). During "FIR" phase, the filter coefficient is k equal to 1.00 "FIR" phase ends if a fail is reported or after 2.00 Filtered Test Values in "FIR". At the end of "FIR" phase, filter status is moved to "Standard". During "Standard" phase, the filter coefficient is k equal to 1.00 Filter status can be moved to "RR" (Rapid Response) if the following entry conditions are					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			satisfied: (Test Value @ time t) higher than 0.00 AND (Filtered Test Value @ time t-1) lower than 0.00 AND (Test Value @ time t) - (Filtered Test Value @ time t-1) higher than 0.00 When "RR" phase is entered, the filter is initialized to 0.00 During "RR" phase, the filter coefficient is k equal to 1.00. "RR" phase ends if a fail is reported or after 2.00 Filtered Test Values in "RR"or if the following exit condition is satisfied: (Test Value @ time t) - (Filtered Test Value @ time t-1) lower than 0.00 At the end of "RR" phase, filter status is moved back to "Standard".					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
HP EGR Slow Response - Increasing Flow (OBDII market only)	P140B	This monitor (in increasing flow direction) detects failures in the air system such to not fulfilll the request of HP EGR flow in the intake manifold during transient conditions. It works only in closed loop EGR control zone. This monitor is used to detect any malfunction in the HP EGR system that leads to slow down the air control causing the vehicle's emissions to exceed OBDII limits. The aim of the HP EGR flow slow response monitor is to detect small obstructions in the exhaust pipe. This monitor could also detect slow responding HP EGR valve, or skewed MAF sensor. Slow responding throttle and VGT vanes could also affect the HP EGR flow response time.	Error difference (absolute value) between the desired HP EGR rate and the actual HP EGR rate during transient air control conditions. The error is averaged over a calibrate-able cumulative transient time.	**>** **P140B: Increasing HP EGR slow response threshold** **[%]**	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Air Control is Active (air control in closed loop) Air control active condition lasts for a time Desired EGR rate No active transition from a combustion mode to another one (Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	1.00==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "Air Control Active" Free Form > 0.50 [s] > 0 [%] ==TRUE > 30.00 [°C] ==TRUE < 129.00 [°C] >20.00 [%]	Test is evaluated after the enabling conditions are satisfied for a number of samples >=200.00 sampling time is 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Throttle measured position			
					Outside air temperature	> -20.00 [°C]		
					Ambient air pressure	> 69.60 [kPa]		
					LP EGR valve total mass error (absolute value, | desired LP EGR mass - estimated LP EGR mass|)	< 1.00 [mg]		
					Desired fuel quantity in range	> **P140B: Increasing HP EGR slow response Min fuel enabling condition** [mm^3] AND < **P140B: Increasing HP EGR slow response Max fuel enabling condition** [mm^3]		
					Exhaust manifold pressure in range	>70.00 [kPa] AND <350.00 [kPa]		
					Desired HP EGR flow gradient (Req-ReqOld) lower than a threshold	< 1.45 [mg/s]		
					Desired HP EGR flow Gradient (Rea-ReaOld)	TRUE if > 1.30 [mg], FALSE if < 0.70 [mal		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					greater than a threshold, with hysteresis	<= 45.00 [count]		
					Hysteresis lasts for a limited number of samples			
					HP EGR valve total mass error (desired HP EGR mass - estimated HP EGR mass) in range, with hysteresis	TRUE if > 35.00 [mg], FALSE if < 15.00 [mg]		
					Desired HP EGR rate	> 9.00 [%]		
					HP EGR valve position OR it is above that threshold for a time	<= 55.00 [%] >= 0.50 [s]		
					Exhaust manifold pressure is valid	EXM_ExhMnfdPresNotVId ==FALSE		
					Nominal HP EGR valve total flow is valid	EGR_VlvTotFlowNomNotVid ==FALSE		
					Nominal LP EGR valve total flow is valid	LPE_VlvTotFlowNomNotVId ==FALSE		
					All enabling conditions last for a time	>= 0.07 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
HP EGR Slow Response - Decreasing Flow (OBDII market only)	P140C	This monitor (in decreasing flow direction) detects failures in the air system such to not fulfilll the request of HP EGR flow in the intake manifold during transient conditions. It works only in closed loop EGR control zone. This monitor is used to detect any malfunction in the HP EGR system that leads to slow down the air control causing the vehicle's emissions to exceed OBDII limits. The aim of the HP EGR flow slow response monitor is to detect small leakages in the pipe after the compressor or in the intake/exhaust manifold. This monitor could also detect slow responding HP EGR valve, or skewed MAF sensor. Slow responding throttle and VGT vanes could also affect the HP EGR flow response time.	Error difference (absolute value) between the desired HP EGR rate and the actual HP EGR rate during transient air control conditions. The error is averaged over a calibrate-able cumulative transient time.	**> P140C: Decreasing HP EGR slow response threshold [%]**	Calibration on diagnostic enabling	**P140B, P140C: HP EGR slow response enabling** ==TRUE	Test is evaluated after the enabling conditions are satisfied for a number of samples	Type B, 2 Trips
					Engine Running	==TRUE		
					Cranking ignition in range	Battery voltage > 11.00 [V]	>=200.00 sampling time is 25ms	
					PT Relay voltage in range	Powertrain relay voltage > 11.00 [V]		
					Air Control is Active (air control in closed loop)	Refer to "Air Control Active" Free Form		
					Air control active condition lasts for a time	> 0.50 [s]		
					Desired EGR rate	> 0 [%]		
					No active transition from a combustion mode to another one	==TRUE		
					(Engine Coolant Temperature	> 30.00 [°C]		
					OR OBD Coolant Enable Criteria),	==TRUE		
					AND Engine Coolant Temperature	< 129.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Throttle measured position	>20.00 [%]		
					Outside air temperature	> -20.00 [°C]		
					Ambient air pressure	> 69.60 [kPa]		
					LP EGR valve total mass error (absolute value, | desired LP EGR mass - estimated LP EGR mass|)	< 1.00 [mg]		
					Desired fuel quantity in range	> **P140C: Decreasing HP EGR slow response Min fuel enabling condition** [mm^3] AND < **P140C: Decreasing HP EGR slow response Max fuel enabling condition** [mm^3]		
					Exhaust manifold pressure in range	>70.00 [kPa] AND <350.00 [kPa]		
					Desired HP EGR flow gradient (Req-ReqOld) greater than a threshold	> -1.45 [mg/s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Desired HP EGR flow gradient (Req-ReqOld) lower than a threshold, with hysteresis	TRUE if < -1.30 [mg], FALSE if > -0.70 [mg]		
					Hysteresis lasts for a limited number of samples	<= 45.00 [count]		
					HP EGR valve total mass error (desired HP EGR mass - estimated HP EGR mass) in range, with hysteresis	TRUE if < -35.00 [mg], FALSE if > -15.00 [mg]		
					Desired HP EGR rate	< 55.00 [%]		
					Exhaust manifold pressure is valid	EXM_ExhMnfdPresNotVld ==FALSE		
					Nominal HP EGR valve total flow is valid	EGR_VlvTotFlowNomNotVld ==FALSE		
					Nominal LP EGR valve total flow is valid	LPE_VlvTotFlowNomNotVld ==FALSE		
					All enabling conditions last for a time	> 0.02 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensori vs IAT2 (MAT) Not Plausible	P1428	The power up temperature varies too much from reference sensor after long soak. At start up, after a long enough soak time to stabilize temperatures, the EGR 1 temp sensor is compared to the MAT temp sensor. If the temperature delta is above an allowed operating threshold the sensor is determined to be faulted.	If the power up initial value of the temp sensor varies more than allowed from the reference temp sensor.	Temperature Delta from MAT. at power up > 27 C	Monitor Enable Condition AND Engine soak (not run) time AND Engine Mode Cranking AND Run Crank Low Time Error AND Rational Sensor Comparator Fault Active AND Differential ECT Condition Detected AND Diagnostic System Disabled Ambient Temperature	1.00 ==TRUE >= 28,800.00 == FALSE == FALSE == FALSE == FALSE == FALSE >-60.00 0.00 == FALSE	Function Task: 100 ms /sample, continuousNA	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					with hysteresis AND Rational Fault Condition Met Trip AND Block Heater Detected AND Sensor Circuit Fault Active AND Propulsion system activated	== FALSE == FALSE == TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensor2 vs IAT2 (MAT) Not Plausible	P142A	The power up temperature varies too much from reference sensor after long soak. At start up, after a long enough soak time to stabilize temperatures, the EGR 2 temp sensor is compared to the MAT temp sensor. If the temperature delta is above an allowed operating threshold the sensor is determined to be faulted.	If the power up initial value of the temp sensor varies more than allowed from the reference temp sensor.	Temperature Delta from MAT at power up > 33.00 C	Monitor Enable Condition AND Engine soak (not run) time AND Enginer Mode Crank AND Run Crank Low Time Error AND Rational Sensor Compare Fault Active AND Differential ECT Condition Detected AND Diagnosis System Disable AND Ambient Temperature	1.00 ==TRUE >= 28,800.00 == FALSE == FALSE == FALSE == FALSE == FALSE >-60.00 0.00	NA	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					with hysteresis Rational Fault Condition Met Trip AND Block Heater Detected AND Sensor Circuit Fault Active AND Propulsion system activated	== FALSE == FALSE == FALSE == TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level SensorA Reference Feedback Range/ Performance [For use on vehicles with FTZM]	P1434	This DTC will detect a fault in Primary fuel tank level sensor 5V reference by comparing DEC ECU commanded signal period and pulse width values against measured period and pulse width reported by the smart device	Reference Voltage 0 Period Error Maximum [Measured Ref V Period - Commanded Ref V Period]	> 25.00 millisec	a] CAN serial data available [$2D7] b] Calibration - Reference Voltage Command Source c] Timer - Reference Voltage Pulse Width Available Synchronization d] Timer - Reference Voltage Period Available Delay e] Diagnostic System Disabled f] FTZM Serial Data Info4 Rolling Counter Check Error g] Reference Voltage Performance 0 Diagnostic Enabled	a] ––True b] == ECM c] > 1.25 sec d] > 0.75 sec e] <> True f] <> True g] == TRUE	250 ms / sample	Type B, 2 Trips
			Reference Voltage 0 Pulse Width Error Maximum [Measured Ref V PW - Commanded Ref V PW]	> 1.50 millisec	a] CAN serial data available [$2D7] b] Calibration - Reference Voltage Command Source c] Timer - Reference Voltage Pulse Width Available Synchronization d] Timer - Reference Voltage Period Available Delay e] Diagnostic System Disabled	a] ––True b] == ECM c] > 1.25 sec d] > 0.75 sec e] <> True	250 ms / sample 16 Failures/ 20 Samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					f] FTZM Serial Data Info4 Rolling Counter Check Error g] Reference Voltage Performance 0 Diagnostic Enabled	f] <> True g] == TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor B Reference Feedback Range/ Performance [For use on vehicles with FTZM and Secondary Fuel Tank]	P143E	This DTC will detect a fault in Secondary fuel tank level sensor 5V reference by comparing DEC ECU commanded signal period and pulse width values against measured period and pulse width reported by the smart device	Reference Voltage 1 Period Error Maximum [Measured Ref V Period - Commanded Ref V Period]	> 25.00 millisec	a] CAN serial data available [$2D7] b] Calibration - Reference Voltage Command Source c] Timer - Reference Voltage Pulse Width Available Synchronization d] Timer - Reference Voltage Period Available Delay e] Diagnostic System Disabled f] FTZM Serial Data Info4 Rolling Counter Check Error g] Reference Voltage Performance 1 Diagnostic Enabled	a] —— True b] == ECM c] > 1.25 sec d] > 0.75 sec e] <> True f] <> True g] == TRUE	250 ms / sample 16 Failures/ 20 Samples	Type B, 2 Trips
			Reference Voltage 1 Pulse Width Error Maximum [Measured Ref V PW - Commanded Ref V PW]	> 1.50 millisec	a] CAN serial data available [$2D7] b] Calibration - Reference Voltage Command Source c] Timer - Reference Voltage Pulse Width Available Synchronization d] Timer - Reference Voltage Period Available Delay e] Diagnostic System Disabled	a] —— True b] == ECM c] > 1.25 sec d] > 0.75 sec e] <> True	250 ms / sample 16 Failures/ 20 Samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					f] FTZM Serial Data Info4 Rolling Counter Check Error g] Reference Voltage Performance 1 Diagnostic Enabled	f] <> True g] == TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module Configuration Command Signal 1 Message Counter Incorrect	P14CD	The FTZM monitors its specific command data serial message frames [message FTZM CommandI $0CE] received from the ECM over its private CAN channel and evaluates whether these data are updating regularly. The FTZM diagnostic runs every 10msec. Each FTZM diagnostic evaluation is sent back to the ECM over the private bus. When the ECM diagnostic detects that the transmitted message counter and the received message counter do not match, it will increment a fail counter. The diagnostic status is monitored using X/Y counting and the Diagnostic Trouble Code is set when the failure count has matured to its threshold value. The X/Y counting is a rolling array type where X of the most recent Y samples represent a failing status, and it is updated continuously with each execution loop and resets only on an end-of-trip event.	FTZM bus CAN Message CommandI $0CE Alive Rolling Counter transmitted from ECM OR FTZM bus CAN Message CommandI $0CE Protection Value checksum transmitted from ECM	<> ARC sequence at FTZM OR <> Protection Value checksum at FTZM	a) Diagnostic is .. b) Diagnostic System Disabled c) System Voltage [Batt In Range] d) FTZM bus [Sensor Bus] Wakeup signal e) Diagnostic delay time f) Message Received status g) Data Received status h) No message fault conditions present	a) .. Enabled b) == False c) > 8.0 volts d) == TRUE e) > 3,000 msec f) == TRUE g) == TRUE h) == TRUE	15 fail counts out of 16 sample counts continuously updated rolling array 12.5 msec loop execution	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module Configuration Command Signal 5 Message Counter Incorrect	P14D6	The FTZM monitors its specific command data serial message frames [message FTZM Commands $3C6] received from the ECM over its private CAN channel and evaluates whether these data are updating regularly. The FTZM diagnostic runs every 10msec. Each FTZM diagnostic evaluation is sent back to the ECM over the private bus. When the ECM diagnostic detects that the transmitted message counter and the received message counter do not match, it will increment a fail counter. The diagnostic status is monitored using X/Y counting and the Diagnostic Trouble Code is set when the failure count has matured to its threshold value. The X/Y counting is a rolling array type where X of the most recent Y samples represent a failing status, and it is updated continuously with each execution loop and resets only on an end-of-trip event.	FTZM bus CAN Message Commands $3C6 Alive Rolling Counter transmitted from ECM OR FTZM bus CAN Message Commands $3C6 Protection Value checksum transmitted from ECM	<> ARC sequence at FTZM OR <> Protection Value checksum at FTZM	a) Diagnostic is .. b) Diagnostic System Disabled c) System Voltage [Batt In Range] d) FTZM bus [Sensor Bus] Wakeup signal e) Diagnostic delay time f) Message Received status g) Data Received status h) No message fault conditions present	a) .. Enabled b) == False c) > 8.0 volts d) == TRUE e) > 3,000 msec f) == TRUE g) == TRUE h) == TRUE	8 fail counts out of 10 sample counts continuously updated rolling array 12.5 msec loop execution	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Switch State Undertermined Bank 1 and 2	P155A	Detects when cruise switch state cannot be determined, such as low voltage condition When the BCM tells the ECM that the cruise switch "Indeterminate" (momentary on/off switch architectures) is detected for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	cruise switch state is received as "undetermined" for greater than a calibratable time over a sample period.	fail in the indeterminate state for greater than 0.50 seconds over the sample period of 15.00 seconds	Diagnostic is enabled.		indicate failure for 0.50 seconds / 15.00 seconds.	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Set/ Coast Signal 2 Circuit Switch Bank 1 or 2	P155B	Detects a failure of the cruise set 2 switch in a continously applied state. When the BCM tells the ECM that the cruise control analog input voltage is stuck in Decrease High state for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	Cruise Control Set 2 switch remains applied for greater than a calibratable period of time.	fail in the applied state for greater than 89.00 seconds over the sample period of 99.00 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail for greater than 89.00 seconds/ 99.00 seconds	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Resume/ Acceleration Signal 2 Circuit Switch Bank 1 or 2	P155C	Detects a failure of the cruise resume 2 switch in a continously applied state "When the BCM tells the ECM that the cruise control analog input voltage is stuck in Increase High state for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	Cruise Control Resume 2 switch remains applied for greater than a calibratable period of time over a sample period.	fail in the applied state for greater than 89.00 seconds over the sample period of 99.00 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail for greater than 89.00 seconds/ 99.00 seconds	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Sensor Bus Relay Feedback Circuit High Voltage	P157A	Detects unexpected CAN activity on the sensor bus. This diagnostic reports the DTC when controller-specific CAN frames are received while the sensor bus relay is commanded "off."	Continued reception of sensor bus CAN frames during driver off state indicates a stuck on circuit failure. Controller specific received CAN frames are selected to determine continued CAN activity.		Sensor Bus Relay feedback circuit high voltage diagnostic enabled Sensor Bus Relay commanded “OFF” No Sensor Bus active DTCs:	= 1 P16D7, P16D8, P16D9	6 failures out of 10 samples 250ms / Sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Bank 1 Sensor 1 DPS "A" Temperature Sensor Circuit Low	P15CC	This monitor refers to electrical fails on the differential pressure temperature information, covering the out of range low. The monitor compares the raw temperature signal with a minimum threshold. If this threshold is overcome, a short circuit to GND is detected.	Differential pressure sensor Temperature information	<-73.00	Monitor enabled by calibration Run Cranck Active Run Crank Igntion in Range Diagnostic system reset status Engine in Crank Mode	1.00 ==TRUE ==TRUE ==FALSE ==FALSE	19.00 fail samples out of 25.00 samples Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Bank 1 Sensor 1 DPS "A" Temperature Sensor Circuit High	P15CD	This monitor refers to electrical fails on the differential pressure temperature information sensor, covering the out of range high. The monitor compares the raw temperature signal with a maximum threshold. If this threshold is overcome, an open circuit or a short circuit to battery is detected.	Differential pressure sensor Temperature information	>438.00	Monitor enabled by calibration Run Cranck Active Run Crank Igntion in Range Diagnostic system reset status Engine in Crank Mode	1.00 ==TRUE ==TRUE ==FALSE ==FALSE	19.00 fail samples out of 25.00 samples Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Bank 1 Sensor 1 DPS "A" Temperature Sensor Intermittent	P15CE	This monitor checks if the raw signal variation is too high, comparing consecutive samples diffeerence with a threshold.	Difference between two subsequent differential pressure temperature information samples exceeds a certain threshold	>20.00 [°C]	Monitor enabled by dedicated calibration AND Diagnostic system reset status AND Engine cranking phase AND Electrical errors flags for the differencial pressure temperature information (out of range high/low, loss of communication in case of digital sensor) AND Run Crank Active AND Run Cranck Ignition in Range AND No electrical fault on differential pressure temperature information (out of range high/low, loss of communication in case of digital sensor)	1.00 [Boolean] ==FALSE == FALSE == FALSE ==TRUE ==TRUE DPST_CktFlt	12.00 fail samples out of 25.00 samples Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Bank 1 Sensor 1 DPS A Temperature Sensor Key on Test	P15CF	This monitor checks if the raw signal is affected by offset issue comparing a measured DPS temperature at key on with a average temperature calculated at key on.	Difference between the average temperature calculated at key one the DPS measured temperature shall be greater than in case block heater is not detected instead shall be greater than in case the Block heater is detected	>20.00 [°C] >30.00 [°C]	Monitor enabled by dedicated calibration AND Ambient temperature greater than a calibratable threshold with hysteresis AND Diagnostic system reset status AND Electrical errors flags for the differential pressure temperature information (out of range high/ low,intermittent and loss of communication in case of digital sensor) AND Average temperature calculation valid AND Run Cranck Ignition in Range AND No electrical fault on	1.00 [Boolean] >-20.00 2.00 ==FALSE == FALSE ==TRUE ==TRUE DPST_CktFlt	2.00 fail samples out of 2.00 samples Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					differential temperature information(out of range high/low, intermittent and loss of communication in case of digital sensor) Key on report done	 ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Bank 1 Sensor 2 DRS "C" Temperature Sensor Circuit Low	P15D4	This monitor refers to electrical fails on the downstream relative pressure temperature information, covering the out of range low. The monitor compares the raw temperature signal with a minimum threshold. If this threshold is overcome, a short circuit to GND is detected.	Downstream relative pressure sensor Temperature information	<-73.00	Monitor enabled by calibration	1.00	19.00 fail samples out of 25.00 samples Function task: 100 ms	Type B, 2 Trips
					Run Cranck Active	==TRUE		
					Run Crank Igntion in Range	==TRUE		
					Diagnostic system reset status	==FALSE		
					Engine in Crank Mode	==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Bank 1 Sensor 2 DRS "C" Temperature Sensor Circuit High	P15D5	This monitor refers to electrical fails on the downstream relative pressure temperature information sensor, covering the out of range high. The monitor compares the raw temperature signal with a maximum threshold. If this threshold is overcome, an open circuit or a short circuit to battery is detected.	Downstream relative pressure sensor Temperature information	>438.00	Monitor enabled by calibration Run Cranck Active Run Crank Igntion in Range Diagnostic system reset status Engine in Crank Mode	1.00 ==TRUE ==TRUE ==FALSE ==FALSE	19.00 fail samples out of 25.00 samples Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Bank 1 Sensor 2 DRS "C" Temperature Sensor Intermittent	P15D6	This monitor checks if the raw signal variation is too high, comparing consecutive samples diffeerence with a threshold.	Difference between two subsequent downstream relative pressure temperature information samples exceeds a certain threshold	>20.00 [°C]	Monitor enabled by dedicated calibration AND Diagnostic system reset status AND Engine cranking phase AND Electrical errors flags for the downstream relative pressure temperature information (out of range high/low, loss of communication in case of digital sensor) AND Run Crank Active AND Run Cranck Ignition in Range AND No electrical fault on downstream relative pressure temperature information(out of range high/low, loss of communication in case of digital sensor)	1.00 [Boolean] ==FALSE == FALSE == FALSE ==TRUE ==TRUE DRST_CktFlt	12.00 fail samples out of 25.00 samples Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Bank 1 Sensor 2 DRSC Temperature Sensor Key on Test	P15D7	This monitor checks if the raw signal is affected by offset issue comparing a measured DRS temperature at key on with a average temperature calculated at key on.	Difference between the average temperature calculated at key one the DRS measured temperature shall be greater than in case block heater is not detected instead shall be greater than a calibratalble value in case the Block heater is detected	>20.00 [°C] >30.00 [°C]	Monitor enabled by dedicated calibration AND Ambient temperature greater than a calibratable threshold with hysteresis AND Diagnostic system reset status AND Electrical errors flags for the downstream relative pressure temperature information (out of range high/low,intermittent and loss of communication in case of digital sensor) AND Average temperature calculation valid AND Run Cranck Ignition in Range AND No electrical fault on	1.00 [Boolean] >-20.00 2.00 ==FALSE == FALSE ==TRUE ==TRUE DRST_CktFlt	2.00 fail samples out of 2.00 samples Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					downstream relative pressure temperature information(out of range high/low, intermittent and loss of communication in case of digital sensor) Key on report done	==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Wheel Speed Sensor Sequence Number Incorrect	P15FD	This DTC monitors wheel speed signals for an incorrect sequence	Communication of the wheel speed sequence numbers from the ABS / Brake Control Module is incorrect. A complete set of sequence numbers has not been received for and this state is continuous for out of a total sample time of	 > 10.00 seconds >4.00 seconds > 5.00 seconds	Sequence Number Error DTC is enabled Power Mode Run/Crank Ignition Voltage Driven and non-driven wheel rotational status is currently being received and not failsoft.	Enabled = Run or Crank >=11.00 Volts	Diagnostic executes in 25ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Voltage Correlation	P1682	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage and the Powertrain Relay Ignition Voltage. The diagnostic monitors the difference in voltage between Run/Crank Voltage and the Powertrain Relay Ignition Voltage and fails the diagnostic when the voltage difference is too high. This diagnostic only runs when the powertrain is commanded on and the Run/Crank Voltage is greater than a threshold based on IAT or the powertrain ignition voltage is high enough the Run/Crank voltage is high enough.	|Run/Crank - PT Relay Ignition| >	3.00 Volts	Powertrain Relay commanded on AND (Run/Crank voltage > OR PT Relay Ignition voltage >) AND Run/Crank voltage >	 Table, f(IAT). See supporting tables: **P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)** 5.50 Volts 5.50 Volts	240/480 counts; or 0.175 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Voltage Correlation #2	P16A7	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage and the Powertrain Relay Ignition Voltage #2. The diagnostic monitors the difference in voltage between Run/Crank Voltage and the Powertrain Relay Ignition Voltage and fails the diagnostic when the voltage difference is too high. This diagnostic only runs when the powertrain is commanded on and the Run/Crank Voltage is greater than a threshold based on IAT or the powertrain ignition voltage is high enough the Run/Crank voltage is high enough. Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage #2.	|Run/Crank - PT Relay Ignition| >	3.00 Volts	Powertrain Relay commanded on AND (Run/Crank voltage > OR PT Relay Ignition voltage >) AND Run/Crank voltage >	 Table, f(IAT). See supporting tables: **P16A7_PT Relay Pull-in Run/Crank Voltage f(IAT)** 5.50 Volts 5.50 Volts	240/480 counts; or 0.175 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Controls Ignition Relay Feedback Circuit 2 Low Voltage - (GEN III Controllers ONLY)	P16AF	Detects low voltage in the engine controls ignition relay feedback circuit 2. This diagnostic reports the DTC when low voltage is present. Monitoring occurs when run crank voltage is above a calibrated value.	Engine controls ignition relay feedback circuit 2 low voltage	Relay voltage <= 5.00	Powertrain relay low diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 1.00 >=11.00 >9.00 = ON	5 failures out of 6 samples 1000 ms / sample	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Controls Ignition Relay Feedback Circuit 2 High Voltage -(GEN III Controllers ONLY)	P16B3	Detects high voltage in the engine controls ignition relay feedback circuit 2. This diagnostic reports the DTC when high voltage is present. Monitoring occurs when the relay state is inactive.	Engine controls ignition relay feedback circuit 2 high voltage	Relay voltage >=4.00	Powertrain relay high diag enable Powertrain relay state	= 1.00 = INACTIVE	50 failures out of 63 samples 100 ms /sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Voltage Correlation #3	P16BC	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage #2	|Run/Crank - PT Relay Ignition| >	3.00 Volts	Powertrain Relay commanded on AND (Run/Crank voltage > OR PT Relay Ignition voltage >) AND Run/Crank voltage >	 Table, f(IAT). See supporting tables: **P16BC_PT Relay Pull-in Run/Crank Voltage f(IAT)** 5.50 Volts 5.50 Volts	240/480 counts; or 0.175 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Controls Ignition Relay Feedback Circuit 3 Low Voltage - (Diesel Controllers ONLY)	P16BD	Detects low voltage in the engine controls ignition relay feedback circuit 3. This diagnostic reports the DTC when low voltage is present. Monitoring occurs when run crank voltage is above a calibrated value.	Engine controls ignition relay feedback circuit 3 low voltage	Relay voltage <= 5.00	Powertrain relay low diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 1.00 >=11.00 >9.00 = ON	5 failures out of 6 samples 1000 ms / sample	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Controls Ignition Relay Feedback Circuit 3 High Voltage - (Diesel Controllers ONLY)	P16BF	Detects high voltage in the engine controls ignition relay feedback circuit 3. This diagnostic reports the DTC when high voltage is present. Monitoring occurs when the relay state is inactive.	Engine controls ignition relay feedback circuit 3 high voltage	Relay voltage >=4.00	Powertrain relay high diag enable Powertrain relay state	= 1.00 = INACTIVE	50 failures out of 63 samples 100 ms /sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Sensor Bus Relay Control Circuit	P16D7	Detects an open circuit in the sensor bus relay circuit. This diagnostic reports the DTC when an open circuit is present. Adecisionis made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	Open Circuit: > 200 K Ω ohms impedance between output and controller ground	Sensor Bus relay circuit open diagnostic = TRUE Run/Crank Voltage	1.00 Voltage > 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips Note: In certain controllers P16D8 may also set (Sensor Bus Relay Control Circuit Low).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Sensor Bus Relay Control Circuit Low	P16D8	Detects a short to ground in the sensor bus relay circuit. This diagnostic reports the DTC when a short to ground is present. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver off 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.	Short to ground: < 0.5 Q impedance between output and controller ground	Run/Crank Voltage	Voltage >11.00 volts	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips Note: In certain controlle rs P16D7 may also set (Sensor Bus Relay Control Circuit Open).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Sensor Bus Relay Control Circuit High	P16D9	Detects a short to power in the sensor bus relay circuit. This diagnostic reports the DTC when a short to power is present. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	Short to power: < 0.5 Q impedance between output and controller power	Run/Crank Voltage	Voltage >11.00 volts	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transfer Case Control Module Transfer Case Command State Rationality - 4WD high or 4WD low command not 4wd high or 4WD low ratio	P17D4	The diagnostic monitor compares measured transfer case ratio to the transfer case control module commanded transfer case state. When the measured transfer case gear ratio is 4WD neutral ratio, while, the transfer case control module command state is 4WD high ratio or 4WD low ratio, the DTC is set. The 4WD neutral ratio regions are considered ratios outside the nominal 4WD high and nominal 4WD low ratios. The 4WD ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.	transfer case contol module transfer case command state AND measured transfer case ratio is NOT in 4WD low ratio window AND measured transfer case ratio is NOT in 4WD high window AND measured transfer case ratio is NOT in 4WD low ratio window AND measured transfer case ratio is NOT in 4WD high window OR vehicle is stopped: transfer case output shaft speed transmission output shaft speed vehicle stopped secondary parameter thresholds met (measured transfer case ratio = transmission output speed / transfer case output speed)	# 4WD neutral 4WD low ratio window < 3.00 > 2.40 4WD high ratio window <1.30 > 0.70 > 2.90 < 2.00 > 1.20 < 0.80 < 10.0 RPM > 500.0 RPM	vehicle stopped: transmission output shaft speed engine torque engine speed accelerator pedal position accelerator pedal position brake pedal position transmssion gear is forward gear: transmission output shaft speed engine torque engine speed accelerator pedal position accelerator pedal position brake pedal position transmssion gear is reverse gear: transmission output shaft speed engine torque engine speed accelerator pedal position accelerator pedal position brake pedal position diagnsotic monitor enable PTO active engine power limited DTCs not fault active	> 500.0 RPM > 100.0 Nm > 300.0 RPM > 5.0 % hysteresis high NOT < 3.0 % hysteresis low < 100.0 % > 500.0 RPM > -20.0 Nm > 0.0 RPM > 0.0 % hysteresis high NOT < 0.0 % hysteresis low < 100.0 % > 500.0 RPM > 90.0 Nm > 300.0 PRM > 6.0 % hysteresis high NOT < 3.0 % hysteresis low < 100.0 % = 1.00 Boolean = FALSE = FALSE P057B, P057C, P057D, P057E, P279A, P279B, P279C, P0502, P0503, P0722,	fail count > 840.00 counts out of sample count > 1,200.00 counts update rate 12.5 milliseconds for 1 count	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			update rate 12.5 milliseconds			P0723, P2160, P2161		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Injector Circuit / Open Bank 1 Unit 1	P2047	This diagnosis verifies if a DEF dosing valve open circuit occurred	HWIO interface DEFMV_OPEN = Fault	VeHWIO_e_DEFMV_ Open == CeSCRR_e_Fault	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage HWIO interface DEFMV_OPEN different from INDETERMINATE	1.00 > 11.00 [V]	30.00 failures out of 60.00 samples Time basis = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Injector Circuit Low Bank 1 Unit 1	P2048	This diagnosis verifies if a DEF dosing valve low side short to ground occurred	HWIO interface DEFMV_GROUND_SHORT = Fault	VeHWIO_e_DEFMV_Gsht == CeSCRR_e_Fault	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage HWIO interface DEFMV_GROUND_SHORT different from INDETERMINATE	1.00 > 11.00 [V]	30.00 failures out of 60.00 samples Time basis = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Injector Circuit High Bank 1 Unit 1	P2049	This diagnosis verifies if a DEF dosing valve low side short to battery occurred	HWIO interface DEFMV_POWER_SHORT = Fault	VeHWIO_e_DEFMV_Psht == CeSCRR_e_Fault	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage HWIO interface DEFMV_ENABLE_POWER_SHORT different from INDETERMINATE	1.00 > 11.00 [V]	30.00 failures out of 60.00 samples Time basis = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 2 Performance (For use on vehicles with dual fuel tanks and electric transfer pump)	P2066	This DTC will detect a secondary fuel tank level sensor stuck in-range	1) ****************************** Fuel Level in Primary and Secondary Tanks Remain in an Unreadable Range too Long ****************************** 1a) If Deadband diagnostic subtest enabled 1b) If fuel volume in primary tank is 1c) and if fuel volume in secondary tank is 1d) and if 1b and 1c indications do not change while fuel volume consumed by engine is OR 2) ****************************** Fuel consumed without a Secondary Fuel Level Change ****************************** 2a) If engine is running, and the fuel consumed is 2b) then secondary tank volume change must be	1b) >1,024.0 liters 1c) <0.0 liters 1d) > 18.0 liters 2a) > 30 liters 2b) > 5.00 liters	1a) Engine Operational Status	1b) == Running	250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 2 Circuit Low Voltage (For use on vehicles with two fuel senders connected to an FTZM)	P2067	This DTC will detect a fuel sender out-of-range low in the secondary fuel tank.	Fuel level Sender % of 5V range	< 10 %	a) Diagnostic is Enabled b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	 b) == True c) == True d) <> True	40 failures out of 50 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 2 Circuit High Voltage (For use on vehicles with two fuel senders connected to an FTZM)	P2068	This DTC will detect a fuel level sensor out-of-range high in the secondary fuel tank.	Fuel level Sender % of 5V range	> 60 %	a) Diagnostic is Enabled b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	 b) == True c) == True d) <> True	40 failures out of 50 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SCR1 Plouton NOx Conversion Efficiency Monitor - EWMA Enabled	P20EE	It detects a SCR1 catalyst malfunction when its NOx conversion capability decreases to the point that emissions exceed OBD emissions threshold. SCR1 Plouton NOx conversion efficiency monitoring estimates, using a model-based approach, the maximum SCR1 NH3 storage capacity (maximum amount of NH3 that the component is still able to store). The diagnostic parameter (f_avg) is an estimator of the overall deviations between the SCR1 ammonia storage capacity estimates and a nominal value in a set of valid samples. EWMA Filtering functionality (including Fast Initial Response (FIR), Rapid Response (RR) and EWMA Standard) is supported.	Check if the EWMA filtererd diagnostic parameter (f_avg) is above the: - Fail thrsh (if SCR_CatEffFA = FALSE) - Repass thrsh (if SCR_CatEffFA = TRUE)	Fail Thrsh 0.34000 Repass Thrsh 0.31000	TEST ENABLED No DTC present: Time elapsed since SCR chemical model not in fault Diagnostic system not disabled Engine running DEF system ready If DEF quality sensor present: DEF concentration Upstream SCR1 NOx sensor measurement reliable Downstream SCR1 NOx sensor measurement reliable DEF Tank state Time elapsed since DEF Tank state condition satisfied DEF Tank state	1 NOX_NOx_SnsrCatUpFlt SCR_NOxSnsrDwnFit SCR.ThermalMdlFlt EGT_SnsrSCR_DwnFlt SCR_ExhGasVolFlowFlt SCR_RDP_FA SCR_TipStuckFltSt SCR_DEFMV_FA SCR_ChemicalMdlFlt SBR_RlyFA SCR_DEFSysFlt_IUPR_DenDsbl EXF_TotExhSCR_UpFlt EXF_TotExhCatUpFlt > 5.00 s TRUE TRUE TRUE DEFQS present = 1 >29% (28%<hys<29%) TRUE TRUE Not Frozen	The diagnostic parameter is calculated collecting and averaging 300 samples when enabling conditions are satisfied, then filtering the resuting mean value by means of EWMA filter. 250 ms/sample. FIR Gain = 0.41 TestPerTrip <= 1.00 TotTest <= 2.00 RR Gain = 0.14 TestPerTrip <= 2.00 TotTest <= 4.00 STD	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Time elapsed since DEF Tank state condition satisfied DEF strategy for emission reduction not inhibited in case of a DPF clogging, only for emergency vehicles; Number of DPF regeneration events successfully completed after vehicle exits from assembly plant SCR Service Bay test Time elapsed since SCR Service Bay test NOx Storage model Time elapsed since NOx Storage condition satisfied Conditions satisfied NOx inlet concentration in ppm Condition satisfied NOx inlet flow in g/s Condition satisfied NOx inlet gradient Time elapsed since NOx inlet conditions satisfied	> 300.00 s Partially Frozen and able to inject the maximum injection quantity > 1.00 s TRUE > 1 Not Running > 300 s <=0.10 > 5.00 s >-10.00 <800.00 < 0.13 g/s < 500.00 >= 10.00 s >= 220.00 °C <= 340.00 °C	Gain = 0.14 TestPerTrip <= 1	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Estimated SCR1 substrate temperature to enable the monitoring after init events condition satisfied Ambient temperature Ambient pressure SCR PCS Control Time elapsed since SCR PCS Control condition satisfied SCR1 substrate temperature Time elapsed since SCR1 substrate temperature satisfied Combustion mode Time elapsed since Combustion mode condition satisfied The estimated error variance of NH3 storage (P11)	>-22.00 °C (-24.00 °C <hys< -22.00 °C) > 70.00 kPa (69.00 kPa <hys< 70.00 kPa) PCS_Dosing PCS_RemedialAction > 5.00 s >220.00 °C <340.00 °C > 5.00 s **SCR_Eff1_CombMode_ Enbl** > 300.00 s <=900.00000 <=20.00000 <= 0.75 >= 0.00 <=1,000.00000 <= 1 <= 1 <= 2		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					The estimated error covariance of NH3 storage and max storage capacity (P12,P21) The maximum value of NH3 storage estimate The minimum value of NH3 storage estimate The estimated error variance of NH3 max storage capacity (P22) Test per trip with Standard mode active Tests per trip with Fast Initial Response (FIR) mode active Tests per trip with Rapid Response (RR) mode active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Injector Performance - Low Reductant Consumptio n	P20FE	This diagnostic checks the DEF hydraulic system for faults that can lead to diminished DEF delivery from 1st DEF Injector.This monitor determines when RDP compensation has achieved a compensation factor so high that the expected pressure drop does not guarantee proper reductant delivery performance.	EWMA of Reductant Delivery Performance Compensation Factor	> 1.44	Closed Loop of Reductant Delivery Performance Compensation active	== TRUE	Function Task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Accelerator Pedal Position (APP) Sensor 1 Lo	P2122	Detects a continuous or intermittent short low or open in the APP sensor #1 by monitoring the APP1 sensor percent Vref and failing the diagnostic when the APP1 percent Vref is too low. This diagnostic only runs when battery voltage is high enough. Detects a continuous or intermittent short low or open in the APP sensor #1 on the Main processor.	APP1 percent Vref < (100% corresponds to 5.0 Volt)	9.25 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	19/39 counts; or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Accelerator Pedal Position (APP) Sensor 1 Hi	P2123	Detects a continuous or intermittent short high in the APP sensor #1 by monitoring the APP1 sensor percent Vref and failing the diagnostic when the APP1 percent Vref is too high. This diagnostic only runs when battery voltage is high enough. Detect a continuous or intermittent short high in the APP sensor #1 on the Main processor.	APP1 percent Vref > (100% corresponds to 5.0 Volt)	95.00 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	>6.41 Volts P06A3	19/39 counts; or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Accelerator Pedal Position (APP) Sensor 2 Lo	P2127	Detects a continuous or intermittent short low or open in the APP sensor #2 by monitoring the APP2 sensor percent Vref and failing the diagnostic when the APP2 percent Vref is too low. This diagnostic only runs when battery voltage is high enough. Detects a continuous or intermittent short low or open in the APP sensor *#2* on the Main processor.	APP2 percent Vref < (100% corresponds to 5.0 Volt)	6.50 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P0697	19/39 counts; or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Accelerator Pedal Position (APP) Sensor 2 Hi	P2128	Detects a continuous or intermittent short high in the APP sensor #2 by monitoring the APP2 sensor percent Vref and failing the diagnostic when the APP2 percent Vref is too high. This diagnostic only runs when battery voltage is high enough. Detect a continuous or intermittent short high in the APP sensor #2 on the Main processor.	APP2 percent Vref > (100% corresponds to 5.0 Volt)	52.00 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P0697	19/39 counts; or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138	Detect a continuous or intermittent correlation fault between APP sensors #1 and #2 on Main processor. 1.) The diagnostic monitors the difference in position between APP1 and the APP2 and fails the diagnostic when the difference is too high. This diagnostic only runs when the battery voltage is high enough. 2.) The diagnostic also monitors the difference in reference voltage between normalized min APP1 and the normalized min APP2 and fails the diagnostic when the difference is too high. This diagnostic only runs when the battery voltage is high enough. Detects a continuous or intermittent correlation fault between APP sensors #1 and #2 on Main processor	Difference between APP1 displaced and APP2 displaced >	5.000% offset at min. pedal position with a linear threshold to 10.001 % at max. pedal position	Run/Crank voltage No APP sensor faults No 5V reference errors or faulst for # 3 & # 4 5V reference circuits	> 6.41 Volts (P2122, P2123.P2127, P2128) (P06A3, P0697)	19/39 counts intermittent; or 15 counts continuous, 12.5 ms/count in the main processor	Type A, 1 Trips
			Difference between (normalized min APP1) and (normalized min APP2) >	3.500 % Vref	Run/Crank voltage No APP sensor faults No 5V reference errors or faulst for # 3 & # 4 5V reference circuits	> 6.41 Volts (P2122, P2123.P2127, P2128) (P06A3, P0697)	19/39 counts intermittent; or 15 counts continuous, 12.5 ms/count in the main processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Vehicle Speed - Output Shaft Speed Correlation	P215B	Detect invalid vehicle speed source. This failure is set by two different conditions. Either the absolute difference between wheel speed vehicle speed and TOS vehicle speed is too high, or secure vehicle speed is not available.	The absolute difference between wheel speed vehicle speed and TOS vehicle speed greater than > OR Secure vehicle speed source is unavailable	6.21 mph		Time since first CAN activity > 0.5000 s Secure vehicle speed source is TOS vehicle speed or wheel speed vehicle speed Trans engaged state is equal to engaged.	400/800 counts for wheel speed correlation or 400/ 800 counts for TOS correlation; 25ms/count	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure (BARO) Sensor Performance (3 intake air pressure sensor configuration)	P2227	This monitor is used to identify BARO sensor internal faults (measurement with an offset o r a drift). The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running). If BARO sensor is not in agreement with the other two the monitor is able to pinpoint BARO as the faulty sensor.	Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor	> **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] <= **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crankrelay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	==1.00 > 11.00 [V] < 950.00 [rpm] < 40.00 [mm^3] > 90.00 [%] > 70.00 [°C] Crank8ensor_FA ==FALSE FUL_GenericlnjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE ECT_Sensor_FA	640.00 fail counters over 800.00 sample counters sampling time is 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						==FALSE MAF_MAF_SnsrFA ==FALSE		
			BARO Pressure OR BARO Pressure OR Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor	< 50.0 [kPa] > 115.0 [kPa] > 10.0 [kPa] > 10.0 [kPa] <= 10.0 [kPa]	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 5.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	384 fail counters over 480 sample counters sampling time is 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure (BARO) Sensor Circuit Low (applications with LIN MAF)	P2228	Detects an eroneously low value being reported over the LIN serial connection from the BARO sensor. The diagnostic monitors the BARO sensor pressure output and fails the diagnostic when the pressure is too low. The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure. The BARO pressure value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	BARO Pressure	< 45.0 kPa	Diagnostic is Enabled LIN communications established with MAF		160 failures out of 200 samples 1 sample every 25 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure (BARO) Sensor Circuit High (applications with LIN MAF)	P2229	Detects an eroneously high value being reported over the LIN serial connection from the BARO sensor. The diagnostic monitors the BARO sensor pressure output and fails the diagnostic when the pressure is too high. The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure. The BARO pressure value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	BARO Pressure	> 115.0 kPa	Diagnostic is Enabled LIN communications established with MAF		160 failures out of 200 samples 1 sample every 25 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure (BARO) Sensor Circuit Intermittent (applications with LIN MAF)	P2230	Detects a noisy or erratic signal in the barometric pressure (BARO) circuit by monitoring the BARO sensor and failing the diagnostic when the BARO signal has a noisier output than is expected. When the value of BARO in kilopascals (kPa) is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of BARO readings. The result of this summation is called a “string length”. Since the BARO signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic BARO signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current BARO reading - BARO reading from 25 milliseconds previous)	> 100 kPa 80 consecutive BARO readings	Diagnostic is Enabled LIN communications established with MAF		4 failures out of 5 samples Each sample takes 2.0 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger Inlet Pressure (TCIAP) Sensor Performance (3 intake air pressure sensor configuration)	P227B	This monitor is used to identify TCIAP sensor internal faults (measurement with an offset or a drift). The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running) If TCIAP sensor is not in agreement with the other two the monitor is able to pinpoint TCIAP as the faulty sensor.	Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor	> **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] <= **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crank relay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	==1.00 > 11.00 [V] < 950.00 [rpm] < 40.00 [mm^3] > 90.00 [%] > 70.00 [°C] Crank8ensor_FA ==FALSE FUL_GenericlnjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE	640.00 fail counters over 800.00 sample counters sampling time is 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						ECT_Sensor_FA ==FALSE MAF_MAF_SnsrFA ==FALSE		
			TCIAP Pressure OR TCIAP Pressure OR Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor	< 50.0 [kPa] > 115.0 [kPa] > 10.0 [kPa] > 10.0 [kPa] <= 10.0 [kPa]	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 5.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP2_SnsrCktFA AAP3_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP AAP3_SnsrCktFP	384 fail counters over 480 sample counters sampling time is 12.5ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure Sensor Circuit C Low (Diesel, applications with LIN MAF)	P227C	Detects an eroneously low value being reported over the LIN serial connection from the BARO C sensor. The diagnostic monitors the BARO C sensor pressure output and fails the diagnostic when the pressure is too low. The BARO C sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure. The BARO C pressure value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	BARO C Pressure	< 45.0 kPa	Diagnostic is Enabled LIN Communications established with MAF		160 failures out of 200 samples 1 sample every 25 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure Sensor Circuit C High (Diesel, applications with LIN MAF)	P227D	Detects an eroneously high value being reported over the LIN serial connection from the BARO C sensor. The diagnostic monitors the BARO C sensor pressure output and fails the diagnostic when the pressure is too high. The BARO C sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure. The BARO C pressure value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	BARO C Pressure	> 115.0 kPa	Diagnostic is Enabled LIN Communications established with MAF		160 failures out of 200 samples 1 sample every 25 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure Sensor C Circuit Intermittent/ Erratic (applications with LIN MAF)	P227E	Detects a noisy or erratic signal in the barometric pressure (BARO) C circuit by monitoring the BARO C sensor and failing the diagnostic when the BARO C signal has a noisier output than is expected. When the value of BARO C in kilopascals (kPa) is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of BARO C readings. The result of this summation is called a “string length”. Since the BARO C signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic BARO C signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current BARO C reading - BARO C reading from 25 milliseconds previous)	> 100 kPa 80 consecutive BARO C readings	Diagnostic is Enabled LIN communications established with MAF		4 failures out of 5 samples Each sample takes 2.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator 1 - Forced Engine Shutdown	P228A	Determines when rail pressure is lower than desired setpoint and metering unit actuator has achieved its maximum authority.	Rail pressure setpoint - measured rail pressure Commanded fuel flow for metering unit	>30 MPa > Maximum flow deliverable by high pressure pump (refer to *RailPresCntrl* section)	Powertrain relay voltage Engine Mode Run Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl)*	>= 11.0V == True == True	160 failures out of 320 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 Ilium.
Fuel Pressure Regulator 2 - Forced Engine Shutdown	P228B	Determines when rail pressure is lower than desired setpoint and rail pressure regulator has achieved its maximum authority.	Rail pressure setpoint - measured rail pressure Commanded pressure for pressure regulator valve	>30 MPa > 45 to 278 MPa (see table **P228B Pressure Regulator completely closed command**)	Powertrain relay voltage Engine Mode Run Pressure Regulator controlled in closed loop (refer to *RailPresCntrl)*	>= 11.0V == True == True	160 failures out of 320 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 Ilium.
Fuel Pressure Regulator 1 Exceeded Control Limits - Pressure Too Low	P228C	Determines when rail pressure is lower than desired setpoint.	Rail pressure setpoint - measured rail pressure	> 16.00 MPa	Powertrain relay voltage Engine Mode Run Fuel Metering Unit controlled in closed loop (refer to *RailPresCntrl)* Fuel injected quantity (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	>= 11.0V == True == True > 4.0 mm^3/stroke ==0.00 == False) ==0.00 >= 0 kPa) ==0.00 >=-40 °C)	320 failures out of 640 samples 25 ms/sample	Type B, 2 Trips MIL is illuminated according to 'similar engine conditions' criteria.

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Rail pressure setpoint - measured rail pressure	> 16.00 MPa	Powertrain relay voltage Engine Mode Run Pressure Regulator controlled in closed loop (refer to *RailPresCntrl)* Fuel injected quantity (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	>= 11.0V == True == True > 2.0 mm^3/stroke ==0.00 == False) ==0.00 >= 0 kPa) ==0.00 >=-40 °C)	320 failures out of 640 samples 25 ms/sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator 1 Exceeded Control Limits - Pressure Too High	P228D	Determines when rail pressure is greater than desired setpoint.	Rail pressure setpoint - measured rail pressure	<--25.00 MPa	Powertrain relay voltage Fuel Metering Unit controlled in closed loop (refer to *RailPresCntrl)* Fuel injected quantity Fuel temperature (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	>= 11.0V == True > 4.0 mm^3/stroke >-40 °C == 0.00 == False) == 0.00 >= 0 kPa) == 0.00 >=-40 °C)	320 failures out of 640 samples 25 ms/sample	Type B, 2 Trips MIL is illuminated according to 'similar engine conditions' criteria.
			Rail pressure setpoint - measured rail pressure	<-25 MPa	Powertrain relay voltage Pressure Regulator controlled in closed loop (refer to RailPresCntrl)	>= 11.0V == True	320 failures out of 640 samples 25 ms/sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Fuel injected quantity	> 2.00 mm^3/stroke		
					(Low fuel level calibrated as enabling condition	==0.00		
					OR			
					LowFuelConditionDiagnostic	== False)		
					(Air ambient pressure calibrated as enabling condition	==0.00		
					OR			
					Air ambient pressure	>=0kPa)		
					(Air ambient temperature calibrated as enabling condition	==0.00		
					OR			
					Air ambient temperature	>=-40 °C)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator 2 Performance	P2293	Determines when rail pressure is above maximum threshold when pressure is governed by Pressure Regulator valve.	Rail pressure	>68 to 238 MPa (see table **P2293 Maximum rail pressure with PR)** OR 68.00 to 238.00 MPa (see table **P2293 Extended Maximum rail pressure with PR** if extended area is enabled)	Powertrain relay voltage Rail pressure is governed by Pressure Regulator (refer to *RailPresCntrl)*	>= 11.0 == True	121 failures out of 242 samples OR 121 continuous failures 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid 2 Control Circuit	P2294	Controller specific output driver circuit diagnoses the Rail Pressure Regulator valve low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit: impedance between signal and controller ground	> 200 kQ	Powertrain relay voltage Engine cranking Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	> 11.00V == FALSE == TRUE == FALSE	61 failures out of 122 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid 2 Control Circuit Low Voltage	P2295	Controller specific output driver circuit diagnoses the Rail Pressure Regulator valve low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off 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: impedance between signal and controller ground	< 0.5 Q	Powertrain relay voltage Engine cranking Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	> 11.00V == FALSE == TRUE == FALSE	61 failures out of 122 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid 2 Control Circuit High Voltage	P2296	Controller specific output driver circuit diagnoses the Rail Pressure Regulator valve low sided driver for a short to power 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 power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power: impedance between signal and controller power	< 0.5 Q	Powertrain relay voltage Engine cranking Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	> 11.00V == FALSE == TRUE == FALSE	61 failures out of 122 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator B Solenoid Supply Voltage Control Circuit Low	P233E	This DTC detects a short circuit to ground of the high side driver circuit of the Pressure Regulator valve	Voltage high across High Side driver of the Pressure Regulator valve during ON state indicates short to ground	Impedence between High Side pin of the Pressure Regulator and the controller ground < 0.5 Q	Powertrain relay voltage Engine cranking Run crank active	> 11.00V == FALSE == TRUE	61.00 failures out of 122.00 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator B Solenoid Supply Voltage Control Circuit High	P233F	This DTC detects a short circuit to power of the high side driver circuit of the Pressure Regulator valve	Voltage low across High Side driver of the Pressure Regulator valve during OFF state indicates short to power	Impedence between High Side pin of the Pressure regulator valve and the controller power < 0.5 Q	Powertrain relay voltage Engine cranking Run crank active	> 11.00V == FALSE == TRUE	61.00 failures out of 122.00 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate filter differential pressure too low	P244A	The monitor has the purpose of detecting whether the upstream pipe is leaking or disconnected. The monitor compares the sensed differential pressure across the particulate filter with a threshold. This threshold value is estimated as output of a map, function of the soot load estimation and the exhaust gass mass flow.	Differential Pressure Sensor Value	**<DPS_DPL_Thrsh**	Monitor enabled by dedicated calibration AND engine mode run AND Model Pipes Temperature enablement AND No fault affect Exhaust mass Flow and Soot load model AND no offset, quick change, elettrical check and DPS Too Hi, no electrical and quicke change fault attected the DPS temperature information AND Soot load inside a calibratable value with hysteresis AND	1.00 ==TRUE ==TRUE ==TRUE DPS.OfstTFTKO DPS_QckChgFlt DPS_CktFlt DPS_DPH_Flt DPST_CktFlt DPST_QckChgFlt <100.00 >15.00 2.00	800.00 fail samples out of 1,000.00 samples Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Exhaust FLow lower than a calibratable with hysteresis AND Exhaust vallve 1 inside a calibratable range with hysteresis AND Exhaust vallve 2 inside a calibratable range with hysteresis	<80.00 5.00 >100.00 <0.00 0.00 >100.00 <0.00 0.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Filter differential pressure too high	P244B	The monitor has the purpose of detecting whether the downstream pipe is leaking or disconnected. This monitor has two differerent concepts, depending on the available hardware (sensor type). If the sensor supports the reading of the downstream filter relative to ambient pressure, the diagnostic compares this value with a threshold (DRS concept). Otherwise, the monitor compares the ratio between the sensed differential pressure across the filter and the exhaust gas mass flow with a threshold value. This threshold value is estimated as output of a map, function of the soot load estimation and the upstream filter sensed temparature. The ratio used as test parameter is calculated over a time window, whose value is calibratable (DPS concept).	in case: 0.00 Differential Pressure Sensor moving average else Differential Pressure Sensor moving average	==1 >AvrThrshAvg_calculated > **DPS_DPHD_RatioThrsh**	Monitor enabled by dedicated calibration Monitore enable for Downstream Too high set to False AND engine mode run AND Model Pipes Temperature enable AND No fault affect Exhaust mass Flow and Soot load model AND no offset, quick change, electrical check and DPS Too Low,no electrical and quick change of the DPST temperature fault No fault on Temperature upstream the Filter AND No fault Exhaust Back Pressure measured position	1.00 1.00 ==TRUE ==TRUE =TRUE DPS.OfstTFTKO DPS_QckChgFlt DPS_CktFlt DPS_DPL_Flt DPST_CktFlt DPST_QckChgFlt EGT_SnsrCatUpFlt ==TRUE	Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND			
					Exhaust Back Pressure measured position inside a calibratable value with hysteresis	>100.00 <-1.00 5.00		
					AND	<1,000.00 >0.00		
					Soot load inside a calibratable value with hysteresis	2.00		
					AND	<650.00 >200.00 10.00		
					The Temperature Upstream the filter inside a calibratable range with hysteresis	<175.00 5.00 0.00		
					AND			
					Exhaust flow lower than a calibratable value with hysteresis and shall ne evaluated after a calibratable time	>100.00 < -1.00		
					AND	>100.00 <-1.00		
					Exhaust vallve flap 1 inside a calibratable range with hysteresis	5.00		
					AND			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Exhaust vallve flap 2 inside a calibratable range with hysteresis			
			Downstream relative pressure	<0.04	Monitor enabled by dedicated calibration	1.00	479.00 fail samples out of 500.00 samples	
					Monitore enable for DRS Too high monitor set to True	1.00	Function task: 12.5 ms	
					AND			
					engine mode run AND	==TRUE		
					Model Pipes Temperature enable	==TRUE		
					AND			
					No fault affect Exhaust mass Flow	==TRUE		
					AND			
					no DRS offset fault, no DRS quick change fault, no DRS elettica check fault and DPS Too low fault, no DRS temperature quick change fault, no DRS temperature electrical fault .	DRS_OfstTFTKO DPS_QckChgFlt DPS_CktFlt DPS_DPL_Flt DRST_CktFlt DRST_QckChgFlt		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND			
					no fault Exhaust Back Pressure measured position	==TRUE		
					AND			
					Exhaust Back Pressure measured position inside a calibratable value with hysteresis	>100.00 <-1.00 5.00		
					AND			
					Exhaust mass Flow with hysteresis and shall ne evaluated after a calibratable time	<175.00 5.00 0.00		
					AND	>100.00 <-1.00		
					Exhaust vallve flap 1 inside a calibratable range with hysteresis	5.00 >100.00 <-1.00 5.00		
					AND			
					Exhaust vallve flap 2 inside a calibratable range with hysteresis	>1.00 0.50 >70.00 5.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND Ambiente pressure greater than a claibratable value with hysteresis AND DR8 temperature information greater tha a calibratable threshold with hysteresis			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Differential pressure sensor offset rationality	P2452	This monitor verifies if the differential pressure for the particulate filter, checked in no flow conditions (0 kPa expected differential pressure when the engine is not running), is out of specification (sensor accuracy).	the absoulute difference between the Offset Differential value and the calibratabe offset Nominal vallue(4.71)	>2.20 [%]	Monitor enabled by dedicated calibration AND **DPS offset learn completed** AND Model Pipes Temperature enablement AND Offeset Report Done No DPS electrical fault, no DPS stuck fault or no DPS quick change faults,no DPS Temperature fault, no DPS Temperature quick chenage fault, no enge not run fault	1.00 [Boolean] ==TRUE ==TRUE ==FALSE DPS_CktFlt DPS_QckChgFlt DPS_StkFlt DPST_CktFlt DPST_QckChgFlt EngineModeNotRunTimer_FA	No debounce Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Differential pressure sensor stuck in range	P2453	This monitor detects a stuck signal, reporting a failure if the signal does not change when it is expecteded to (during transient phases).	Differential pressure variation lower than expected	<= 0.10 [%]	Monitor enabled by dedicated calibration	1.00 [Boolean]	11.00 fail samples out of 15.00 samples	Type A, 1 Trips
					AND			
					Engine movement detection	== TRUE	Function task: 12.5 ms	
					AND			
					Model Pipes Temperature enable	==TRUE		
					AND			
					No electrical, plausibility, offset and quick change faults affecting the sensors, no DPS temperature electrical fault, no DPS quick change Temperature fault.	DPS.OfstTFTKO DPS_QckChgFlt DPS_CktFlt DPST_CktFlt DPST_QckChgFlt		
					AND			
					Engine speed variation	>100.00 [rpm/s]		
					AND			
					Fuel quantity variation	>12.50 [l/s]		
					AND			
					Minimum air flow variation value	>75.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Differential pressure sensor out of range low	P2454	This monitor refers to electrical fails on the pressure sensor, covering the out of range low. The monitor compares the raw differential pressure signal with a minimum threshold. If this threshold is overcome, a short circuit to GND is detected.	Signal voltage raw value is compared to the voltage clamp value reported on the sensor datasheet, referring to a short to ground; a fault is detected when the value is lower than a certain threhsold.	< 0.02 [%]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine Mode in Crank	1.00 [Boolean] ==TRUE ==TRUE ==FALSE ==FALSE	158.00 fail samples out of 200.00 samples Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Differential pressure sensor out of range high	P2455	This monitor refers to electrical fails on the differential pressure sensor, covering the out of range high. The monitor compares the raw differential pressure signal with a maximum threshold. If this threshold is overcome, an open circuit o r a short circuit to battery is detected.	Signal raw value is compared to the voltage clamp value reported on the sensor datasheet, referring to a open circuit or a short to battery; a fault is detected when the value exceeds a certain threhsold.	> 99.80 [%]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine Mode in Crank	1.00 [Boolean] ==TRUE ==TRUE =FALSE ==FALSE	158.00 fail samples out of 200.00 samples Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Differential pressure sensor quick change	P2456	This monitor checks if the raw signal variation is too high, comparing consecutive samples diffeerence with a threshold.	Difference between two subsequent differential pressure raw signal samples exceeds a certain threshold	> 20.00 [%]	Monitor enabled by dedicated calibration AND Diagnostic system reset status AND Engine cranking phase AND Electrical errors flags (out of range high/low, loss of communication in case of digital sensor) AND Run Crank Active AND Run Cranck Ignition in Range AND No electrical fault on exhaust gas pressure sensor (out of range high/ low, loss of communication in case of digital sensor)	1.00 [Boolean] ==FALSE == FALSE == FALSE ==TRUE ==TRUE DPS_CktFlt	99.00 fail samples out of 200.00 samples Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Closed Loop Reductant Injection Control At Limit - Flow Too Low, PCS	P249D	Monitoring detects when the DEF injection is too low to reach the target. The following parameters: - the SCR# EKF coverage ratio; - the difference between the SCR# model and EKF coverage ratios; are checked and compared with specific thresholds. Monitoring reports the **failure:** - If **any** SCR catalysts/ bricks **fulfill all** Malfunction Criteria; - <u>With PTC active</u>, if **any** SCR catalysts/ bricks **fulfill any** Malfunction Criteria (with dedicated repass thresholds). Monitoring reports the **pass:** - If **none of** the SCR catalysts/bricks **fulfill all** Malfunction Criteria; - <u>With PTC active</u>, if **all** SCR catalysts/bricks **do not fulfill any** Malfunction Criteria (with dedicated repass thresholds).	SCR1 EKF coverage ratio SCR1 "model - EKF" coverage ratios SCR2 EKF coverage ratio SCR2 "model - EKF" coverage ratios	< 0.010 **(With DTC Active:** < 0.030) > 0.700 **(With DTC Active:** > 0.500) < 0.000 **(With DTC Active:** < 0.000) > 0.000 **(With DTC Active:** >0.000)	CAL ENABLER a) No SCR1 chemical model faults b) No SCR2 chemical model faults c) No DEF1 electrical faults d) No DEF2 electrical faults e) No DEF Component management faults Conditions a), b), c), d), e) fulfilled for a period of time Diagnostic System Code Clear Requested Diagnostic System Reset Complete f) SCR1 substrate temperature g) SCR2 substrate temperature Conditions f) and g) fulfilled for a period of time h) SCR1 Dosing Status	1 = TRUE; SCR_ChemicalMdlFlt_SCR = FALSE; SCR_ChemicalMdlFlt_SCR2 = FALSE; SCR_DEFMV_FA = FALSE; SCR_DEFMV2_FA = FALSE; SCR_DEFSysFlt_IUPR_DenDsbl = FALSE; >= 10.00 [s]; = FALSE; = TRUE; >= 210.00 [°C]; <= 300.00 [°C]; >= 210.00 [°C]; <= 300.00 [°C]; >= 3.00 [s]; = PCS_DOSING; = PCS_DOSING;	Monitoring provides the Report only if Malfunction Criteria are verified (or not) for a time equal or greater to 10.00 [s].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Architectures: - For single SCR applications, all conditions related to SCR2 are neglected; - For single SCR applications, with an SCR dual brick model, all conditions related to SCR1 and SCR2 refer to Brickl and Brick2 respectively; - For single DEF applications, all conditions related to DEF2 are neglected.			i) SCR2 Dosing Status j) SCR1 EKF correction active k) SCR2 EKF correction active Conditions h), i), j) and k) fulfilled fora period of time l) RDP test run request Condition l) fulfilled for a period of time	= TRUE; = TRUE; >= 10.00 [s]; = FALSE; >= 10.00 [s];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Closed Loop Reductant Injection Control At Limit - Flow Too High, PCS	P249E	Monitoring detects when the DEF injection is too high to reach the target. The following parameters: - the SCR# EKF coverage ratio; - the difference between the SCR# model and EKF coverage ratios; are checked and compared with specific thresholds. Monitoring reports the failure: - If **any** SCR catalysts/ bricks **fulfill all** Malfunction Criteria; - With PTC active, if **any** SCR catalysts/ bricks **fulfill any** Malfunction Criteria (with dedicated repass thresholds). Monitoring reports the pass: - If **none of** the SCR catalysts/bricks **fulfill all** Malfunction Criteria; - With PTC active, if **all** SCR catalysts/bricks **do not fulfill any** Malfunction Criteria (with dedicated repass thresholds).	SCR1 EKF coverage ratio SCR1 "EKF - model" coverage ratios SCR2 EKF coverage ratio SCR2 "EKF - model" coverage ratios	> 0.850 **(With DTC Active:** > 0.800) > 0.700 **(With DTC Active:** > 0.500) > 0.000 **(With DTC Active:** > 0.000) > 0.000 **(With DTC Active:** > 0.000)	CAL ENABLER a) No SCR1 chemical model faults b) No SCR2 chemical model faults c) No DEF1 electrical faults d) No DEF2 electrical faults e) No DEF Component management faults Conditions a), b), c), d), e) fulfilled for a period of time Diagnostic System Code Clear Requested Diagnostic System Reset Complete f) SCR1 substrate temperature g) SCR2 substrate temperature Conditions f) and g) fulfilled for a period of time h) SCR1 Dosing Status	1 = TRUE; SCR_ChemicalMdlFlt_SCR = FALSE; SCR_ChemicalMdlFlt_SCR2 = FALSE; SCR_DEFMV_FA = FALSE; SCR_DEFMV2_FA = FALSE; SCR_DEFSysFlt_IUPR_DenDsbl = FALSE; >= 10.00 [s]; = FALSE; = TRUE; >= 210.00 [°C]; <= 300.00 [°C]; >= 210.00 [°C]; <= 300.00 [°C]; >= 3.00 [s]; = PCS_DOSING; = PCS_DOSING;	Monitoring provides the Report only if Malfunction Criteria are verified (or not) for a time equal or greater to 10.00 [s].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Architectures: - For single SCR applications, all conditions related to SCR2 are neglected; - For single SCR applications, with an SCR dual brick model, all conditions related to SCR1 and SCR2 refer to Brickl and Brick2 respectively; - For single DEF applications, all conditions related to DEF2 are neglected.			i) SCR2 Dosing Status j) SCR1 EKF correction active k) SCR2 EKF correction active Conditions h), i), j) and k) fulfilled fora period of time l) RDP test run request Condition l) fulfilled for a period of time	= TRUE; = TRUE; >= 10.00 [s]; = FALSE; >= 10.00 [s];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 ECM run/ crank is active.	Ignition switch Run/Start position circuit low	Run / Crank = FALSE	Ignition switch Run/Start position circuit low diag enable and Run / Crank active ECM	= 1.00 = TRUE	320 failures out of 400 samples 25 ms /sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 ECM run/ crank is NOT active.	Ignition switch Run/Start position circuit high	Run / Crank = TRUE	Ignition switch Run/Start position circuit low diag enable and Run / Crank active ECM	= 1.00 = FALSE	320 failures out of 400 samples 25 ms /sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Control Torque Request Circuit	P2544	Determines if the torque request from the TCM is valid	Protect error - Serial Communication message 2's complement not equal ($189/$199) OR Rolling count error - Serial Communication message ($189/$199) rolling count index value OR Range Error - Serial Communication message - ($189/$199) TCM Requested Torque Increase OR Multi-transition error - Trans torque intervention type request change	Message <> two's complement of message Message <> previous message rolling count value + one > 1,298 Nm Requested torque intervention type toggles from not increasing request to increasing request	Diagnostic Status Power Mode Ignition Voltage Engine Running Run/Crank Active No Serial communication loss to TCM (U0101)	Enabled = Run > 6.41 volts = True > 0.50 Sec No loss of communication	>=16 failures out of 20 samples. Performed on every received message >= 6 Rolling count errors out of 10 samples. Performed on every received message >=6 range errors out of 10 samples. Performed on every received message >=5 multi-transitions out of 5 samples. Performed every 200 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Hood Switch Performance	P257D	This DTC monitors the hood switch rationality	Hood Switch position is in an invalid position. The hood switch reading is invalid in these ranges. Hood Switch Type: CeVIOS_e_GlobalB If Hood Switch type is CeVIOS_e_GlobalA If Hood Switch type is CeVIOS_e_GlobalB	 43.4% to 45.7% 59.34% to 66.96%	The diagnostic is enabled Enabled when Run/Crank is active only, otherwise Run/Crank is not used as an enable	Enabled Use Run/Crank as Enable	80 failed samples within 100 total samples Diagnostic runs in the 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Hood Switch Short to Ground / Low Voltage	P257E	This DTC monitors the hood switch for a short to ground or low voltage condition	Hood Switch position reading is lower than an expected bounds for The hood switch reading is lower than expected bounds at: Hood Switch Type: CeVIOS_e_GlobalB If Hood Switch type is CeVIOS_e_GlobalA If Hood Switch type is CeVIOS_e_GlobalB	< 17.2% < 28.54%	The diagnostic is enabled Enabled when Run/Crank is active only, otherwise Run/Crank is not used as an enable	Enabled Use Run/Crank as Enable	80 failed samples within 100 total samples Diagnostic runs in the 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Hood Switch Short to Voltage / High Voltage	P257F	This DTC monitors the hood switch for a short to voltage or high voltage condition	Hood Switch position reading is higher than an expected bounds for The hood switch reading is higher than expected bounds at: Hood Switch Type: CeVIOS_e_GlobalB If Hood Switch type is CeVIOS_e_GlobalA If Hood Switch type is CeVIOS_e_GlobalB	 > 67.8% > 85.2%	The diagnostic is enabled Enabled when Run/Crank is active only, otherwise Run/Crank is not used as an enable	Enabled Use Run/Crank as Enable	80 failed samples within 100 total samples Diagnostic runs in the 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Brake System Control Module Requested MIL Illumination	P25A2	Monitors the Brake System Control Module MIL request message to determine when the Brake System Control Module has detected a MIL illuminating fault.	Brake System Control Module Emissions-Related DTC set and module is requesting MIL	Brake System Control Module Emissions-Related DTC set and module is requesting MIL		Time since power-up > 3 seconds	Continuous	Type A, No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Unmetered Fuel- Forced Engine Shutdown	P25BD	Determines if engine overspeed condition is occuring when no fuel is being delivered	Engine Speed exceeds a threshold for a period of time	Fail Condition: Engine Speed > 5,200 RPM		Engine Speed > 1,500 RPM	Fail threshold: Overspeed condition TRUE > 500.0 milliseconds	Type A, 1 Trips
			Engine Speed less than a threshold for a period of time	Pass Condition: Engine Speed <(5,200 - 300) RPM		Engine Speed > 1,500 RPM	Pass threshold: Overspeed condition FALSE > 500.0 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Power Off Timer Performance	P262B	This DTC determines if the hardware timer does not initialize or count properly. There are two tests to ensure proper functioning of the timer: Count Up Test (CUT) and Range Test (RaTe). Count Up Test (CUT): Verifies that the HWIO timer is counting up with the proper increment. Range Test (RaTe): When the run/crank is not active both the hardware and mirror timers are started. The timers are compared when module shutdown is initiated or run/crank becomes active.	Count Up Test: Time difference between the current read and the previous read of the timer Range Test: The variation of the HWIO timer and mirror timer is	> 1.50 seconds > 0.25%.			Count Up Test: 4 failures out of 20 samples 1 sec / sample Continuous while run/crank is not active and until controller shutdown is initiated. Range Test: Once per trip when controller shutdown is initiated or run/ crank becomes active.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Low Temperature Coolant Loop Pump Overspeed	P26FA	This DTC indicates a out of range high failure of the pump speed.	Actual pump speed	>= 4,500 rpm	Pump H/W present Diagnostic enabled **************************** Powertrain relay voltage Or WCP direct connected too Batt **************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True True **************************** >=11.0 Volts False ****************************	4 failures out of 5 samples 1000ms /sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transfer Case Control Module Transfer Case Command State Rationality - 4WD high command not 4WD high ratio	P279A	Monitor measured transfer case gear ratio is 4WD low ratio or neutral while the transfer case control module command state is4WDhigh. The 4WD measured transfer case ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.	transfer case contol module transfer case command state AND measured transfer case ratio is in 4WD low ratio window OR measured transfer case ratio is in neutral window AND measured transfer case ratio is in 4WD low ratio window (measured transfer case ratio = transmission output speed / transfer case output speed) update rate 12.5 milliseconds	= 4WD high 4WD low ratio window < 3.00 > 2.40 neutral ratio window < 1.20 > 0.80 OR < 2.90 > 2.50 4WD low ratio window < 2.90 > 2.50	transmssion gear is forward gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position transmssion gear is reverse gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position diagnsotic monitor enable PTO active engine power limited DTCs not fault active	 > 500.0 RPM > 80.0 Nm > 300.0 RPM > 5.0 % <100.0 % > 500.0 RPM > 80.0 Nm > 300.0 PRM > 5.0 % < 100.0 % = 1.00 Boolean = FALSE = FALSE P057B, P057C, P057D, P057E P17D4, P279B, P279C P0502, P0503, P0722, P0723, P2160, P2161	fail counts > 560.00 counts out of sample counts > 800.00 counts update rate 12.5 milliseconds for 1 count	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transfer Case Control Module Transfer Case Command State Rationality - 4WD low command not 4WD low ratio	P279B	Monitor measures transfer case gear ratio is 4WD high ratio or neutral while the transfer case control module command state is4WDlow. The4WD measured transfer case ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.	transfer case contol module transfer case command state AND measured transfer case ratio is in 4WD high ratio window OR measured transfer case ratio is in neutral window AND measured transfer case ratio is in 4WD high ratio window (measured transfer case ratio = transmission output speed / transfer case output speed) update rate 12.5 milliseconds	= 4WD low 4WD high ratio window < 1.30 > 0.70 neutral ratio window < 1.20 > 0.80 OR < 2.90 > 2.50 4WD high ratio window < 1.20 > 0.80	transmssion gear is forward gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position transmssion gear is reverse gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position diagnsotic monitor enable PTO active engine power limited DTCs not fault active	 > 500.0 RPM > 80.0 Nm > 300.0 RPM > 5.0 % < 100.0 % > 500.00 RPM > 80.0 Nm > 300.0 PRM > 5.0 % < 100.0 % = 1.00 Boolean = FALSE = FALSE P057B, P057C, P057D, P057E P17D4, P279A, P279C P0502, P0503, P0722, P0723, P2160, P2161	fail count > 560.00 counts out of sample count >800.00 counts update rate 12.5 milliseconds for 1 count	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Sensor B Circuit Low	P2802	Controller specific PWM circuit diagnoses the internal range sensor (IRS) B for a short to ground failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates short to ground failure Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to ground	< 0.5 Q impedance between signal and controller ground	diagnostic monitor enable battery voltage update battery voltage timer PWM % duty cycle when voltage directly proportional OR PWM % duty cycle when voltage inversly proportional circuit sensor type	= 1 Boolean > 0.00 volts < 7.78 % > 7.78 % CeTRGD_e_VoltDirctProP	fail time > 0.50 seconds out of sample time > 1.00 seconds battery voltage timer > 1.00 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Sensor B Circuit High	P2803	Controller specific PWM circuit diagnoses the internal range sensor (IRS) B for a power short or 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 or power short failure Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit or power short	< 0.5 0 impedance between signal and controller voltage source OR > 200 K 0 impedance between signal and controller ground	diagnostic monitor enable battery voltage update battery voltage timer PWM % duty cycle when voltage directly proportional OR PWM % duty cycle when voltage inversly proportional circuit sensor type	= 1 Boolean > 0.00 volts > 92.22 % < 92.22 % CeTRGD_e_VoltDirctProP	fail time > 0.50 seconds out of sample time > 1.00 seconds battery voltage timer > 1.00 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Low Temperature Coolant Loop Pump Underspeed	P2BA0	This DTC indicates a out of range low failure of the pump speed.	Actual pump speed	< -50 rpm	Pump H/W present Diagnostic enabled **************************** Powertrain relay voltage Or WCP direct connected too Batt **************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True True **************************** >=11.0 Volts False ****************************	4 failures out of 5 samples 1000ms /sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Fuel Pressure Regulator A Exceeded Control Limits - Pressure Too Low	P2C1F	Determines when rail pressure is lower than desired setpoint during Cold Start	Rail pressure setpoint - measured rail pressure OR Rail pressure setpoint - measured rail pressure	> 16.00 MPa > 16.00 MPa	Cold Start strategy enabled Powertrain relay voltage Engine Mode Run Fuel Metering Unit OR Pressure Regulator controlled in closed loop (refer to RailPresCntrl) (Fuel injected quantity (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature OR (Fuel injected quantity (Low fuel level calibrated	== TRUE >= 11.0V == True == True > 4.0 mm^3/stroke ==0.00 == False) ==0.00 >=0kPa) ==0.00 >=-40 °C)) > 2.0 mm^3/stroke	320 failures out of 640 samples 25 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	==0.00 == False) ==0.00 >= 0 kPa) ==0.00 >=-40 °C))		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Fuel Pressure Regulator A Exceeded Control Limits - Pressure Too High	P2C20	Determines when rail pressure is greater than desired setpoint.	Rail pressure setpoint - measured rail pressure	< - -25.00 MPa	Cold Start strategy enabled	== TRUE	320 failures out of 640 samples 25 ms/sample	Type B, 2 Trips
			OR					
			Rail pressure setpoint - measured rail pressure	<-25 MPa	Powertrain relay voltage	>= 11.0V		
					Engine Mode Run	== True		
					Fuel Metering Unit OR Pressure Regulator controlled in closed loop (refer to RailPresCntrl)	== True		
					(			
					Fuel injected quantity	> 4.0 mm^3/stroke		
					Fuel temperature	>-40 °C		
					(			
					Low fuel level calibrated as enabling condition	== 0.00		
					OR			
					LowFuelConditionDiagnostic	== False)		
					(			
					Air ambient pressure calibrated as enabling condition	== 0.00		
					OR			
					Air ambient pressure	>= 0 kPa)		
					(			
					Air ambient temperature calibrated as enabling condition	== 0.00		
					OR			
					Air ambient temperature	>=-40 °C)		
					OR			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(Fuel injected quantity (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	 > 2.00 mm^3/stroke ==0.00 == False) ==0.00 >=0kPa) ==0.00 >=-40 °C)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Low Temperature Coolant Loop Pump Preformance	P2C48	This DTC indicates a pump flow deviation failure. An expected phase current of the pump is superviced to detect any pump malfunction.	Absolute Pump AC (Phase) current error = (Actual pump speed refer to **PmpPerf: Tabel to estimate the expected pump AC current based on the pump speed,** in Supporting table) - Actual Pump AC current For more than	> 1.00 A > 5.00 sec	Pump H/W present Diagnostic enabled **************************** Actual pump speed **************************** NelCPD_b_IC_PmpMtrCurrFA OR Pump Current OOR Error **************************** Powertrain relay voltage Or LTL direct connected too Batt (Coolant Temp OR OBD Coolant enable Criteria) AND (Coolant Temp OR OBD max Coolant Temp achieved) **************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True True **************************** > 2,800 rpm **************************** = False **************************** >=11.0 Volts False > -39.00 C =TRUE <= 126.00 C =FALSE ****************************	10 failures out of 12 samples 1000ms /sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Downstream filter relative pressure sensor offset rationality	P2CE5	This monitor verifies if the downstrem pressure for the particulate filter, checked in no flow conditions (0 kPa expected pressure when the engine is not running), is out of specification (sensor accuracy).	the absoulute difference between the Offset Differential value and the calibratabe offset Nominal vallue(22.80)	>[%2.20]	Monitor enabled by dedicated calibration AND **DRS Offset Learn Completed** AND Model Pipes Temperature enablement AND Offeset Report Done AND No DRS pressure electrical, rationality or quick change faults , no DRS temperature information electricalfaul, no DRS temperature quiche change faul, no enge not run timer fault.	1.00 [Boolean] ==TRUE ==TRUE ==FALSE DPS_CktFlt DPS_QckChgFlt DRS_StkFlt DRST_CktFlt DRST_QckChgFlt EngineModeNotRunTimer_FA	No debounce Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Downstream filter relative pressure sensor stuck in range	P2CE6	This monitor detects a stuck signal, reporting a failure if the signal does not change when it is expecteded to (during transient phases).	Downsteam pressure variation lower than expected	<= [%] 0.07	Monitor enabled by dedicated calibration AND Engine movement detection AND No electrical, plausibility, offset and quick change faults affecting the sensors, no DRS temperature electrical fault.no quick change DRS temperature fault Model Pipes Temperature enablement AND Engine speed variation AND Fuel quantity variation AND Minimum air flow variation value	1.00 [Boolean] == TRUE DRS_OfstTFTKO DPS_QckChgFlt DPS_CktFlt DRST_CktFlt DRST_QckChgFlt ==TRUE >150.00 [rpm/s] > 20.00 [l/s] >75.00	11.00 fail samples out of 15.00 samples Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Downstream relative pressure sensor out of range low	P2CE7	This monitor refers to electrical fails on the pressure sensor, covering the out of range low. The monitor compares the raw downstream relativedifferential pressure signal with a minimum threshold. If this threshold is overcome, a short circuit to GND is detected.	Signal voltage raw value is compared to the voltage clamp value reported on the sensor datasheet, referring to a short to ground; a fault is detected when the value is lower than a certain threhsold.	< 0.02 [%]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine Mode in Crank	1.00 [Boolean] ==TRUE ==TRUE ==FALSE ==FALSE	158.00 fail samples out of 200.00 samples Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Downstream relative pressure sensor out of range high	P2CE8	This monitor refers to electrical fails on the downstream relativedifferential pressure sensor, covering the out of range high. The monitor compares the raw downstream relativedifferential pressure signal with a maximum threshold. If this threshold is overcome, an open circuit o r a short circuit to battery is detected.	Signal raw value is compared to the voltage clamp value reported on the sensor datasheet, referring to a open circuit or a short to battery; a fault is detected when the value exceeds a certain threhsold.	> 99.80 [%]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine Mode in Crank	1.00 [Boolean] ==TRUE ==TRUE =FALSE ==FALSE	158.00 fail samples out of 200.00 samples Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Downstream relative pressure sensor quick change	P2CE9	This monitor checks if the raw signal variation is too high, comparing consecutive samples diffeerence with a threshold.	Difference between two subsequent downstream relative pressure raw signal samples exceeds a certain threshold	> 20.00 [%]	Monitor enabled by dedicated calibration AND Diagnostic system reset status AND Engine cranking phase AND Electrical errors flags (out of range high/low, loss of communication in case of digital sensor) AND Run Crank Active AND Run Cranck Ignition in Range AND No electrical fault on exhaust gas pressure sensor (out of range high/ low, loss of communication in case of digital sensor)	1.00 [Boolean] ==FALSE == FALSE == FALSE ==TRUE ==TRUE DRS_CktFlt	99.00 fail samples out of 200.00 samples Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 1	P30D6	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	>=6.41 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 Ilium.**
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	>=6.41 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 Ilium.
Control Module Serial Peripheral Interface Bus 3	P30D8	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	>=6.41 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 Ilium.
Control Module Serial Peripheral Interface Bus 4	P30D9	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	>=6.41 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 Ilium.
Control Module Serial Peripheral Interface Bus 5	P30DA	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	>=6.41 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 1 6 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 Ilium.
Control Module Serial Peripheral Interface Bus 6	P30DB	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	>=6.41 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 1 6 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 Ilium.
Control Module Serial Peripheral Interface Bus 7	P30DC	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	>=6.41 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 Ilium.
Control Module Serial Peripheral Interface Bus 8	P30DD	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	>=6.41 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 Ilium.
Fuel Rail Pressure Sensor 2 Signal Message Counter Incorrect	P30DE	This DTC detects when the synchronization with the diagnostic feedback protocol is lost for the entire protocol period.	The state of the diagnostic feedback prtocol is	== *NoSync*	**Rail Pressure Sensor Configuration** Run crank voltage (Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage No active DTC:	= CeFHPG_e_RPS_DoubleTrack > 11.0V >15,000 s > 8.4 V) FHP_RPS_CktFA FHP_RPS2_CktFA	70.00 failures out of 70.00 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
P3186 (Internal Control Module Security Peripheral Performance)	P3186	This DTC indicates the security peripheral has experienced an internal fault indicating that MAC verification results are unreliable.	MAC verification has falsely passed a configurable number of times.	3.00	Calibration enable	= 1.00 Boolean		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Performance - Under Pressure	P3187	This DTC detects degradation in the performance of the electronically regulated fuel system by calculating the difference between the sensed, filtered system [line] pressure versus the ECM-commanded pressure [error calculation]. The calculated error is then compared to calibrated fault threshold tables for a fault decision.	Sensed Filtered Fuel System [line] pressure error	> Threshold [Supporting Table] **P3187_Threshold**	a) Diagnostic is .. b) Timer - Engine Running Minimum c1) Fuel Flow Rate Valid c2) Ambient Air Pressure Value Defaulted c3) Fault bundle FDB_FuelPresSnsrCktFA c4) Reference Voltage Fault Status [DTC P0641] c5) Exhaust AfterTreatment Fuel Injector A Control Circuit Short Low Fault [DTC P20CD] c6) Fuel Pres Sensor Performance Fault Active [DTC P018B] c7) Use Calculated Flow Performance Fault Thresholds c8) Engine Speed Status Valid c9) Fault bundle FAB_FuelPmpCktFA c10) Fuel Control Enable Fault Active [DTC P12A6] c11) Fuel Pump Driver Module OverTemp Fault	a) Enabled b) >= 40.00 seconds c1)== TRUE c2) == False c3) == False c4) == False c5) == False c6) == False c7) == False c8] ==TRUE c9] == False c10) == False d 1) == False	1 sample/ 12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Active [DTC P1255] c12) Fuel Pump Speed Fault Active [DTCP129F] c13) CAN Sensor Bus message $0C3 Comm Fault [DTCP165C] c14) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [DTC U18A7] c15) Sensor Configuration [is Wired To FTZM?] c16) Sensor Bus Relay On d) Emissions Fuel Level Low [Message $3FB] e) Fuel Control Enable f) Fuel Pump Control State g) Input circuit minimum voltage h) High Pres Fuel Pump Mode Management Active j) High Pres Fuel Pump Control Mode m I) Fuel Pmp Speed Command Alive Rollina	 c12) == False c13) ——False c14] == False c15) == CeFDBR_e_WiredTo_FTZM c16) == TRUE d) == False e) == TRUE f) == NORMAL g) >= 9.00 volts h) == False j) == Not Disabled Mode AND == Not ZeroFlow Mode m I) == False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Count and Checksum Error [CAN Bus C $0CE] [DTC P14CD] m2) CAN Sensor Bus message $0C3 Available m3) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus C $0C3] [DTC U18A7] n) Timer - Diagnostic Enable	 m2) == TRUE m3) == False n) > 2.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Performance - Over Pressure	P3188	This DTC detects degradation in the performance of the electronically regulated fuel system by calculating the difference between the sensed, filtered system [line] pressure versus the ECM-commanded pressure [error calculation]. The calculated error is then compared to calibrated fault threshold tables for a fault decision.	Sensed Filtered Fuel System [line] pressure error	<= Threshold [Supporting Table] **P3188_Threshold**	a) Diagnostic is .. b1) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [Cmd1 DTC U131D] b2) Sensor Configuration b3) Fuel Pres Sensor Serial Comm Ready b4) Fuel Pres Sensor Serial Comm Fault Pending [DTCP14D5] b5) Sensed Fuel Control Enable Serial Comm Ready b6) Sensed Fuel Control Enable Serial Comm Fault Pending c1) Fuel Flow data Valid c2) Ambient Air Pressure Value Defaulted c3) Fuel Pres Sensor Type c4) Fault Bundle FDB_FuelPresSnsrCktFA c5) Reference Voltage	a) Enabled b1)== False b2) == CeFDBR_e_WiredTo_FTZM b3) == TRUE b4) == False b5) == TRUE b6) == False c1)== TRUE c2) == False c3) == CeFDBR_e_AbsolutePressure c4) == False c5) == False	1 sample/ 12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Fault Status [DTC P0641]			
					c6) Fuel Pres Sensor Performance Fault Active [DTC P018B]	c6) == False		
					c7) Use Calculated Flow Performance Fault Thresholds	c7) == False		
					c8) Engine Speed Status Valid	c8] ==TRUE		
					c9) Fault bundle FAB_FuelPmpCktFA	c9] == False		
					c10) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255]	c10) == False		
					c11) Fuel Pump Speed Fault Active [DTCP129F]	d 1) == False		
					c12) Fuel Pump Duty Cycle Fault Active [DTC P2BB3]	c12) == False		
					c13) CAN Sensor Bus message $0C3 Comm Fault [DTCP165C]	c13) ––False		
					c14) Fuel Pres Sensor Serial Comm Fault Active [DTCP14D5]	c14) == False		
					c15) Sensor Bus Relay On	c15) == TRUE		
					d1) Timer -- Minimum Engine Running	d1) >= 40.00 seconds		
					d2) Diaanostic Data	d2) == TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Integrity OK e) Fuel Control Enable f) Fuel Pump Control State g) Instantaneous Fuel Flow h) Fuel Control Enable Fault Active [DTC P12A6] j) Emissions Fuel Level Low [Message $3FB] k) High Pres Fuel Pump Mode Management Enabled l) High Pres Fuel Pump Control Mode m) Diagnostic Data OK n) Timer - Diagnostic Enable	 e) == TRUE f) == Normal AND == NOT Over Response Active g) >= 0.05 gms /sec h) == False j) == False k) == False l) == NOT Disabled Mode AND NOT Over Response Active Mode m) == TRUE n) > 2.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Low Temperature Coolant Loop Pump Speed Performance	P3196	This DTC indicates a pump speed performance failure. Two fault paths are considered. When pump is commanded with pump speed > 0 and commanded pump speed = 0. When the On path fails, the off path is disabled until the ON path completes a OK cycle.	Absolut pump speed error =Abs(Desired pump speed - Actual Pump Speed) For more than	> **PumpSpdPerfErrorLim** rpm > **PmpSpdPerfDiagDly** sec	Pump H/W present Diagnostic enabled **************************** Desired pump speed **************************** Powertrain relay voltage Or WCP direct connected too Batt (Coolant Temp OR OBD Coolant enable Criteria) AND (Coolant Temp OR OBD max Coolant Temp achieved) **************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled - No CAC device control acitve - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True True **************************** > 0 rpm **************************** >=11.0 Volts False > -39.00 C =TRUE <= 126.00 C =FALSE ****************************	16 failures out of 20 samples 1000ms /sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Low Temperature Coolant Loop Pump Motor Current Out Of Range High	P3198	This DTC indicates a out of range high failure of the pump motor current.	Actual Motor Current	> 10.00 A	Pump H/W present Diagnostic enabled **************************** Actual pump speed **************************** Powertrain relay voltage Or WCP direct connected too Batt (Coolant Temp OR OBD Coolant enable Criteria) AND (Coolant Temp OR OBD max Coolant Temp achieved)**************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True True **************************** > 2,800 rpm **************************** >=11.0 Volts False > -39.00 C =TRUE <= 126.00 C =FALSE ****************************	4 failures out of 5 samples 1000ms /sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Low Temperature Coolant Loop Pump Motor Current Out Of Range Low	P3199	This DTC indicates a out of range low failure of the pump motor current. Two fault paths are considered. When pump is commanded with pump speed > 0 and commanded pump speed = 0.	Actual Motor Current For more than	< -0.20 A > 1.00 sec	Pump H/W present Diagnostic enabled **************************** Actual pump speed **************************** Powertrain relay voltage Or WCP direct connected too Batt **************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled- No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True True **************************** > 2,800 rpm **************************** >=11.0 Volts False ****************************	4 failures out of 5 samples 1000ms /sample	Type B, 2 Trips
			Actual Motor Current For more than	< -0.20 A > 1.00 sec	Pump H/W present Diagnostic enabled **************************** Actual pump speed **************************** Powertrain relay voltage Or WCP direct connected too Batt **************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True True **************************** = 2,800 rpm **************************** >=11.0 Volts False ****************************	4 failures out of 5 samples 1000ms /sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication on Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures equals or exceeds	>= 10.00 counts in a sliding window of 50 samples	General Enable Criteria: Starter motor engaged for Or Run/Crank ignition voltage All below criteria have been met for CAN channel is requesting full communications Normal CAN transmission on Bus is enabled Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled	 > 15,000.00 milliseconds >8.41 Volts >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts >=11.00 Volts Disabled	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	 >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication on Bus B Off	U0074	This DTC monitors for a BUS B off condition	Bus off failures equals or exceeds In a window of	>= 10.00 counts >=100.00 milliseconds	General Enable Criteria: Starter motor engaged for Or Run/Crank ignition voltage All below criteria have been met for CAN channel is requesting full communications Normal CAN transmission on Bus is enabled Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run Run/Crank ignition voltage If power mode = Accessory:	 > 15,000.00 milliseconds > 8.41 Volts >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts >=11.00 Volts Enabled	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication Powertrain Sensor CAN Bus Off	U0076	This DTC monitors for a Powertrain Sensor Bus S off condition	Bus off failures equals or exceeds In a window of	>= 10.00 counts >=100.00 milliseconds	General Enable Criteria: Starter motor engaged for Or Run/Crank ignition voltage All below criteria have been met for CAN channel is requesting full communications Normal CAN transmission on Bus is enabled Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run Run/Crank ignition voltage If power mode = Accessory:	> 15,000.00 milliseconds > 8.41 Volts >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts >=11.00 Volts Enabled	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Transfer Case Control Module	U0102	This DTC monitors for a loss of communication with the Transfer Case Control Module.	Message is not received from controller for Message $035:	>425.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled IfOBDII: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts > 15,000.00 milliseconds > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Turbocharger Boost Control Module	U010C	This DTC monitors for a loss of communication with the Turbocharger Boost Control Module.	Message is not received from controller for Message $099 Message $499	 >10,000.00 milliseconds > 9,200.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	 >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
						> 15,000.00 milliseconds		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 8.41 Volts		
						>=6.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage			
						Enabled		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller			
					Controller shutdown is not impending			
						>=11.00 Volts		
					Power Mode is not run/ crank			
					Battery voltage			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Reductant Control Module (SCR)	U010E	This DTC monitors for a loss of communication with the Reductant Control Module (SCR).	Message is not received from controller for Message $0BF: Message $255: Message $291: Message $292: Message $296: Message $2A1: Message $2A2: Message $2A3: Message $2A4: Message $45D: Message $530:	>10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				>10,000.00 milliseconds	If calibratable low voltage disable mode is not Never Disabled IfOBDII: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts > 15,000.00 milliseconds > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 $010: Message $202: Message $203: Message $204: Message $205: Message $228: Message $25A: Message $25E: Message $274: Message $284: Message $404: Message $407: Message $409:	>425.00 milliseconds >10,000.00 milliseconds >325.00 milliseconds >325.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >325.00 milliseconds >700.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Message $40A: Message $40C: Message $413: Message $460: Message $461: Message $47E: Message $47F: Message $481: Message $49F: Message $4EB: Message $590:	>10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds > 7,450.00 milliseconds > 7,450.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds	If calibratable low voltage disable mode is not Never Disabled IfOBDII: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	 >=11.00 Volts > 15,000.00 milliseconds > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				> 2,000.00 milliseconds >10,000.00 milliseconds				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Restraints Control Module	U0151	This DTC monitors for a loss of communication with the Restraints Control Module.	Message is not received from controller for Message $024: Message $0D1: Message $0D2: Message $441: Message $442:	>10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds > 2,000.00 milliseconds > 2,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled IfOBDII: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts > 15,000.00 milliseconds > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Active Grill Air Shutter Module A	U0284	This DTC monitors for a loss of communication on the LIN bus 1 with Shutter Module A.	Message is not received from controller for		General Enable Criteria:		LIN bus communication executes in 500ms loop.	Type B, 2 Trips
					Diagnostic is enabled	Disabled		
			ACM1_Rsp	>=1,250.00 milliseconds	LIN channel is enabled	Enabled		
					LIN module is initialized Slave is calibrated as present			
					Actuator relay is powered Or			
					Powertrain Relay is on and powertrain relay state feedback is enabled			
					All below criteria have been met for	>= 5,000.00 milliseconds		
					Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or			
					Battery Voltage	<=18.00 Volts		
					Controller type: OBD Controller			
					If power mode = Run/ Crank: Power Mode is run			
					Run/Crank ignition voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	 Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With NOx SensorA	U029D	This DTC monitors for a loss of communication with the NOx SensorA.	Message is not received from controller for Message $0B0: Message $0B1: Message $0B5: Message $0B7: Message $289: Message $293: Message $296: Message $591:	> 1,025.00 milliseconds > 1,025.00 milliseconds > 1,025.00 milliseconds > 1,025.00 milliseconds > 1,137.50 milliseconds >10,000.00 milliseconds > 1,700.00 milliseconds > 7,450.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If Secure: Starter motor engaged for	> 15,000.00 milliseconds		
					Or Run/Crank ignition voltage	> 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory:	Disabled		
					Off key cycle diagnostics are enabled Or Controller is an OBD controller			
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With NOx Sensor B (post catalyst NOx sensor)	U029E	This DTC monitors for a loss of communication with the NOx Sensor B (post catalyst NOx sensor).	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
			Message $0A4:	> 1,025.00 milliseconds	All below criteria have been met for	>= 5,000.00 milliseconds		
			Message $0B2:	> 1,025.00 milliseconds	If message is on Bus A: U0073 not active			
			Message $0B6:	> 1,025.00 milliseconds	If message is on Bus B: U0074 not active			
			Message $0B8:	> 1,025.00 milliseconds	If message is on Bus S: U0076 not active			
			Message $28B:	> 1,137.50 milliseconds	CAN channel is requesting full communications			
			Message $294:	>10,000.00 milliseconds	Normal CAN transmission on Bus is enabled			
			Message $297:	> 1,700.00 milliseconds	If bus type is Sensor Bus, sensor bus relay is on			
			Message $592:	> 7,450.00 milliseconds	Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
					Controller type: OBD Controller			
					If power mode = Run/ Crank:			
					Power Mode is run			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled IfOBDII: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts > 15,000.00 milliseconds > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With PM Sensor	U02A3	This DTC monitors for a loss of communication with the PM Sensor.	Message is not received from controller for Message $3AD: Message $3AE: Message $3AF:	>10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	 >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If Secure: Starter motor engaged for	> 15,000.00 milliseconds		
					Or Run/Crank ignition voltage	> 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory:	Disabled		
					Off key cycle diagnostics are enabled Or Controller is an OBD controller			
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Transmission Control Module	U0402	This DTC monitors for an error in communication with the Transmission Control Module.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type A, 1 Trips
			TGI2P_ARC:	8.00 fail counts out of 18.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
			TrnsGnrInfo2_Prtctd:	8.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending			
			TORSP_ARC:	8.00 fail counts out of 18.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
			TransOutRotSts_Prtctd:	8.00 fail counts out of 18.00 sample counts	Controller type: OBD Controller			
			TGIP.ARC:	8.00 fail counts out of 18.00 sample counts				
			TrnsGnrInfo_Prtctd:	8.00 fail counts out of 18.00 sample counts				
			TRDP_ARC:	8.00 fail counts out of 18.00 sample counts				
			TCMGnrlInfo1_Prtctd:	8.00 fail counts out of 18.00 sample counts				
			TEGP_ARC:	8.00 fail counts out of				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				18.00 sample counts				
			TrnsEstGr_Prtctd:	8.00 fail counts out of 18.00 sample counts				
			SD79P_ARC:	8.00 fail counts out of 18.00 sample counts				
			SrlDat79_Prtctd:	8.00 fail counts out of 18.00 sample counts				
			TGI3_ARC:	8.00 fail counts out of 18.00 sample counts				
			TGI3_CS:	8.00 fail counts out of 18.00 sample counts				
			TCTP_ARC:	8.00 fail counts out of 18.00 sample counts				
			TransCrksftTrq_Prtctd:	8.00 fail counts out of 18.00 sample counts				
			TGI4_ARC:	8.00 fail counts out of 18.00 sample counts				
			TGI4_CS:	8.00 fail counts out of 18.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Transfer Case Control Module	U0403	This DTC monitors for an error in communication with the Transfer Case Control Module.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type B, 2 Trips
			SAP_ARC:	8.00 fail counts out of 18.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
			SecAxl_Prtctd:	8.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending			
					If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
					Controller type: OBD Controller			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Reductant Control Module	U040F	This DTC monitors for an error in communication with the Reductant Control Module.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type A, 1 Trips
			DEFI1_ARC:	6.00 fail counts out of 15.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
			DEFI1_CS:	6.00 fail counts out of 15.00 sample counts	Accessory mode to off mode transition not pending			
			DEFDS1_ARC:	3.00 fail counts out of 10.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
			DEFDS1_CS:	3.00 fail counts out of 10.00 sample counts	Controller type: OBD Controller			
			DEFDS2_ARC:	3.00 fail counts out of 10.00 sample counts				
			DEFDS2_CS:	3.00 fail counts out of 10.00 sample counts				
			DEFDS3_ARC:	3.00 fail counts out of 10.00 sample counts				
			DEFDS3_CS:	3.00 fail counts out of 10.00 sample counts				
			DEFDS4_ARC:	3.00 fail counts out of				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				10.00 sample counts				
			DEFDS4_CS:	3.00 fail counts out of 10.00 sample counts				
			DEFDS5_ARC:	3.00 fail counts out of 10.00 sample counts				
			DEFDS5_CS:	3.00 fail counts out of 10.00 sample counts				
			DEFI4_ARC:	3.00 fail counts out of 10.00 sample counts				
			DEFI4_CS:	3.00 fail counts out of 10.00 sample counts				
			DEFI5_ARC:	3.00 fail counts out of 10.00 sample counts				
			DEFI5_CS:	3.00 fail counts out of 10.00 sample counts				
			DEFI6_ARC:	3.00 fail counts out of 10.00 sample counts				
			DEFI6_CS:	3.00 fail counts out of 10.00 sample counts				
			DEFI2_ARC:	3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			DEFI2_CS:	3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Brake System Control Module	U0418	This DTC monitors for an error in communication with the Brake System Control Module.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type A, 1 Trips
			BSIS2P_ARC:	8.00 fail counts out of 18.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
			BrkSysInfoSts2_Prtctd:	8.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending			
			CSBTP_ARC:	8.00 fail counts out of 18.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
			ChsSysBrkTrq_Prtctd:	8.00 fail counts out of 18.00 sample counts	Controller type: OBD Controller			
			FrntAngVel_Prtctd:	8.00 fail counts out of 18.00 sample counts				
			RearAngVel_Prtctd:	8.00 fail counts out of 18.00 sample counts				
			BSIRP_ARC:	8.00 fail counts out of 18.00 sample counts				
			EBCMGnrlInfo1_Prtctd:	8.00 fail counts out of 18.00 sample counts				
			SWIP_ARC:	8.00 fail counts out of				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				18.00 sample counts				
			StrgWhlInfo_Prtctd:	8.00 fail counts out of 18.00 sample counts				
			BSISP_ARC:	3.00 fail counts out of 10.00 sample counts				
			BrkSysInfoSts_Prtctd:	3.00 fail counts out of 10.00 sample counts				
			WRDSP.ARC:	3.00 fail counts out of 10.00 sample counts				
			EBCMGnrlInfo2_Prtctd:	3.00 fail counts out of 10.00 sample counts				
			DMCP_ARC:	3.00 fail counts out of 10.00 sample counts				
			EBCMGnrlInfo3_Prtctd:	3.00 fail counts out of 10.00 sample counts				
			BSIR3P_ARC:	3.00 fail counts out of 10.00 sample counts				
			BrkSysInfoReqs3_Prtctd:	3.00 fail counts out of 10.00 sample counts				
			EPBSP_ARC:	3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			ElecPrkBrkSts_Prtctd:	3.00 fail counts out of 10.00 sample counts				
			BSSIP_ARC:	3.00 fail counts out of 10.00 sample counts				
			BrkSysStsInfo_Prtctd:	3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Body Control Module	U0422	This DTC monitors for an error in communication with the Body Control Module.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type B, 2 Trips
			BGI3P_ARC:	8.00 fail counts out of 18.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
			BdyGenInfo3_Prtctd:	8.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending			
			BVSCP_ARC:	3.00 fail counts out of 10.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
			BdyVehSpdCtl_Prtctd:	3.00 fail counts out of 10.00 sample counts	Controller type: OBD Controller			
			RIP_ARC:	3.00 fail counts out of 10.00 sample counts				
			RelImblz_Prtctd:	3.00 fail counts out of 10.00 sample counts				
			SD91P_ARC:	3.00 fail counts out of 10.00 sample counts				
			SrlDat91_Prtctd:	3.00 fail counts out of 10.00 sample counts				
			IBSBatVlt_ARC:	3.00 fail counts out of				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				10.00 sample counts				
			IBSBatVlt_CS:	3.00 fail counts out of 10.00 sample counts				
			SPMP_ARC:	3.00 fail counts out of 10.00 sample counts				
			SysPwrMode_Prtctd:	3.00 fail counts out of 10.00 sample counts				
			BGI1P_ARC:	3.00 fail counts out of 10.00 sample counts				
			BdyGenInfo1_Prtctd:	3.00 fail counts out of 10.00 sample counts				
			VehOdoDispVal_Prtctd:	3.00 fail counts out of 10.00 sample counts				
			CCHI_ARC:	3.00 fail counts out of 10.00 sample counts				
			CCHI_CS:	3.00 fail counts out of 10.00 sample counts				
			RTPP_ARC:	3.00 fail counts out of 10.00 sample counts				
			BCMGnrlInfo1_Prtctd:	8.00 fail counts out of 18.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CCCGI_ARC: CCCGI_CS:	3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Gateway A	U0447	This DTC monitors for an error in communication with the Gateway A.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type B, 2 Trips
			BSPMP_ARC:	3.00 fail counts out of 10.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
			BkupSysPwrMode_Prtctd:	3.00 fail counts out of 10.00 sample counts	Accessory mode to off mode transition not pending			
					If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
					Controller type: OBD Controller			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Restraints Control Module	U0452	This DTC monitors for an error in communication with the Restraints Control Module.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type C, 1 Trip No MIL Emissions Neutral
			IMUSR2_ARC:	4.00 fail counts out of 10.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
			IMUSR2_CS:	4.00 fail counts out of 10.00 sample counts	Accessory mode to off mode transition not pending			
			IMUSR1P.ARC:	4.00 fail counts out of 10.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
			IMUSnsrRw1_Prtctd:	4.00 fail counts out of 10.00 sample counts	Controller type: OBD Controller			
			ORIP_ARC:	3.00 fail counts out of 10.00 sample counts				
			OccptRstrntInfo_Prtctd:	3.00 fail counts out of 10.00 sample counts				
			PCIP.ARC:	3.00 fail counts out of 10.00 sample counts				
			PstClsnInfo_Prtctd:	3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Particu late Matter Sens or A	U04A4	This DTC monitors for an error in communication with the Particulate Matter Sensor A.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type B, 2 Trips
			SootSnsStatARC:	3.00 fail counts out of 10.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
			SootSnsEltrdSuVoltARC:	3.00 fail counts out of 10.00 sample counts	Accessory mode to off mode transition not pending			
			SootSnsEltrdCrntARC:	3.00 fail counts out of 10.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
			SootSnsEltrdCrntPVal:	3.00 fail counts out of 10.00 sample counts	Controller type: OBD Controller			
			SootSnsEltrdSuVoltPVal:	3.00 fail counts out of 10.00 sample counts				
			SootSnsStatPVal:	3.00 fail counts out of 10.00 sample counts				
			SootSnsOutErrARC:	3.00 fail counts out of 10.00 sample counts				
			SootSnsInErrARC:	3.00 fail counts out of 10.00 sample counts				
			SootSnsHtrDtyCycARC:	3.00 fail counts out of				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				10.00 sample counts				
			SootSnsInErrProtVal:	3.00 fail counts out of 10.00 sample counts				
			SootSnsHtrDtyCycPVal:	3.00 fail counts out of 10.00 sample counts				
			SootSnsOutErrProtVal:	3.00 fail counts out of 10.00 sample counts				
			SootSnsSplyVltERARC:	3.00 fail counts out of 10.00 sample counts				
			SootSnsEltrdTempARC:	3.00 fail counts out of 10.00 sample counts				
			SootSnsSplyVltERPVal:	3.00 fail counts out of 10.00 sample counts				
			SootSnsEltrdTempPVal:	3.00 fail counts out of 10.00 sample counts				
			SootSnsRgStpTmpARC:	3.00 fail counts out of 10.00 sample counts				
			SootSnsHtrResARC:	3.00 fail counts out of 10.00 sample counts				
			SootSnsHtrResPVal:	3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			SootSnsRgStpTmpPVal: SootSnsTmpCmEICuRC: SootSnsTmpCmEICuPVal: SootSnsrCtlU1nfoARC: SootSnsrCtlUInfoChksm: SSBD2_ARC: SSBD3_ARC: SSBD4_ARC: SootSnsPrbCrntSensFtrARC: SootSnsPrbCrntSensFtrPVai:	3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from Active Grill Air Shutter Module A	U0585	This DTC monitors for an error in communication with the Active Grill Air Shutter Module A.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type B, 2 Trips
			ACMIJnitStatARC:	3.00 fail counts out of 10.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
					Accessory mode to off mode transition not pending			
					If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
					Controller type: OBD Controller			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From NOx SensorA	U059E	This DTC monitors for an error in communication with the NOx SensorA.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for: NOxSOxgEngOutARC: NOxSOxgEngOutChkSm: EngOtNOxSnsDalARC: NOxCnctrEngOutProtVa: NOSnsStEngOutProtVa: NOxSnsErrEngOutARC: NOxSnsErrEngOutChkSm: EngOtNOxSnsDa6ARC:	 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	 >= 5,000.00 milliseconds >= 11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			EngOtNOxSnsDa6Chksm:	10.00 sample counts				
				3.00 fail counts out of 10.00 sample counts				
			NOxSnsCmptlnfEngOutARC:	3.00 fail counts out of 10.00 sample counts				
			NOxSnsCmptlnfEngOutPVai:					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From NOx Sensor B	U059F	This DTC monitors for an error in communication with the NOx Sensor B.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for: NOxSOxgPstCatARC: NOxSOxgPstCatChkSm: PstCatNOxSnsDalARC: NOxCntrnPstCatystPVa: NOxSnsSPstCatlystPVa: PstCtNOxSnsSlfDgFdkSt PVal: PstCatNOxSnsDa2ARC: PstCtNOxSnsrSlfDgRsItP Vai:	 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	 >= 5,000.00 milliseconds >= 11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				18.00 sample counts				
			NOxSnsErrPstCatARC:	8.00 fail counts out of 18.00 sample counts				
			NOxSnsErrPstCatChksm:	3.00 fail counts out of 10.00 sample counts				
			PstCatNOxSnsDa6ARC:	3.00 fail counts out of 10.00 sample counts				
			PstCatNOxSnsDa6Chksm:	3.00 fail counts out of 10.00 sample counts				
			NOxSnsCmptInfPstCatARC:	3.00 fail counts out of 10.00 sample counts				
			NOxSnsCmptInfPstCatPVal:					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Differential pressure sensor loss of communication	U0601	This monitor refers to electrical fails on the differential pressure sensor, due to loss communication issues. It is digital sensors specific.Sensor internal faults that cause SENT signal to be switched off.Sensor internal faults that cause SENT protocol communication faults The monitor evaluates several digital inputs to determine if a loss of communication occured.	Loss of communication error is detected in one of the cases below: 1) Digital differential pressure sensor message fault higher than a fixed value 2) Minimum digital differential pressure sensor message age is reached	 > 0 >12.50 [s]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine in Crank Mode	1.00 [Boolean] == TRUE ==TRUE ==FALSE ==FALSE	158.00 fail samples out of 200.00 samples Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Mass or Volume Air Flow Sensor A	U060F	This DTC monitors for a loss of communication on the LIN bus 2 with Mass or Volume Air Flow Sensor A.	Message is not received from controller for		General Enable Criteria:		LIN bus communication executes in 500ms loop	Type B, 2 Trips
					Diagnostic is enabled	Enabled		
			MAF1_Press_Rsp	>=62.50 milliseconds	LIN channel is enabled	Enabled		
			MAF1_TmpHum_Rsp	>= 250.00 milliseconds	LIN module is initialized			
					Slave is calibrated as present			
					All below criteria have been met for	>= 5,000.00 milliseconds		
					Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
					Controller type: OBD Controller			
					If power mode = Run/ Crank: Power Mode is run			
					Run/Crank ignition voltage	>=11.00 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or	Disabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Loss Of Communication with Low Temperature Coolant Loop Pump	U062F	This DTC monitors for a loss of communication on the LIN bus with the Low Temperature Coolant Loop Pump.	Message is not received from device for CWP_Rsp_25_C02	>=2,500.00 milliseconds	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Slave is calibrated as present All below criteria have been met for Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or	 Enabled Enabled >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts >=11.00 Volts Enabled	LIN bus communication executes in 500ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Exhaust Gas Recirculation Temperature Sensor 1	U068E	This function has the purpose to detect is there any proble of the SENT sensor wiring harness or sensor internal faults that cause the SENT signal to be switched off, sensor internal faults that cause the SENT protocol communication faults. In this case two DTC shall be set, the DTCs relative to a Module 1 or Module2, it depende at which module the EGRT1 sensore is connected.	Message Faults OR Message Age	>0 100.00	Monitor Enable Condition RunCrankActive EngModeCrank RunCrankIgnInRange DiagSystemDsbl	1.00 ==TRUE ==TRUE ==FALSE ==FALSE	19.00 failures out of 25.00 samples 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Downstream relative pressure sensor loss of communication	U0696	This monitor refers to electrical fails on the downstream relative pressure sensor, due to loss communication issues. It is digital sensors specific.Sensor internal faults that cause SENT signal to be switched off.Sensor internal faults that cause SENT protocol communication faults The monitor evaluates several digital inputs to determine if a loss of communication occured.	Loss of communication error is detected in one of the cases below: 1) Downstream relative pressure sensor message fault higher than a fixed value 2) Minimum digital downstream relative differential pressure sensor message age is reached	> 0 >12.50 [s]	Test enabled by calibration AND Run Crank Active AND Run Crank Ignition in Range AND Diagnostic system reset status AND Engine in Crank Mode	1.00 [Boolean] == TRUE ==TRUE ==FALSE ==FALSE	158.00 fail samples out of 200.00 samples Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Bank 1 Sensor 1 DPS "A" Temperature Sensor	U06B4	This monitor refers to electrical fails on the differential pressure temperature sensor, due to loss communication issues. It is digital sensors specific.Sensor internal faults that cause SENT signal to be switched off.Sensor internal faults that cause SENT protocol communication faults The monitor evaluates several digital inputs to determine if a loss of communication occured.	Loss of communication error is detected in one of the cases below: 1) Digital differential pressure sensor message fault higher than a fixed value 2) Minimum digital differential pressure sensor message age is reached	 > 0 >12.50 [s]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine in Crank Mode	1.00 [Boolean] == TRUE ==TRUE ==FALSE ==FALSE	158.00 fail samples out of 200.00 samples Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Bank 1 Sensor 2 DRS "C" Temperature Sensor	U06B6	This monitor refers to electrical fails on the downstream relative pressure temperature information, due to loss communication issues. It is digital sensors specific.Sensor internal faults that cause SENT signal to be switched off.Sensor internal faults that cause SENT protocol communication faults The monitor evaluates several digital inputs to determine if a loss of communication occured.	Loss of communication error is detected in one of the cases below: 1) Downstream relative pressure sensor message fault higher than a fixed value 2) Minimum digital downstream relative differential pressure sensor message age is reached	 > 0 >12.50 [s]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine in Crank Mode	1.00 [Boolean] == TRUE ==TRUE ==FALSE ==FALSE	158.00 fail samples out of 200.00 samples Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Communication CAN Bus 1 Off	U1002	This DTC monitors for a Central Gateway Module Communication CAN Bus 1 Off as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Communication CAN Bus 1 Off DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Communication CAN Bus 3 Off	U1004	This DTC monitors for a Central Gateway Module Communication CAN Bus 3 Off as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Communication CAN Bus 3 Off DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Communication CAN Bus 5 Off	U1006	This DTC monitors for a Central Gateway Module Communication CAN Bus 5 Off as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Communication CAN Bus 5 Off DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Tank Zone Module Configuratio n Error	U101A	FTZM Pump Control Configuration Management provides a method for a Diagnostic and Emissions-Critical Electronic Control Unit (DEC ECU) to communicate configuration information to an OBD Smart Device (SD); in this case the FTZM. The FTZM contains pre-loaded sets of calibrations, each of which specifies proper tuning values for electronic commutation of corresponding fuel pump motor variants including a default value that denotes a non-operational [factory default] pump variant. This configuration management feature provides a method to reduce the number of FTZM end-item part numbers. The Configuration Error Diagnostic runs every 100ms to verify that a calibration index value is present that is not the factory default value. When the diagnostic identifies that the default index value is loaded, the	FTZM Fuel Pump Configuration Calibration Index Value	= Factory Default Index Value OR = Not Configured Index Value [device failed to accept calibration value on 1st wake-up]	a] Diagnostic enabled; b] Device feedback Faulted; c] Diagnostic system disabled; d] CAN serial data message $3C8 received	a]= 1.00 [1=TRUE;0<> True] b] <> True; c] <>True; d] =TRUE	6.00 failures of 8.00 samples ; 100 millisec/ sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		DTC is set.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from Mass Air Flow Sensor 1	U1319	This DTC monitors for an error in communication with the Mass Air Flow Sensor 1.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type B, 2 Trips
			PAMITempHmdtyARC:	3.00 fail counts out of 10.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
			PAMIPresARC:	8.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending			
					If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
					Controller type: OBD Controller			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from Fuel Tank Zone Module	U131D	This DTC monitors for an error in communication with the Fuel Tank Zone Module.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type A, 1 Trips
			FTZMInfolARC:	8.00 fail counts out of 18.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
			FTZMInfolChksm:	8.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending			
			FTZMInfo11ARC:	8.00 fail counts out of 18.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
			FTZMInfo11Chksm:	8.00 fail counts out of 18.00 sample counts	Controller type: OBD Controller			
			FTZMInfo8ARC:	8.00 fail counts out of 18.00 sample counts				
			FTZMInfo8Chksm:	8.00 fail counts out of 18.00 sample counts				
			FTZMInfo2ARC:	8.00 fail counts out of 18.00 sample counts				
			FTZMInfo2Chksm:	8.00 fail counts out of 18.00 sample counts				
			FTZMInfo12ARC:	8.00 fail counts out of				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				18.00 sample counts				
			FTZMInfo12Chksm:	8.00 fail counts out of 18.00 sample counts				
			FTZMInfo14ARC:	8.00 fail counts out of 18.00 sample counts				
			FTZMInfo14Chksm:	8.00 fail counts out of 18.00 sample counts				
			FTZMInfo3ARC:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo3Chksm:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo4ARC:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo4Chksm:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo5ARC:	4.00 fail counts out of 10.00 sample counts				
			FTZMInfo5Chksm:	4.00 fail counts out of 10.00 sample counts				
			FTZMInfo16ARC:	3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			FTZMInfo16Chksm:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo6ARC:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo6Chksm:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo7ARC:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo7Chksm:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo9ARC:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo9Chksm:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo13ARC:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo13Chksm:	3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Control Module LIN Bus 1	U1345	This DTC monitors for a LIN bus off condition on LIN Bus 1.	Loss of Communication Method:		Loss of Communication Method:		Dependent on bus loading.	Type B, 2 Trips
			The total number of diagnostic enabled slave nodes on LIN Bus 1	= Total number of slave nodes on LIN Bus 1 that have reported lost communications DTCs	Diagnostic is enabled	Enabled		
					LIN channel is enabled	Enabled		
			Or LIN channel Wakeup Method:		LIN module is initialized			
					All below criteria have been met for:	>= 5,000.00 milliseconds		
			LIN channel wakeup repetition counter	>= 10.00 counts	LIN channel is requesting full communications			
					Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
					Controller type: OBD Controller			
					If power mode = Run/ Crank:			
					Power Mode is run			
					Run/Crank ignition voltage	>=11.00 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics	Disabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage LIN channel Wakeup Method: Diagnostic is enabled LIN channel is enabled LIN channel is requesting full communications LIN module is initialized The following criteria have been enabled for: Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage	>=11.00 Volts Enabled Enabled >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Control Module LIN Bus 2	U1346	This DTC monitors for a LIN bus off condition on LIN Bus 2.	Loss of Communication Method:		Loss of Communication Method:		Dependent on bus loading.	Type B, 2 Trips
			The total number of diagnostic enabled slave nodes on LIN Bus 2	= Total number of slave nodes on LIN Bus 2 that have reported lost communications DTCs	Diagnostic is enabled	Enabled		
					LIN channel is enabled	Enabled		
					LIN module is initialized			
			Or		All below criteria have been met for	>= 5,000.00 milliseconds		
			LIN channel Wakeup Method:		LIN channel is requesting full communications			
					Accessory mode to off mode not pending			
			LIN channel wakeup repetition counter	>=10.00 counts	Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
					Controller type: OBD Controller			
					If power mode = Run/ Crank:			
					Power Mode is run			
					Run/Crank ignition voltage	>=11.00 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled	Disabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Or Controller is an OBD controller			
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		
					LIN channel Wakeup Method:			
					Diagnostic is enabled	Enabled		
					LIN channel is enabled	Enabled		
					LIN channel is requesting full communications			
					LIN module is initialized			
					The following criteria have been enabled for:	>= 5,000.00 milliseconds		
					Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Low Temperature Coolant Loop Pump	U1378	This DTC monitors for an error in communication with the Low Temperature Coolant Loop Pump.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for: CACPmpARC:	 3.00 fail counts out of 10.00 sample counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	 >= 5,000.00 milliseconds >= 11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Invalid Data Received from Body Control Module	U137F	This DTC monitors for a Central Gateway Module Invalid Data Received from Body Control Module error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Invalid Data Received from Body Control Module DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module BCM	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Gateway A on CAN 2	U1608	This DTC monitors for a loss of communication with the Gateway A on CAN 2.	Message is not received from controller for Message $209: Message $425: Message $427: Message $490: Message $494: Message $561: Message $562:	>10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
						> 15,000.00 milliseconds		
					If Secure: Starter motor engaged for	> 8.41 Volts		
					Or Run/Crank ignition voltage	>=6.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage			
						Disabled		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller			
					Controller shutdown is not impending			
						>=11.00 Volts		
					Power Mode is not run/ crank			
					Battery voltage			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Central Gateway Module on CAN Bus 3	U1609	This DTC monitors for a loss of communication with the Central Gateway Module on CAN Bus 3.	Message is not received from controller for Message $209: Message $20D: Message $25F: Message $457: Message $458: Message $45A: Message $561:	>10,000.00 milliseconds >325.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled IfOBDII: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts > 15,000.00 milliseconds > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Brake System Control Module 1 on CAN Bus 1	U160F	This DTC monitors for a loss of communication with the Brake System Control Module 1 on CAN Bus 1.	Message is not received from controller for Message $287:	>325.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	 >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
						> 15,000.00 milliseconds		
					If Secure: Starter motor engaged for	> 8.41 Volts		
					Or Run/Crank ignition voltage	>=6.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	Disabled		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller			
					Controller shutdown is not impending	>=11.00 Volts		
					Power Mode is not run/ crank			
					Battery voltage			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Brake System Control Module 1 on CAN Bus 2	U1610	This DTC monitors for a loss of communication with the Brake System Control Module 1 on CAN Bus 2.	Message is not received from controller for Message $012: Message $014: Message $015: Message $017: Message $01A: Message $081: Message $082: Message $210: Message $211: Message $219: Message $21B: Message $415: Message $42A:	>10,000.00 milliseconds >425.00 milliseconds >425.00 milliseconds >425.00 milliseconds >425.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >500.00 milliseconds >10,000.00 milliseconds >200.00 milliseconds >325.00 milliseconds >200.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Message $57D:	>10,000.00 milliseconds >10,000.00 milliseconds	If calibratable low voltage disable mode is not Never Disabled IfOBDII: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts > 15,000.00 milliseconds > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Transmission Control Module on CAN Bus 2	U1643	This DTC monitors for a loss of communication with the Transmission Control Module on CAN Bus 2.	Message is not received from controller for Message $01E:	>418.75 milliseconds	General Enable Criteria: All below criteria have been met for	>= 5,000.00 milliseconds	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
			Message $026:	>418.75 milliseconds	If message is on Bus A: U0073 not active			
			Message $027:	>418.75 milliseconds	If message is on Bus B: U0074 not active			
			Message $02D:	>418.75 milliseconds	If message is on Bus S: U0076 not active			
			Message $02E:	>418.75 milliseconds	CAN channel is requesting full communications			
			Message $031:	>418.75 milliseconds	Normal CAN transmission on Bus is enabled			
			Message $032:	>10,000.00 milliseconds	If bus type is Sensor Bus, sensor bus relay is on			
			Message $036:	>418.75 milliseconds	Accessory mode to off mode not pending			
			Message $04C:	>418.75 milliseconds	Battery voltage	>11.00 Volts		
			Message $0BB:	> 9,887.50 milliseconds	Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
			Message $0CD:	>387.50 milliseconds	Controller type: OBD Controller			
			Message $216:	>500.00 milliseconds	If power mode = Run/ Crank:			
			Message $27A:	>10,000.00 milliseconds	Power Mode is run			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Message $459:	> 2,000.00 milliseconds	If calibratable low voltage disable mode is not Never Disabled IfOBDII: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts > 15,000.00 milliseconds > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Fuel Pump Driver Control Module	U18A2	This DTC monitors for a loss of communication with the Fuel Pump Driver Control Module.	Message is not received from controller for Message $0C3: Message $0CB: Message $0CC: Message $2C1: Message $2D7: Message $3EB: Message $3EC: Message $3EE:	>10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled			
					IfOBDII:	>=11.00 Volts		
					Run/Crank ignition voltage			
						> 15,000.00 milliseconds		
					If Secure:			
					Starter motor engaged for	> 8.41 Volts		
					Or Run/Crank ignition voltage	>=6.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage			
						Disabled		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller			
					Controller shutdown is not impending			
						>=11.00 Volts		
					Power Mode is not run/ crank			
					Battery voltage			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

Key Table Not Provisioned / Authoritative Counter At Maximum	U1960	This DTC indicates that the ECU security peripheral key slots are not provisioned OR ECU message authenticatioon Authoritative Counters are at MAX value	During controller initialization:
			
			IF (Any Security Peripheral Key Slot reports as Empty)
			-OR-
			(Any Authoritative Counter is at MAX value)
			
			During controller operation:
			
			IF (A Security Peripheral Key Slot reports as Empty)
			-OR-
			(An Authoritative Counter is at MAX value)
					Calibration enable	= 1.00 Boolean		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
U1961 (Security Peripheral Performance)	U1961	This DTC indicates that the ECU security peripheral has reported that it has failed.	The ECU security peripheral reports that the security peripheral hardware has failed.		Calibration enable	= 1.00 Boolean		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
U1962 (Unable to Authenticate Serial Data Message)	U1962	This DTC indicates that serial data message authentication on any key slot has failed a configurable number of times this key cycle.	Message authentication on a single key slot has failed a configurable number of times.	KeSSAR_Cnt_SecKeySlotFailLimit	Calibration enable	= 1.00 Boolean		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Vehicle Identification Number of First Vehicle Not Programmed	U1978	This DTC checks that the VIN of the first vehicle is correctly written	At least one of the programmed VIN of the first vehicle digits	Not a valid ASCII value	Calibration enable	= 1	250 ms / test Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Self-Learn Did Not Execute	U197B	This DTC monitors for a Central Gateway Module Self-Learn Did Not Execute error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Self-Learn Did Not Execute DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module ECU Identification List Memory Fault	U197C	This DTC monitors for a Central Gateway Module ECU Identification List Memory Fault error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module ECU Identification List Memory Fault DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Self-Learn Invalid Due To VIN Mismatch	U197D	This DTC monitors for a Central Gateway Module Self-Learn Invalid Due To VIN Mismatch error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Self-Learn Invalid Due To VIN Mismatch DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Key Table Not Provisioned	U1982	This DTC monitors for a Central Gateway Module Key Table Not Provisioned error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Key Table Not Provisioned DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Security Peripheral Performance – Performance or Incorrect Operation	U1983	This DTC monitors for a Central Gateway Module Security Peripheral Performance - Performance or Incorrect Operation error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Security Peripheral Performance - Performance or Incorrect Operation DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Unable To Authenticate Serial Data Message	U1984	This DTC monitors for a Central Gateway Module Unable To Authenticate Serial Data Message error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Unable To Authenticate Serial Data Message DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Lost Communication with Body Control Module	U2203	This DTC monitors for a Central Gateway Module Lost Communication with Body Control Module error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Body Control Module DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module BCM	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Lost Communication with Diesel Exhaust Fluid Control Module	U2204	This DTC monitors for a Central Gateway Module Lost Communication with Diesel Exhaust Fluid Control Module error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Diesel Exhaust Fluid Control Module DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module DEFC	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Lost Communication with HVAC Display - Front	U2209	This DTC monitors for a Central Gateway Module Lost Communication with HVAC Display - Front error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with HVAC Display - Front DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module HVAC Display - Front	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Lost Communication with Transmission Control Module	U220F	This DTC monitors for a Central Gateway Module Lost Communication with Transmission Control Module error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Transmission Control Module DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module TCM	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module High Speed CAN Bus Off	U2413	This DTC monitors for a Central Gateway Module High Speed CAN Bus Off error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module High Speed CAN Bus Off DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Lost Communication with Brake System Control Module on CAN Bus 1	U2418	This DTC monitors for a Central Gateway Module Lost Communication with Brake System Control Module on CAN Bus 1 error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Brake System Control Module on CAN Bus 1 DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module BSCM	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Lost Communication with Brake System Control Module on CAN Bus 2	U2419	This DTC monitors for a Central Gateway Module Lost Communication with Brake System Control Module on CAN Bus 2 error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Brake System Control Module on CAN Bus 2 DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module BSCM	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Lost Communication with Engine Control Module on CAN Bus 2	U241C	This DTC monitors for a Central Gateway Module Lost Communication with Engine Control Module on CAN Bus 2 error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Engine Control Module on CAN Bus 2 DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module ECM	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Lost Communication with Engine Control Module on CAN Bus3	U241D	This DTC monitors for a Central Gateway Module Lost Communication with Engine Control Module on CAN Bus 3 error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Engine Control Module on CAN Bus 3 DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module ECM	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Odometer Vehicle Identification Number Not Programmed	U2A90	This DTC checks that the odometer VIN is correctly written	At least one of the programmed odometer VIN digits	Not a valid ASCII value	Calibration enable	= 1	250 ms / test Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Odometer Vehicle Identification Number Invalid Configuration	U2A91	This DTC checks that the odometer VIN matches the ECU VIN	At least one of the programmed odometer VIN digits	Does not match the ECU VIN digits.	Calibration enable	= 1	250 ms / test Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Input Power Circuit A - Ignition Input On/Start Circuit Correlation	U3023	Detect a Power A vs RuncCrank correlation error	Power A - RunCrank - Voltage	> 3.00	PowerA- RunCrank Correlation monitoring enable = TRUE Battey Present RunCrank Active Starter Motor NOT Engaged	Diagnostcis 1.00 Battey Present = TRUE RunCrank Active = TRUE Starter Motor Engaged = FALSE	40.00 failures out of 50.00	Type C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharge rVGTA Position Exceeded Learning Limit (VGT Smart)	P003A	This monitor checks if the VGT smart travel (from fully closed to fully open position) measured at key off during the learning procedure is plausibile	physical travel measured at key off when the VGT is fully closed< low threshold OR physical travel measured at key off hen the VGT is fully closed> high threshold OR physical travel measured at key off when the VGT is fully open< low threshold OR physical travel measured at key off hen the VGT is fully open> high threshold	< 60.80 [%] OR > 94.40 [%] OR < 2.50 [%] OR > 27.40 [%]	Test enabled by calibration Key signal is off Learning procedure at key off has been successfully completed: End Of Trip event has elapsed No fault validated on smart VGT rolling counters	== 1.00 CFM_VGT_CommFA ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger VGT A Performance (VGT Smart)	P0046	This monitor detects an obstruction on the actuator (obstruction found during the vanes opening or closing) checking the setpoint position against the position measured by the VGT Position Sensor	Absolute value of position tracking error (setpoint position - measured position)	>16.00 [%]	Test enabled by calibration	==1.00	420.00 fail count out of 520.00 sample counts Function task: 25 ms	Type A, 1 Trips
					Diagnostic system enabled (no clear code or EOT in progress)			
					System out of the cranking phase			
					Cold Start strategy enabled	==FALSE		
					PT relay supply voltage in range	> 11.00 [V]		
					VGT position closed loop control active (no faults present on VGT position sensor, VGT vanes, VGT position control deviation)	VGT_PstnSnsrOfstFA ==FALSE VGT_SmartActrFA ==FALSE CFM_VGT_CommFA ==FALSE		
					VGT position setpoint in steady state conditions for minimum time	<100.00 [%/s] >-100.00 [%/s] for 0.50 [s]		
					Engine coolant temperature higher or equal to minimum	>=0.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					threshold OR Engine cooling system target temperature reached (thermostat opening)			
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature higher or equal to minimum threshold	>=-60.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		
					No mechanical stop soft approach in progress			
					No anti-sticking procedure in progress			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Up Circuit Performance	P007B	This monitor checks if the CAC up air temperature sensor is irrational at key on when compared with two reference temperature sensors after a long soak time	Charge air cooler up air temperature is compared at power up with an average temperature calculated using the intake manifold air temperature sensor and the fuel temperature sensor over a calibratable number of samples	>20.00 [°C]	Test enabled by calibration	==1.00	Test executed after a counter of 10.00 samples Functional task: 100 ms	Type B, 2 Trips
					Key on and engine not running or engine running for less than a calibratable time	< 1.00 [s]		
					Runk Crank Relay voltage in range	>11.00 [V]		
					The engine has not run for a calibratable time since last key off	>=28,800.00 [s]		
					No faults detected on engine off timer	EngineModeNotRunTimer Error ==FALSE		
					Absolute value of the difference between intake manifold air temperature and fuel temperature smaller than a calibratable threshold	<45.00 [°C]		
					No electrical or self-correlated faults detected on charge air cooler up air temperature sensors	CIT_CAC_UpCktFA ==FALSE CIT_CAC_UpSelfCorFA ==FALSE		
					No faults detected on intake manifold air temperature sensor	MnfdTempSensorFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No faults detected on fuel temperature sensor	FTS_FTS_Flt==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Up Circuit Low	P007C	This monitor checks if the CAC up air temperature sensor is out of electrical range low	Charge air cooler up air temperature resistance value < low threshold	<7.11 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	==1.00 >11.00 [V]	20.00 fail counter over 24.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Up Circuit High	P007D	This monitor checks if the CAC up air temperature sensor is out of electrical range high	Charge air cooler up air temperature resistance value > high threshold	>753,016.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	==1.00 > 11.00 [V]	20.00 fail counter over 24.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Up Circuit Intermittent/ Erratic	P007E	This monitor checks if the CAC up air temperature has an intermittent fault	Charge air cooler up air temperature value > T_MAX_threshold OR Charge air cooler up air temperature value < T_MIN_threshold where - T_MAX_threshold = (1 - alpha)*T_MAX + alpha*T_last_good - T_MIN_threshold = (1 - alpha)*T_MIN + alpha*T_last_good - alpha = e^(#fails + 1)*(ts/ tau) - #fails = number of consecutive samples where the test failed - ts = sensor sampling time - tau = sensor filter response time - T_MAX = sensor maximum actual reading - T_MIN = sensor minimum actual reading - T_last_good = last good temperature measured by the sensor	>300.00 [°C] <-40.00 [°C]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range No electrical faults detected on CAC up air temperature sensor	==1.00 >11.00 [V] CIT_CAC_UpCktFA ==FALSE	50.00 fail counter over 63.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger VGT A Module Performance (VGT Smart)	POOAF	This monitor checks if the smart VGT has an internal fault	Smart actuator internal fault: Pattern Error, Overcurrent Error, Checksum Error (error information provided by the actuator)		Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No fault validated on smart VGT rolling counters HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V] CFM_VGT_CommFA ==FALSE	8.00 fail counts out of 10.00 sample counts Function task: 500 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Mass Air Flow (MAF) Sensor Performance (OBDIIonly)	P0101	This monitor checks if the MAF sensor measure is coherent with MAF estimation when the HP EGR and LP EGR are closed. It is able to detect MAF sensor wiring harness poor contacts, MAF sensor internal fault (offset), leaks from the induction air circuit, leaks from the recirculation exhaust gas circuit. For OBDII market, it can be used to detect a PCV disconnection in case a dedicated pressure sensor is not present. The standard test can be calibrated to run when engine conditions are recognised as IDLE, OVERRUN or HIGH LOAD. An intrusive test can be enabled in idle, to force the HP EGR and the LP EGR to close when particular conditions are encountered, to allow the monitoring to run. An intrusive test can be enabled in overrun, to force the HP EGR and the LP EGR to close and the throttle valve to open when particular	Drift high check: drift of the mass air flow Drift low check: drift of the mass air flow The drift of the mass air flow is calculated as the ratio between the MAF sensor reading and the estimated mass airflow. The ratio is averaged over a calibrate-able cumulative transient time. If, by calibration, CeMAFD_e_ArflAdj ==CeMAFD_e_ArflRaw, the MAF sensor reading is given by the raw MAF value multiplied by the **P0101: Pulsation Map**	> 1.25 [ratio] < 0.75 [ratio]	Calibration on diagnostic enabling PT relay supply voltage in range MAF sensor is not depowered Estimated mass air flow is valid No Electrical or offset fault present on MAF sensor Outside Ambient Temperature in range OR Fault present on Ouside Air temperature Induction air temperature No fault present on induction air temperature sensor (Engine Coolant	P0101: MAF performance enabling ==TRUE (see FreeForm) >11.00 [V] ==TRUE MAF_AirFlowEstdSS_NotVid ==FALSE MAF_MAF_SnsrCktOffstFA ==FALSE MAF_MAF_SnsrCktOffstTFKO ==FALSE >=-20.00 [°C] OR OAT_PtEstFiltFA==TRUE > -20.00 [°C] IAT_SensorFA ==FALSE IAT_8ensorTFTKO ==FALSE >40.00 [°C]	Test is evaluated after the enabling conditions are satisfied for a number of samples ==800.00 Sampling time is: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		conditions are encountered, to allow the monitoring to run in case the Diesel Exhaust Cooling Prevention (DECP) strategy is requiring EGR usage and/or throttle control during cut-off maneuvers.			Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	==TRUE <130.00 [°C]		
					No faults detected on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE ECT_Sensor_TFTKO ==FALSE		
					Barometric pressure	> 69.50 [kPa]		
					No faults detected on barometric pressure sensor	AAP_AmbientAirPresDfltd ==FALSE AAP_AmbPresSnsrTFTK 0 ==FALSE		
					Throttle valve position	>68.00 [%]		
					No faults detected on Throttle valve position sensor	TPS_PstnSnsrFA ==FALSE		
					HP EGR valve position	<= 1.00 [%]		
					No faults detected on HP EGR valve position sensor	EGR_PstnSnsrFA ==FALSE		
					LP EGR valve position	<=1.00 [%]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No faults detected on LP EGR valve position sensor	LPE_PstnSnsrFA ==FALSE		
					Engine works in IDLE, OVERRUN or HIGH LOAD conditions	Refer to "Engine conditions" Free Form		
			Drift high check: drift of the mass air flow	> 1.25 [ratio]	Intrusive Test in idle enabled by calibration	0.00==TRUE	Test is evaluated after the enabling conditions are satisfied for a number of samples	
			Drift low check: drift of the mass air flow	< 0.75 [ratio]	MAF rationality monitoring enabled by calibration	P0101: MAF performance enabling ==TRUE (see FreeForm)	==800.00	
			The drift of the mass air flow is calculated as the ratio between the MAF sensor reading and the estimated mass airflow. The ratio is averaged over a calibrate-able cumulative transient time.		Diagnostic has not run in current driving cycle yet	==TRUE	Sampling time is: 12.5 ms	
					SCR predicted NOx conversion efficiency	> 0.60 [ratio]		
			If, by calibration, CeMAFD_e_ArflAdj ==CeMAFD_e_ArflRaw, the MAF sensor reading is given by the raw MAF value multiplied by the **P0101: Pulsation Map**		Air control is working only in EGR control: Desired EGR rate	= 100%		
					Vehicle speed	< 3.00 [kph]		
					No faults detected on vehicle speed sensor	VehicleSpeedSensor_FA ==FALSE		
					Desired fuel in range, with hysteresis	Enabled if < 0.00 [mm^3]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR Global OBD flag for fuel quantity at idle in range	AND > 0.00 [mm^3] Disabled if > 0.00 [mm^3] OR < 0.00 [mm^3] OR ==TRUE		
					PT relay supply voltage in range	>11.00 [V]		
					MAF sensor is not depowered	==TRUE		
					Estimated mass air flow is valid	MAF_AirFlowEstdSS_NotVid ==FALSE		
					No Electrical or offset fault present on MAF sensor	MAF_MAF_SnsrCktOffstFA ==FALSE MAF_MAF_SnsrCktOffstTFKO ==FALSE		
					Outside Ambient Temperature in range OR Fault present on Ouside Air temperature	> -20.00 [°C] OR OAT_PtEstFiltFA==TRUE		
					Induction air temperature	> -20.00 [°C]		
					No fault present on induction air temperature	IAT_SensorFA ==FALSE IAT_SensorTFTKO		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					sensor	==FALSE		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	>40.00 [°C] ==TRUE <130.00 [°C]		
					No faults detected on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE ECT_Sensor_TFTKO ==FALSE		
					Barometric pressure	> 69.50 [kPa]		
					No faults detected on barometric pressure sensor	AAP_AmbientAirPresDfltd ==FALSE AAP_AmbPresSnsrTFTKO ==FALSE		
					Throttle valve position	>68.00 [%]		
					No faults detected on Throttle valve position sensor	TPS_PstnSnsrFA ==FALSE		
					Engine speed in range OR Global OBD flag for idle speed in range	> 560.00 [rpm] < 1,000.00 [rpm] OR ==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					for a time	>= 10.00[s]		
					Intake manifold pressure in range	> 69.60 [kPa] < 50.00 [kPa]		
					Intake manifold pressure is in steady state (SS)	when SS is OFF, the first value of Intake manifold pressure is taken as reference (p_ref); then, | Intake manifold pressure - p_ref| < 3.00 [kPa] for maintaining the SS ON		
					Time elapsed after previous intrusive test request has aborted	> 2.00 [s]		
					Once all the conditions above are satisfied, additional conditions on HP EGR and LP EGR valves must be verified within a time limit:	< 1.00 [s]		
					HP EGR valve position	<= 1.00 [%]		
					No faults detected on HP EGR valve position sensor	EGR_PstnSnsrFA ==FALSE		
					LP EGR valve position	<= 1.00 [%]		
					No faults detected on LP EGR valve position	LPE_PstnSnsrFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					sensor			
					All conditions are verified for a time	> 2.00 [s]		
			Drift high check: drift of the mass air flow	> 1.25 [ratio]	Intrusive Test in overrun enabled by calibration	1.00 ==TRUE	Test is evaluated after the enabling conditions are satisfied for a number of samples ==800.00 Sampling time is: 12.5 ms	
			Drift low check: drift of the mass air flow	< 0.75 [ratio]	MAF rationality monitoring enabled by calibration	P0101: MAF performance enabling ==TRUE (see FreeForm)		
			The drift of the mass air flow is calculated as the ratio between the MAF sensor reading and the estimated mass airflow. The ratio is averaged over a calibrate-able cumulative transient time.		Diagnostic has not run in current driving cycle yet	==TRUE		
					PT relay supply voltage in range	>11.00 [V]		
			If, by calibration, CeMAFD_e_ArflAdj ==CeMAFD_e_ArflRaw, the MAF sensor reading is given by the raw MAF value multiplied by the **P0101: Pulsation Map**		MAF sensor is not depowered	==TRUE		
					Estimated mass air flow is valid	MAF_AirFlowEstdSS_NotVid ==FALSE		
					No Electrical or offset fault present on MAF sensor	MAF_MAF_SnsrCktOffstFA ==FALSE MAF_MAF_SnsrCktOffstTFKO ==FALSE		
					Outside Ambient Temperature in range	> -20.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR Fault present on Ouside Air temperature	OR OAT_PtEstFiltFA==TRUE		
					Induction air temperature	> -20.00 [°C]		
					No fault present on induction air temperature sensor	IAT_SensorFA ==FALSE IAT_8ensorTFTKO ==FALSE		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	>40.00 [°C] ==TRUE <130.00 [°C]		
					No faults detected on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE ECT_Sensor_TFTKO ==FALSE		
					Barometric pressure	> 69.50 [kPa]		
					No faults detected on barometric pressure sensor	AAP_AmbientAirPresDfltd ==FALSE AAP_AmbPresSnsrTFTKO ==FALSE		
					Time elapsed after previous intrusive test request has aborted	> 2.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Engine works in OVERRUN conditions, except for the conditions on Intake manifold pressure in range and in steady state (SS)	Refer to "Engine conditions" Free Form		
					Intake manifold pressure greater than a threshold	> **P0101: Manifold pressure Low limit in (Overrun** - 0.00) [kPa]		
					Intake manifold pressure lower than a threshold, with hysteresis	TRUE if: < **P0101: Manifold pressure High limit in (Overrun** - 0.00) [kPa]; FALSE if: > **P0101: Manifold pressure High limit in Overrun** [kPa]		
					Once all the conditions above are satisfied, additional conditions on HPEGR, LP EGRand throttle must be verified within a time limit:	< 1.00 [s]		
					HP EGR valve position	<= 1.00 [%]		
					No faults detected on HP			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					EGR valve position sensor	EGR_PstnSnsrFA ==FALSE		
					LP EGR valve position	<= 1.00 [%]		
					No faults detected on LP EGR valve position sensor	LPE_PstnSnsrFA ==FALSE		
					Throttle valve position	>68.00 [%]		
					No faults detected on Throttle valve position sensor	TPS_PstnSnsrFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Mass Air Flow (MAF) Sensor Circuit Low	P0102	This monitor checks if the MAF sensor is out of electrical range low. The MAF sensor is out of electrical range low in case of sensor internal fault or wiring harness faults.	MAF frequency value	< 260.00 [Hz]	Test enabled by calibration	1.00==TRUE	30.00 fail counts out of 38.00 sample counts Function task: 100 ms	Type A, 1 Trips
					PT relay supply voltage in range	> 11.00 [V]		
					Share High Side Driver closed	==TRUE		
					All conditions are valid for a time	>=0.30[s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Mass Air Flow (MAF) Sensor Circuit High	P0103	This monitor checks if the MAF sensor is out of electrical range high. The MAF sensor is out of electrical range high in case of sensor internal fault or wiring harness faults.	MAF frequency value	>4,800.00 [Hz]	Test enabled by calibration	1.00==TRUE	30.00 fail counts out of 38.00 sample counts Function task:100 ms	Type A, 1 Trips
					PT relay supply voltage in range	> 11.00 [V]		
					Share High Side Driver closed	==TRUE		
					All conditions are valid for a time	>=0.30[s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Trim System Lean Bank 1	P0171	This DTC monitors if FSA control system has reached its maximum authority and cannot achieve the target. An error shall be detected when the fuel adjustment value (mm3) released by FSA is saturatedat its minimum value.	Released FSA fuel correction value	< refer to supporting table (**KtFADC_V_FSA_FuelMin**) [mm3]	System voltage in range FSA correction release enabled (FSA Learning is active OR DFSA Learning is active) for a time Ambient air pressure OBD Coolant Enable Criteria OR Engine coolant temperature Ambient air temperature No Low fuel tank level indication No pending or confirmed DTCs	> 11.00 [V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtnValid refer to "FSA Control Flag" Free Form (FAD FSA EnblLrn OR FAD DFSA EnblLrn) > 1.40 [s] > 67.00 [kPa] = TRUE > 45.00 [°C] > -20.00 [°C] LowFuelConditionDiagnostic AmbPresDfltdStatus (ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA	Time counter: 280 failures out of 400 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Trim System Rich Bank 1	P0172	This DTC monitors if FSA control system has reached its maximum authority and cannot achieve the target. An error shall be detected when the fuel adjustment value (mm3) released by FSA is saturatedat its maximum value.	Released FSA fuel correction value	> refer to supporting table (**KtFADC_V_FSA_Fuel Max**)[mm3]	System voltage in range FSA correction release enabled (FSA Learning is active OR DFSA Learning is active) for a time Ambient air pressure OBD Coolant Enable Criteria OR Engine coolant temperature Ambient air temperature No Low fuel tank level indication No pending or confirmed DTCs	> 11.00 [V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtn Valid refer to "FSA Control Flag" Free Form (FAD FSA EnbILrn OR FAD DFSA EnbILrn) > 1.40 [s] > 67.00 [kPa] = TRUE > 45.00 [°C] > -20.00 [°C] LowFuelConditionDiagnos tic AmbPresDfltdStatus (ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA	Time counter: 280 failures out of 400 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Injection Timing Perfomance - Over Retarded based on SQP	P01CB	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 1. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 1. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated	> 100.00 [us] > 0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed Hysteresis and Delta on Engine Speed related to the current gear index	1.00 1.00 0.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		able to calculate the drift, in term of angular degree, on injector 1. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			SQP Learning conditions enabled	[°C] < 77.00 [°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl	previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Injection Timing Perfomance - Over Advanced based on SQP	P01CC	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 1. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 1. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated	> 100.00 [us] > 0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed Hysteresis and Delta on Engine Speed related to the current gear index	1.00 1.00 0.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C] <77.00	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		able to calculate the drift, in term of angular degree, on injector 1. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			SQP Learning conditions enabled	[°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl	-the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Injection Timing Perfomance - Over Retarded based on SQP	P01CD	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 2. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 2. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated	>100.00 [us] >0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed Hysteresis and Delta on Engine Speed related to the current gear index	1.00 1.00 0.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] <120.00 [°C] >-40.00 [°C] < 77.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		able to calculate the drift, in term of angular degree, on injector 2. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			SQP Learning conditions enabled	> -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Injection Timing Perfomance - Over Advanced based on SQP	P01CE	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 2. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 2. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated	> 100.00 [us] > 0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 0.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C] <77.00	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00], **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		able to calculate the drift, in term of angular degree, on injector 2. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	[°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl	Sample Rate: [1 Sample every cylinder firing event].	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Injection Timing Perfomance - Over Retarded based on SQP	P01CF	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 3. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 3. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed	Delta Energizing Time calculated OR Delta Start of Injection calculated	> 100.00 [us] > 0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature	1.00 1.00 0.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] <120.00 [°C] >-40.00 [°C] < 77.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00], **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		information and SQP is able to calculate the drift, in term of angular degree, on injector 3. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Engine Speed Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	> -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl	Sample Rate: [1 Sample every cylinder firing event].	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Injection Timing Perfomance - Over Advanced based on SQP	P01D0	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 3. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 3. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated .	>100.00 [us] >0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature	1.00 1.00 0.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C] <77.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00], **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		able to calculate the drift, in term of angular degree, on injector 3. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Engine Speed Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	> -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Injection Timing Perfomance - Over Retarded based on SQP	P01D1	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 4. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 4. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed	Delta Energizing Time calculated OR Delta Start of Injection calculated .	>100.00 [us] >0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature	1.00 1.00 0.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] <120.00 [°C] >-40.00 [°C] < 77.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		information and SQP is able to calculate the drift, in term of angular degree, on injector 4. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Engine Speed Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	> -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Injection Timing Perfomance - Over Advanced based on SQP	P01D2	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 4. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 4. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated .	>100.00 [us] >0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 0.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C] <77.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		able to calculate the drift, in term of angular degree, on injector 4. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	> -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Injection Timing Perfomance - Over Retarded based on SQP	P01D3	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 5. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 5. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed	Delta Energizing Time calculated OR Delta Start of Injection calculated .	>100.00 [us] >0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 0.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] <120.00 [°C] >-40.00 [°C] < 77.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		information and SQP is able to calculate the drift, in term of angular degree, on injector 5. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	> -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Injection Timing Perfomance - Over Advanced based on SQP	P01D4	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 5. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 5. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated .	>100.00 [us] >0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed Hysteresis and Delta on	1.00 1.00 0.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C] <77.00	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		able to calculate the drift, in term of angular degree, on injector 5. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Engine Speed related to the current gear index SQP Learning conditions enabled	[°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Injection Timing Perfomance - Over Retarded based on SQP	P01D5	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 6. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 6. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed	Delta Energizing Time calculated OR Delta Start of Injection calculated .	>100.00 [us] >0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 0.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] <120.00 [°C] >-40.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00], **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		information and SQP is able to calculate the drift, in term of angular degree, on injector 6. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	< 77.00 [°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Injection Timing Perfomance - Over Advanced based on SQP	P01D6	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 6. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 6. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated .	>100.00 [us] >0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 0.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] >	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		able to calculate the drift, in term of angular degree, on injector 6. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	-40.00 [°C] < 77.00 [°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 Injection Timing Perfomance - Over Retarded based on SQP	P01D7	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 7. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 7. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed	Delta Energizing Time calculated OR Delta Start of Injection calculated .	>100.00 [us] >0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 0.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] <120.00 [°C] >-40.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		information and SQP is able to calculate the drift, in term of angular degree, on injector 7. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	< 77.00 [°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 Injection Timing Perfomance - Over Advanced based on SQP	P01D8	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 7. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 7. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated .	>100.00 [us] >0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 0.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		able to calculate the drift, in term of angular degree, on injector 7. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	> -40.00 [°C] <77.00 [°C] >-40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 Injection Timing Perfomance - Over Retarded based on SQP	P01D9	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 8. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 8. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed	Delta Energizing Time calculated OR Delta Start of Injection calculated .	>100.00 [us] >0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 0.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] <120.00 [°C] >-40.00	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		information and SQP is able to calculate the drift, in term of angular degree, on injector 8. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	[°C] < 77.00 [°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 Injection Timing Perfomance - Over Advanced based on SQP	P01DA	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 8. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 8. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated .	>100.00 [us] >0.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 0.00 LowFuelConditionDiagnostic 1.00 0.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 0.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] >	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [1.00] **KaFADC_Cnt_SQP_PulsPerStrk** [1.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [1.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		able to calculate the drift, in term of angular degree, on injector 8. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	-40.00 [°C] < 77.00 [°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 900.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 Open Circuit	P0201	This DTC checks the Injector 1 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 2 Open Circuit	P0202	This DTC checks the Injector 2 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector3 Open Circuit	P0203	This DTC checks the Injector 3 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderH and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderH	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 4 Open Circuit	P0204	This DTC checks the Injector 4 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderE and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderE	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector5 Open Circuit	P0205	This DTC checks the Injector 5 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 6 Open Circuit	P0206	This DTC checks the Injector 6 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 7 Open Circuit	P0207	This DTC checks the Injector 7 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector8 Open Circuit	P0208	This DTC checks the Injector 8 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Injection Timing	P020A	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 1 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 1 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderA or (Active DTC: and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderA FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); FUL_PullInCylErrFlt_CiEPSR_CylinderA ==1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Injection Timing	P020B	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 2 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 2 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderB or (Active DTC and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderB FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); FUL_PullInCylErrFlt_CiEPSR_CylinderB ==1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Injection Timing	P020C	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 3 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 3 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderC or (Active DTC and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderC FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); FUL_PullInCylErrFlt_CiEPSR_CylinderC ==1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Injection Timing	P020D	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 4 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 4 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderD or (Active DTC and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderD FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); FUL_PullInCylErrFlt_CiEPSR_CylinderD 1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Injection Timing	P020E	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 5 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 5 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderE or (Active DTC and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderE FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); FUL_PullInCylErrFlt_CiEPSR_CylinderE ==1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Injection Timing	P020F	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 6 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 6 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderF or (Active DTC and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderF FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); FUL_PullInCylErrFlt_CiEPSR_CylinderF ==1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injection Quantity Monitoring	P0216	This DTC detects an ECU internal fault by comparing requested Energizing Time by Application SW and the actuated Energizing Time by HWIO (Direct Injection Fueling Outputs) on each actuated injection pulse for each cylinder. Two different thresholds (High and Low) are defined for detecting the fault. The monitoring will count an error also in case at least one pulse is dropped on a cylinder.	In order to identify whether there is a fault, the following tests shall be performed: 1. At least one dropped pulse is present (i.e. at least one pulse programmed by the application software is not driven by the ECU) 2. If the actuated ET is greater than the required by application SW, check the following condition: |ETpulseX,programmed (cyl) - ET pulseX,HWIO (cyl)| > calibratable threshold OR If the actuated ET is lower than the required by application SW, check the following condition: |ETpulseX,programmed (cyl) - ET pulseX,HWIO (cyl)| < calibratable threshold where: ETpulseX,HWIO (cyl)) = energizing time feedback read by HWIO for pulseX	> KeFULR_t_QntyMontrETHiThrsh < KeFULR_t_QntyMontrETLoThrsh	Test enabled by calibration Diagnostic System disabled Powertrain relay voltage in range Catalyst Warm-Up boolean from CSERS enabled (this boolean takes into account the combustion mode, the minimum soaking time and the ECT) No monitoring ShutOff conditions present (no FA on Boost Voltage, Injector Electrical monitorings, Pull In Period and Controller Status monitorings) At least one injection pulse is requested by the application software on all cylinders	== KeFULR_b_QntyMontrEnbl [Boolean] = FALSE > 11.00 [V] == FALSE FUL_BoostVoltFA FUL_FuelInjCkt_FA FUL_PullInErrFA FUL_CntrlrStFA = TRUE	KeFULR_Cnt_QntyMontrFailLim failures out of KeFULR_Cnt_QntyMontrSmplLim samples Function Task: angular-based	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			and on cylinder cyl ETpulseX,programmed (cyl) = ETpulseX,SW (cyl) + EOIpulseX,HWIO (cyl) = energizing time programmed by SW for pulseX and on cylinder cyl (end of injection is not included) + end of injection feedback read by HWIO for pulseX and on cylinder cyl					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 Injection Timing	P021A	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 7 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 7 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderC or (Active DTC and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderG FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); FUL_PullInCylErrFlt_CiEPSR_CylinderC ==1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 Injection Timing	P021B	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 8 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 8 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderD or (Active DTC and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderH FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); FUL_FuelInjectedCyl_CiEPSR_CylinderD ==1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 Control Circuit Low Voltage	P0261	This DTC detects a short circuit to ground of the low side driver circuit of Injector 1.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 Control Circuit High Voltage	P0262	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 1.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 2 Control Circuit Low Voltage	P0264	This DTC detects a short circuit to ground of the low side driver circuit of Injector 2.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 2 Control Circuit High Voltage	P0265	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 2.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector3 Control Circuit Low Voltage	P0267	This DTC detects a short circuit to ground of the low side driver circuit of Injector 3.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderH and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderH	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector3 Control Circuit High Voltage	P0268	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 3.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderH and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderH	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Efficiency Below Threshold (OBDII market only)	P026A	This monitor checks the Charge Air Cooler efficiency deterioration, that would cause vehicle's emissions to exceed specific emission levels. It applies to both air-cooled and water-cooled Charge Air Coolers (WCAC), depending on application. The reference temperature can be selected to account for different architectures or applications, in order to guarantee a robust WPA/BPU separation in all conditions. The selectable temperature sensors used as reference are: Outside Air Temperature, Induction Air Temperature, WCAC inlet coolant temperature.	Charge Air Cooler Efficiency (averaged over a calibrate-able cumulative transient time) is compared with a threshold. Charge Air Cooler Efficiency is computed as the ratio between (CAC upstream temperature - CAC downstream temperature) and (CAC upstream temperature - Reference temperature). Reference temperature can be selected via calibration CeCIDG_e_OutsideTemp : - if equal to CeCIDG_e_InductTemp, it is the induction air temperature; - if equal to CeCIDG_e_OutsideTemp, it is the outside air temperature; - if equal to CeCIDG_e_WCAC_WaterTempIn, it is the water temperature at the WCAC inlet. Each sample of the computed Charge Air Cooler Efficiency (before	<36.00 [%] **P026A: Efficiency Offset [%]**	Calibration on diagnostic enabling Diagnostic has not run in current driving cycle yet Vehicle speed in range Compressor flow (Air + LP EGR) in range Engine coolant temperature in range OR OBD Coolant Enable Criteria Throttle valve position Pressure ratio through the compressor in range Temperature difference between upstream charge air cooler temperature and Reference temperature in range Water pump speed in range Environmental pressure in	1.00==TRUE ==TRUE >90.00 [kph] > 20.00 [mg/s] < 400.00 [mg/s] >70.00 [°C] ==TRUE >85.00 [%] > 1.23 [ratio] > 33.00 [°C] > -1.00 [rpm] >69.60 [kPa]	Test executed after 160.00 samples are collected and their average is computed Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			the average) is corrected by an offset depending on the compressor flow and the water pump speed.		range			
					Environmental temperature in range	>-20.00 [°C]		
					No fault on vehicle speed sensor	VehicleSpeedSensor_FA ==FALSE		
					No fault on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					No fault on throttle position sensor	TPS_PstnSnsrFA ==FALSE		
					No fault on ambient pressure sensor	AAP_AmbientAirPresDfltd ==FALSE		
					No fault on ambient temperature sensor	OAT_PtEstFiltFA ==FALSE		
					No fault on Reference temperature sensor	OAT_PtEstFiltFA ==FALSE OR IAT_SensorFA==FALSE OR CIW_TemplnFA==FALSE		
					No fault on charge air cooler upstream and downstream temperature sensors	CIT_CAC_UpFA==FALSE CIT_CAC_DwnFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Compressor flow estimation is valid	INM_ComprTotFlowNotVld ==FALSE		
					No fault on Intake Manifold Pressure sensor	MAP_SensorFA==FALSE		
					No fault on Water pump speed sensor	ICPR_b_IC_PmpPerfFA ==FALSE, OR ICPR_b_IC_PmpCktFA ==FALSE, OR ICP_CWP_LcFA ==FALSE, OR ICP_CWP_Rsp_FoFA ==FALSE		
					All the enabling conditions last for a time	>=2.00[s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injection Timing Performance	P026B	This DTC detects an injection timing only fault by comparison of the requested Start of Injection by Application SW and the scheduled SOI by HWIO SW.	Comparison of the requested Start Of Injection by Application SW and the scheduled SOI by HWIO SW for all cylinders.	< -4.00 OR >4.00	Test enabled by calibration AND Engine Speed in range AND At least one injection pulse is commanded by Application SW on all cylinders in the previous engine cycle FUL_FuelInjectedCyl_CiEPSR CylinderA FUL_FuelInjectedCyl_CiEPSR_CylinderB FUL_FuelInjectedCyl_CiEPSR CylinderC FUL_FuelInjectedCyl_CiEPSR CylinderD FUL_FuelInjectedCyl_CiEPSR_CylinderE FUL_FuelInjectedCyl_CiEPSR CylinderF FUL_FuelInjectedCyl_CiEPSR CylinderG FUL_FuelInjectedCyl_CiEPSR_CylinderH AND At least one injection pulse is commanded by HWIO OR at least one post injection is commanded by Application SW, on all cylinders in the previous engine cycle	== 1.00 > 400 [rpm] AND < 4,500.00 == TRUE; -	88.00 failures out of 176.00 samples 1 sample every engine revolution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND No information of dropped pulse reported by HWIO AND No electrical fault on injectors are present AND No Injection Controller Fault AND No faults on crankshaft sensor for the entire driving cycle. AND Cold Start Strategy not enabled	FUL_FuelInjCkt_FA FUL_CntrlrStFA CrankSensor_FA AND CrankSensor_TFTKO		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Injection Quantity Lower Than Expected	P026C	An error shall be detected when the fuel adjustment value (mm3) released by FSA is below a calibrated threshold.	Released FSA fuel correction value lower than a threshold A selected based on active combustion mode (refer to supporting table **KaFADR_e_FSA_ECM_CombModeGrp)** multiplied per ambient air pressure correction factor B	<A*B A = (If Group1 is selected: refer to supporting table **KtFADD_V_FSA_ECM_LoThrshGrp1** If Group2 is selected: refer to supporting table **KtFADD_V_FSA_ECM_LoThrshGrp2** If Group3 is selected: refer to supporting table **KtFADD_V_FSA_ECM_LoThrshGrp3**) [mm^3] B = (refer to supporting table **KtFADD_K_FSA_ECM_PresAmbWghtLo)**	Following conditions are met for a calibrated time: a. System voltage in range b. FSA correction release enabled c. (FSA Learning is active OR (DFSA Learning is active AND Boolean Flag used to enable DFSA learningactive check is TRUE)) for a time d. Ambient air pressure e. (Power Take-Off (PTO) is not active OR Boolean flag used to disable FSA in case of PTO active is FALSE) f. (OBD Coolant Enable Criteria OR Engine coolant temperature) g. Ambient air temperature h. Gear engaged	> 0.50 + 0.00 [s] > 11.00 [V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtn Valid refer to "FSA Control Flag" Free Form (FAD FSA EnblLrn OR (FAD_DFSA_EnblLrn AND 1 [boolean])) > 1.00 [s] > 70.00 [kPa] 0 [boolean] = TRUE > 70.00 [°C] > -20.00 [°C] different from Neutral or Parking	Time counter: 200 failures out of 400 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					for a time (only in case of Automatic Transmission) i. Engine speed in operating range j. Engine speed gradient for a time k. Injected fuel quantity in operating range l. Injected fuel quantity gradient for a time m. Vehicle speed in operating range for a time n. Difference between FSA estimated error and FSA correction quantity o. Active combustion mode in selected group p. No Low fuel tank level indication q. No pending or confirmed DTCs	> 1.00 [s] > 1,100 [rpm] < 1,800 [rpm] < 85 [rpm/25ms] > 0.50 [s] > 18 [mm^3] < 40 [mm^3] < 1.00 [mm^3/25ms] > 1.00 [s] > 20 [kph] < 255 [kph] > 0.50 [s] < 1,000.00 [mm^3] refer to supporting table **KaFADR_e_FSA_ECM_ (CombModeGrp)** LowFuelConditionDiagnostic (ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA FAD_FSA_LrnShtOffReq OXY_eqr_TurbDwn_FSA _NotVld_		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Injection Quantity Higher Than Expected	P026D	An error shall be detected when the fuel adjustment value (mm^3) released by FSA is above a calibrated threshold.	Released FSA fuel correction value higher than a threshold A selected based on active combustion mode (refer to supporting table **KaFADR_e_FSA_ECM_CombModeGrp)** multiplied per ambient air pressure correction factor B	>A*B A = (If Groupl is selected: refer to supporting table **KtFADD_V_FSA_ECM_HiThrshGrp1** If Group2 is selected: refer to supporting table **KtFADD_V_FSA_ECM_HiThrshGrp2** If Group3 is selected: refer to supporting table **KtFADD_V_FSA_ECM_HiThrshGrp3**) [mm^3] B = (refer to supporting table **KtFADD_K_FSA_ECM_PresAmbWghtHi)**	Following conditions are met for a calibrated time: a. System voltage in range b. FSA correction release enabled c. (FSA Learning is active OR (DFSA Learning is active AND Boolean Flag used to enable DFSA learningactive check is TRUE)) for a time d. Ambient air pressure e. (Power Take-Off (PTO) is not active OR Boolean flag used to disable FSA in case of PTO active is FALSE) f. (OBD Coolant Enable Criteria OR Engine coolant temperature) g. Ambient air temperature h. Gear engaged	> 0.50 + 0.00 [s] > 11.00 [V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtn Valid refer to "FSA Control Flag" Free Form (FAD FSA EnblLrn OR (FAD_DFSA_EnblLrn AND 1 [boolean])) > 1.00 [s] > 70.00 [kPa] 0 [boolean] = TRUE > 70.00 [°C] > -20.00 [°C] different from Neutral or	Time counter: 200 failures out of 400 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Parking		
					for a time (only in case of Automatic Transmission)	> 1.00 [s]		
					i. Engine speed in operating range	> 1,100 [rpm] < 1,800 [rpm]		
					j. Engine speed gradient for a time	< 85 [rpm/25ms] > 0.50 [s]		
					k. Injected fuel quantity in operating range	> 15 [mm^3] < 40 [mm^3]		
					l. Injected fuel quantity gradient for a time	< 1.00 [mm^3/25ms] > 1.00 [s]		
					m. Vehicle speed in operating range for a time	> 20 [kph] < 255 [kph] > 0.50 [s]		
					n. Difference between FSA estimated error and FSA correction quantity	< 1,000.00 [mm^3]		
					o. Active combustion mode in selected group	refer to supporting table **KaFADR_e_FSA_ECM_ (CombModeGrp)**		
					p. No Low fuel tank level indication	LowFuelConditionDiagnostic		
					q. No pending or confirmed DTCs	(ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA FAD_FSA_LrnShtOffReq		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						OXY_eqr_TurbDwn_FSA _NotVld		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 4 Control Circuit Low Voltage	P0270	This DTC detects a short circuit to ground of the low side driver circuit of Injector 4.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderE and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderE	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 4 Control Circuit High Voltage	P0271	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 4.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderE and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderE	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector5 Control Circuit Low Voltage	P0273	This DTC detects a short circuit to ground of the low side driver circuit of Injector 5.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector5 Control Circuit High Voltage	P0274	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 5.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 6 Control Circuit Low Voltage	P0276	This DTC detects a short circuit to ground of the low side driver circuit of Injector 6.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 6 Control Circuit High Voltage	P0277	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 6.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 7 Control Circuit Low Voltage	P0279	This DTC detects a short circuit to ground of the low side driver circuit of Injector 7.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 7 Control Circuit High Voltage	P0280	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 7.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector8 Control Circuit Low Voltage	P0282	This DTC detects a short circuit to ground of the low side driver circuit of Injector 8.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector8 Control Circuit High Voltage	P0283	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 8.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Fuel Injector Offset Learning At Min Limit based on SQP	P02CC	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 1. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQP_MinAdptDeltET [us]**	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Fuel Injector Offset Learning At Max Limit based on SQP	P02CD	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 1. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	**> KaFADC_t_SQP_MaxAdptDeltET [us]**	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Fuel Injector Offset Learning At Min Limit based on SQP	P02CE	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 2. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQP_MinAdptDeltET [us]**	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Fuel Injector Offset Learning At Max Limit based on SQP	P02CF	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 2. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	**> KaFADC_t_SQP_MaxAdptDeltET [us]**	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Fuel Injector Offset Learning At Min Limit based on SQP	P02D0	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 3. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQP_MinAdptDeltET [us]**	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Fuel Injector Offset Learning At Max Limit based on SQP	P02D1	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 3. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	**> KaFADC_t_SQP_Max AdptDeltET [us]**	SQP Authority Diagnosis enabled SQP injection management enabled	FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Fuel Injector Offset Learning At Min Limit based on SQP	P02D2	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 4. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQP_MinAdptDeltET [us]**	SQP Authority Diagnosis enabled SQP injection management enabled	 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Fuel Injector Offset Learning At Max Limit based on SQP	P02D3	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 4. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	**> KaFADC_t_SQP_MaxAdptDeltET [us]**	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Fuel Injector Offset Learning At Min Limit based on SQP	P02D4	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^{A}3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 5. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQP_MinAdptDeltET [us]**	SQP Authority Diagnosis enabled SQP injection management enabled	 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Fuel Injector Offset Learning At Max Limit based on SQP	P02D5	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 5. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	**> KaFADC_t_SQP_MaxAdptDeltET [us]**	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Fuel Injector Offset Learning At Min Limit based on SQP	P02D6	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 6. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQP_MinAdptDeltET [us]**	SQP Authority Diagnosis enabled SQP injection management enabled	 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Fuel Injector Offset Learning At Max Limit based on SQP	P02D7	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 6. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	**> KaFADC_t_SQP_MaxAdptDeltET [us]**	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 Fuel Injector Offset Learning At Min Limit based on SQP	P02D8	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 7. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQP_MinAdptDeltET [us]**	SQP Authority Diagnosis enabled SQP injection management enabled	 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 Fuel Injector Offset Learning At Max Limit based on SQP	P02D9	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 7. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	**> KaFADC_t_SQP_Max AdptDeltET [us]**	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 Fuel Injector Offset Learning At Min Limit based on SQP	P02DA	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 8. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQP_MinAdptDeltET [us]**	SQP Authority Diagnosis enabled SQP injection management enabled	FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 Fuel Injector Offset Learning At Max Limit based on SQP	P02DB	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP on cylinder 8. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQP. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	**> KaFADC_t_SQP_MaxAdptDeltET [us]**	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 1 Sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Control Circuit	P02E0	This monitor checks if the Throttle commands are in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	>200 [kOhm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is OFF HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Performance	P02E1	This monitor detects an obstruction on the actuator (obstruction found during the Throttle valve opening or closing) checking the setpoint position against the position measured by the Throttle Position Sensor	(Throttle Position Tracking Error| (setpoint position - measured position) > maximum threshold	> 16.00 [%]	Test enabled by calibration System out of the cranking phase Cold Start strategy enabled PT relay supply voltage in range Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening) No faults present on engine coolant temperature sensor Outside air temperature higher or equal to minimum threshold No faults present on outside air temperature sensor Throttle position closed loop control active (no faults present on Throttle position sensor, Throttle valve, Throttle position control deviation)	==1.00 ==FALSE >11.00 [V] >=55.00 [°C] ECT_Sensor_FA ==FALSE >=-23.00 [°C] OAT_PtEstFiltFA ==FALSE TPS_PstnSnsrCktFlt== FALSETPS.ActrFA == FALSETPS_PstnDvtnFA == FALSE	1,280.00 fail counts out of 1,600.00 sample counts 640.00 fail counts to enable the open circuit check (P02E0) Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Throttle position setpoint in steady state conditions for minimum time No mechanical stop soft approach in progress No anti-sticking procedure in progress	>-160.00 [%/s] <160.00 [%/s] for >= 0.30 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Control Circuit Low	P02E2	This monitor checks if the Throttle commands are shorted to ground	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 9 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Control Circuit High	P02E3	This monitor checks if the Throttle commands are shorted to power supply	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 9 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Stuck Closed	P02E5	This monitor detects the Throttle valve mechanically stuck in a certain position different from its defaulted position (fully open) when the actuator is no longer driven (missing dafaulted position)	Measured Throttle position < minimum threshold	<80.00 [%]	P02E1 is already set Diagnostic system enabled (no clear code or EOT in progress) Waiting time after driver shut off > minimum threshold (needed for the spring to drive the valve in its defaulted position) No faults present on Throttle position sensor, Throttle valve, Throttle position control deviation	 > 1.00 [s] TPS_PstnSnsrFA== FALSE TPS_ActrFA == FALSE TPS_PstnDvtnFA == FALSE	No debounce is present: DTC sets as soon as the error is present Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Position Sensor Circuit Low (SENT position sensor)	P02E8	This monitor checks if the Throttle SENT position sensor is out of electrical range low	SENT position raw voltage < low threshold	< 1.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on Throttle SENT communication	==1.00 >11.00 [V] TPS_SENT_LossCommFlt == FALSE	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Position Sensor Circuit High (SENT position sensor)	P02E9	This monitor checks if the Throttle SENT position sensor is out of electrical range low	SENT position raw voltage > high threshold	> 99.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on Throttle SENT communication	==1.00 >11.00 [V] TPS_SENT_LossCommFlt == FALSE	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Current Range/ Performance	P02EB	This monitor checks if an excessive current flows through the Throttle DC-Motor (e.g. shunt circuit between load, Throttle DC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 5.5 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on Throttle DC Motor current range/performance H-Bridge driver is ON HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V] TPS_MtrCurrLimTFTKO == FALSE	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start EGRA Control Circuit Range/ Performance	P034F	This monitor detects an obstruction on the actuator (obstruction found during the HP EGR valve opening or closing) checking the setpoint position against the position measured by the HP EGR Position Sensor	|HP EGR Position Tracking Error| (setpoint position - measured position) > maximum threshold	> 16.00 [%]	Cold Start strategy enabled	==TRUE	1,260.00 fail counts out of 1,600.00 sample counts Function task: 6.25 ms	Type B, 2 Trips
					Test enabled by calibration	== 1.00		
					Diagnostic system enabled (no clear code or EOT in progress)			
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					HP EGR position closed loop control active			
					HP EGR position setpoint in steady state conditions for minimum time	< 160.00 [%/s] > -160.00 [%/s] for >= 0.30 [s]		
					Engine coolant temperature higher or equal to minimum threshold (calculated with a table ECT/OAT) OR Engine cooling system target temperature	> 0.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					reached (thermostat opening)			
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature higher or equal to minimum threshold	>= -23.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Glow Plug/ Heater Indicator Control Circuit Low	P037A	This DTC checks the wait to start lamp circuit for electrical integrity during operation. Wait to start lamp pin shorted to ground.	Test performed by HWIO. Aground short condition shall be detected if the circuit attached to the controller external connection has an impedance R to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. The short to ground faults are not required to be detected when the Off state diagnostic leakage current source is Disabled.	R = 0.5 0	Glow Lamp present Test enabled Run/Crank On Run/Crank voltage Engine cranking	== 1.00 [boolean] == 1.00 [boolean] == True >11.00 V == False	10.00 failures out of 15.00 samples (*) (*) Ground short monitoring is implemented in HWIO which means no further debouncing is needed in case of short to ground	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Glow Plug/ Heater Indicator Control Circuit High	P037B	This DTC checks the wait to start lamp circuit for electrical integrity during operation. Wait to start lamp pin shorted to high voltage.	Test performed by HWIO. A power short condition shall be detected if the circuit attached to the Controller external connection has an impedance R to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R = 0.5 0	Glow Lamp present Test enabled Run/Crank On Run/Crank voltage Engine cranking	== 1.00 [boolean] == 1.00 [boolean] == True >11.00 V == False	8.00 failures out of 10.00 samples Sampling rate: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Glow Plug Sense Circuit Low	P037E	This DTC checks the circuit for electrical integrity during operation of glow plug sub-system. ECU internal fault.	Voltage feedback above threshold depending on system current and RunCrank relay voltage	battery_voltage - voltage_feedback > **KtGLOD_U_VoltLoDelMax (KnGLOD_I_GP_Curr)** [V]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; Enable_ON interface is true; No electrical fault detected on glow plugs; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; VeGLOO_b_GlowPlugEnbl = TRUE; VeGLOO_b_ElectFlt = FALSE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_DiagSystemDsbl = FALSE;	60.00 fail samples over 120.00 samples Time task: 50 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Glow Plug Sense Circuit High	P037F	This DTC checks the circuit for electrical integrity during operation of glow plug sub-system. ECU internal fault.	Voltage feedback over a threshold depending on RunCrank relay voltage	voltage_feedback > 5.00 [V]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; Enable_ON interface is true; No electrical fault detected on glow plugs; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VeGLOO_b_GlowPlugEnbl = TRUE; VeGLOO_b_ElectFlt = FALSE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_DiagSystemDsbl = FALSE;	40.00 fail samples over 80.00 samples Time task: 50 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Glow Plug/ Heater Indicator Control Circuit/Open	P0381	This DTC checks the wait to start lamp circuit for electrical integrity during operation. Wait to start lamp pin open circuit.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance Ropendet and shall not be detected if the circuit impedance is less than the Ropmin. The open circuit faults are not required to be detected when the Off state diagnostic leakage current source is Disabled.	Ropendet = 300 0 Ropmin - 10 Q	Glow Lamp present Test enabled Run/Crank On Run/Crank voltage Engine cranking	== 1.00 [boolean] == 1.00 [boolean] == True >11.00 V == False	10.00 failures out of 15.00 samples (*) (*) Open load monitoring is implemented in HWIO which means no further debouncing is needed in case of open load	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Control Circuit	P0403	This monitor checks if the HP EGR commands are in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	> 200 [kOhm]	Test enabled by calibration	==1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					H-Bridge driver is OFF			
					Valve requested in a position different from fully closed (default position)			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Position Performance	P0404	This monitor detects an obstruction on the actuator (obstruction found during the HP EGR valve opening or closing) checking the setpoint position against the position measured by the HP EGR Position Sensor	|HP EGR Position Tracking Error| (setpoint position - measured position) > maximum threshold	>16.00 [%]	Test enabled by calibration Diagnostic system enabled (no clear code or EOT in progress) Cold Start strategy enabled System out of the cranking phase PT relay supply voltage in range Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening) No faults present on engine coolant temperature sensor Outside air temperature higher or equal to minimum threshold	==1.00 ==FALSE >11.00 [V] >=55.00 [°C] ECT_Sensor_FA ==FALSE >=-23.00 [°C]	1,260.00 fail counts out of 1,600.00 sample counts 630.00 fail counts to enable the open circuit check (P0403) Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		
					HP EGR position setpoint in steady state conditions for minimum time	>-160.00 [%/s] <160.00 [%/s] for >= 0.38 [s]		
					HP EGR position closed loop control active			
					No mechanical stop soft approach in progress			
					No anti-sticking procedure in progress			
					No faults present on HP EGR position sensor, HP EGR valve, HP EGR position control deviation	EGR_PstnShtOffReq ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Position Sensor Circuit Low Voltage (analog position sensor)	P0405	This monitor checks if the HP EGR analog position sensor is out of electrical range low	analog position raw voltage < low threshold	< 1.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress)	==1.00 >11.00 [V]	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Position Sensor Circuit High Voltage (analog position sensor)	P0406	This monitor checks if the HP EGR analog position sensor is out of electrical range high	analog position raw voltage > high threshold	>99.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress)	==1.00 >11.00 [V]	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Control Stuck Open	P042E	This monitor detects the HP EGR valve mechanically stuck in a certain position different from its defaulted position (fully closed) when the actuator is no longer driven (missing dafaulted position)	Measured HP EGR position > maximum threshold	>5.00 [%]	P0404 is already set Waiting time after driver shut off > minimum threshold (needed for the spring to drive the valve in its defaulted position) Diagnostic system enabled (no clear code or EOT in progress) No faults present on HP EGR position sensor, HP EGR valve, HP EGR position control deviation	 >2.00 [s] EGR_PstnShtOffReq ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Control Circuit Low Voltage	P0489	This monitor checks if the HP EGR commands are shorted to ground	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Control Circuit High Voltage	P0490	This monitor checks if the HP EGR commands are shorted to power supply	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration	==1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					H-Bridge driver is ON			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Position Exceeded Learning Limit (analog position sensor)	P049D	This monitor checks if the HP EGR analog position sensor has an offset with respect to the nominal position where the valve does the learning procedure (fully closed)	analog position raw voltage when the valve is in fully closed position < low threshold OR analog position raw voltage when the valve is in fully closed position > high threshold	<12.00 [%5V] OR >30.00 [%5V]	Test enabled by calibration Key signal is off Learning procedure at key off in fully closed position has been successfully completed: - engine coolant temperature in range; - no faults present on engine coolant temperature sensor; - outside air temperature above a threshold; - no faults present on outside air temperature sensor. Position control in closed loop: battery voltage above a threshold. No faults present on HP EGR position sensor, HP EGR valve, HP EGR position control deviation End Of Trip event has elapsed	==1.00 >=60.00 [°C] <=150.00 [°C] ECT_Sensor_FA ==FALSE >=-40.00 [°C] OAT_PtEstFiltFA ==FALSE >=9.50 [V] EGR_PstnShtOffReq ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Diagnostic system enabled (no clear code or EOT in progress)			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR “A” Control Temperature Too High	P04FA	This monitor checks if the temperature of the HP EGR DC-Motor increases too much (e.g. HP EGR DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration	==1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 1 out of range monitoring Low	P0545	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature velue in case of digital sensor) with a minimum threshold.	**Analog Sensor:** The monitor compares the EGT 1 raw value (resistance value) with a minimum threshold; if this threshold is overcome, a OOR Low error is detected. **Digital termocouple sensor:** The monitor compares the EGT 1 raw value (temperature value) with a minimum threshold;	<1.00 [Ohm] <-72.80 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status Lost Communication Error A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE ==FASSE ==TRUE	19.00 fail samples over 25.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 1 out of range monitoring High	P0546	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature value in case of digital sensor) with a maximum threshold.	**Analog sensor:** The monitor compares the EGT 1 raw value (resistance value) with a maximum threshold; if this threshold is overcome, a OOR High error is detected. **Digital termocouple sensor:** The monitor compares the EGT 1 raw value (temperature value) with a maximum threshold;	>100,000,000.00 [Ohm] >1,289.85 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status Lost Communication Error A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail samples over 25.00 samples Function task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

Idle Control System - Fuel Quantity Lower Than Expected	P054E	This DTC detects if the fuel quantity of the torque forming pulses is lower than the expected fuel quantity request when the engine is idle. Depending on combustion mode and gear, different maps of fuel quantity thresholds can be used. Each map depends on engine speed and engine coolant temperature	Depending on Combustion Mode
			
			case **StrongExhGasWarmUp**:
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			
			case **SoftExhGasWarmIlp:**
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
				<0.5* **P054E_IFM_MinFuelIdleV3_G** [mm^3] depending on engine speed and engine coolant temperature
				
				<0.5* **P054E_IFM_MinFuelIdleV3_PN** [mm^3] depending on engine speed and engine coolant temperature
				
				<0.5* **P054E_IFM_MinFuelIdleV2_G** [mm^3] depending on engine speed and engine coolant
					For enabling the monitor, all the following conditions must be satisfied continuously for more than
					
					Test enabled by calibration
					
					and
					current gear
					
					and
					current Neutral Control Mode
					
					and
					depending on **Gear Selection Calibration =** CeFULR_e_InGearNeutralPark
					(
					CeFULR_e_InGear: transmission
					
					CeFULReNeutralPark: transmission
					
					CeFULReInGearNeutraIPark: transmission
					)
					
					and
					engine speed
						5.00 [s]
						
						1.00 [Boolean]
						
						unchanged
						
						unchanged
						
						in gear
						
						in park/neutral
						
						in gear and in park neutral
						
						> hysteresis(500.00 , 500.00 + 0.00)[rpm]
							71.00 failures out of 142.00 samples
							
							1 sample every cylinder firing event
								Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				temperature	and engine speed	<hysteresis(1,560.00, 1,560.00 + 0.00)[rpm]		
			<u>transmission in Park/ Neutral:</u> Fuel quantity of the torque forming pulses	<0.5* **P054E_IFM_MinFuelIdleV2_PN** [$mm^{A}3$] depending on engine speed and engine coolant temperature	and (OBD Coolant Enable Criteria	== TRUE		
					OR			
			}		engine coolant temperature	> hysteresis(-21.00 , -20.00) [°C]		
			case **HC unloading driving and park/neutral (HCS_DeHC_Drive || HCS_DeHC_Park):**		)			
					and outside air temperature	> hysteresis(-21.00 , -20.00) [°C]		
			{ <u>transmission in Gear:</u> Fuel quantity of the torque forming pulses		and vehicle speed	< 3.00 [kph]		
				<0.5* **P054E_IFM_MinFuelIdleHC.G** [$mm^{A}3$] depending on engine speed and engine coolant temperature	and enabled in the combustion mode	**P054E_IFM_CombModesEnbl**		
			<u>transmission in Park/ Neutral:</u> Fuel quantity of the torque forming pulses		and Accelerator Pedal Position	<= 0.05 [%]		
				<0.5* **P054E_IFM_MinFuelIdleHC.PN** [$mm^{A}3$] depending on engine speed and engine coolant temperature	and Engine running	-		
					and PTO_PTO_Active	== 0 [Boolean]		
			}		and Run Crank voltage	>=11.00 [V]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

			default:
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
				<0.5* **P054E_IFM_MinFuelIdleC1_G** [mm^3] depending on engine speed and engine coolant temperature
				
				<0.5* **P054E_IFM_MinFuelIdleC1_PN** [mm^3] depending on engine speed and engine coolant temperature
					and
					if the transmission is manual
					(
					if the Gear is Neutral
					AND
					the clutch pedal position
					OR
					the clutch pedal position
					)
					NLT_Active
					
					and
					No active DTC's:
					
					No Neutral Locked Turbine Fault active and Fault Pending:
					VeTLKR_b_NLT_ActvFA AND VeTLKR_b_NLT_ActvFP
					
					Depending on the **OAT Source Calibration =**
					CeOATR_e_ECM_OAT_Sensor
					(
					CeOATR_e_NonOBD_NonECMNonVICM:
					
					default:
					)
						> 0.00
						
						< 0.00
						
						==0 [Boolean]
						
						==0 [Boolean]
						
						==0 [Boolean]
						
						OAT_OAT_SnsrNonEmissFA
						
						OAT_PtEstFiltFA
						
						CrankSensor_TFTKO
						
						ECT_Sensor_FA
						
						Transmission Estimated Gear Validity
						
						VehicleSpeedSensor_FA
						
						AcceleratorPedalFailure
						
						ClutchPedalPosSensor_FA
						
						(FUL GenericIniSvsFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						AND FUL GenericInjSysFlt)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

Idle Control System - Fuel Quantity Higher Than Expected	P054F	This DTC detects if the fuel quantity of the torque forming pulse is higher than the expected fuel quantity request when the engine is idle.
		Depending on combustion mode and gear, different maps of fuel quantity thresholds can be used. Each map depends on engine speed and engine coolant temperature
			Depending on Combustion Mode
			
			case **StrongExhGasWarmUp**:
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			
			case **SoftExhGasWarmUp:**
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
				> 1.5* **P054F_IFM_MaxFuelIdleV3_G** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleV3_PN** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleV2_G** [mm^3] depending on engine speed and engine coolant temperature
					For enabling the monitor, all the following conditions must be satisfied continuously for more than
					
					Test enabled by calibration
					
					and
					current gear
					
					and
					Current Neutral Control Mode
					
					and
					depending on **Gear Selection Calibration =** CeFULR_e_InGearNeutralPark
					{
					CeFULR_e_InGear:
					transmission
					
					CeFULReNeutralPark:
					transmission
					
					CeFULR_e_InGearNeutralPark:
					transmission
					}
					
					and
					engine speed
					
					and
						5.00 [s]
						
						1.00 [Boolean]
						
						unchanged
						
						unchanged
						
						in gear
						
						in park/neutral
						
						in gear and in park neutral
						
						> hysteresis(500.00 , 500.00 + 0.00) [rpm]
						
						< hysteresis(1,560.00, 1,560.00 + 0.00) [rpm]
							71.00 failures out of 142.00 samples
							
							1 sample every cylinder firing event
								Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			}
			case
			HC unloading driving and park/neutral (HCS_DeHC_Drive || HCS_DeHC_Park):
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			}
			default:
				> 1.5* **P054F_IFM_MaxFuelIdleV2_PN** [mm^3] depending on engine speed and engine coolant temperature
				> 1.5* **P054F_IFM_MaxFuelIdleHC.G** [mm^3] depending on engine speed and engine coolant temperature
				> 1.5* **P054F_IFM_MaxFuelIdleHC.PN** [mm^3] depending on engine speed and engine coolant temperature
					engine speed
					and
					{
					OBD Coolant Enable Criteria
					OR
					engine coolant temperature
					}
					and
					outside air temperature
					and
					vehicle speed
					and
					enabled in the combustion mode
					and
					Accelerator Pedal Position
					and
					Engine running
					and
					PTO_PTO_Active
					and
					Run Crank voltage
					and
					if the transmission is manual
					(
						== TRUE
						> hysteresis(-21.00 , -20.00) [°C]
						> hysteresis(-21.00 , -20.00) [°C]
						< 3.00 [kph]
						P054F_IFM_CombModesEnbl
						<= 0.05 [%]
						-
						== 0 [Boolean]
						>= 11.00 [V]
						>0.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
				> 1.5* **P054F_IFM_MaxFuelIdleC1_G** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleC1_PN** [mm^3] depending on engine speed and engine coolant temperature
					if the Gear is Neutral
					AND
					the clutch pedal position
					OR
					the clutch pedal position
					)
					NLT_Active
					and
					No active DTC's:
					No Neutral Locked Turbine Fault active and Fault Pending:
					VeTLKR_b_NLT_ActvFA
					AND
					VeTLKR_b_NLT_ActvFP
					Depending on the **OAT Source Calibration =**
					CeOATR_e_ECM_OAT_Sensor
					{
					CeOATR_e_NonOBD_NonECMNonVICM:
					default:
					}
						<0.00
						==0 [Boolean]
						==0 [Boolean]
						==0 [Boolean]
						OAT_OAT_SnsrNonEmissFA
						OAT_PtEstFiltFA
						CrankSensor_TFTKO
						ECT_Sensor_FA
						Transmission Estimated Gear Validity
						VehicleSpeedSensor_FA
						AcceleratorPedalFailure
						ClutchPedalPosSensor_FA
						(FUL_GenericInjSysFA
						AND
						FUL_GenericInjSysFlt
						)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Injection Timing Performance	P05EC	This DTC detects an injection timing only fault in Cold Start condition by comparison of the requested Start of Injection by Application SW and the scheduled SOI by HWIO SW.	Comparison of the requested Start Of Injection by Application SW and the scheduled SOI by HWIO SW for all cylinders.	< -4.00 OR >4.00	Test enabled by calibration AND Engine Speed in range AND At least one injection pulse is commanded by Application SW on all cylinders in the previous engine cycle FUL_FuelInjectedCyl_CiEPSR_CylinderA FUL_FuelInjectedCyl_CiEPSR_CylinderB FUL_FuelInjectedCyl_CiEPSR_CylinderC FUL_FuelInjectedCyl_CiEPSR_CylinderD FUL_FuelInjectedCyl_CiEPSR_CylinderE FUL_FuelInjectedCyl_CiEPSR_CylinderF FUL_FuelInjectedCyl_CiEPSR_CylinderG FUL_FuelInjectedCyl_CiEPSR_CylinderH AND At least one injection pulse is commanded by HWIO OR at least one post injection is commanded by Application SW, on all cylinders in the previous engine cycle	== 1.00 > 400 [rpm] AND < 4,500.00 == TRUE; -	88.00 failures out of 176.00 samples 1 sample every engine revolution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND No information of dropped pulse reported by HWIO AND No electrical fault on injectors are present AND No Injection Controller Fault AND No faults on crankshaft sensor for the entire driving cycle. AND Cold Start Strategy enabled	FUL_FuelInjCkt_FA FUL_CntrlrStFA CrankSensor_FA AND CrankSensor_TFTKO		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Fuel Injector Control Performance	P062B	This DTC Diagnoses the internal fuel injector control module circuit for circuit faults. The following check are performed: - Chip initialization - Boost voltage - chip test - Code and Parameter - SPI error (SPI communication failed) -ASIC Supply Under/ Over Voltage -ASIC Configuration Register Error -ASIC SPI Fault -ASIC DC-DC Over Voltage/Current -ASIC external clock lost - Injector Timeout Reached - Injector RAM Corruption	Driver Status OR (Driver Status for a number of samples)	== FAILED (chip test not passed OR Wrong download of microcode OR SPI error) == NOT INITIALIZED (chip not initialized OR Boost Voltage < 40.00) > 10 samples	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] > 6.41 [V] - - 40.00 [V]	19 failures out of 38 samples 12.5 ms /sample Continuous	Type A, 1 Trips
			Driver Status	== FAILED (ASIC power supply voltage is < 4.5 V or >33 V)	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] > 6.41 [V] - - 40.00 [V]	8.00 failures out of 16.00 samples 12.5 ms /sample Continuous	
			Driver Status	== FAILED (Injector control circuit configuration register corrupted)	Test enabled by calibration; and Battery voltage and Key ON	== 1 [Boolean] > 6.41 [V] -	8.00 failures out of 16.00 samples 12.5 ms /sample Continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					and Engine is not cranking and Boost Voltage has achieved (at least one time)	- 40.00 [V]		
			Driver Status	== FAILED (SPI Communicatio error)	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] > 6.41 [V] - - 40.00 [V]	8.00 failures out of 16.00 samples 12.5 ms /sample Continuous	
			Driver Status	== FAILED (the Boost converter voltage or current are out of range)	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] > 6.41 [V] - - 40.00 [V]	8.00 failures out of 16.00 samples 12.5 ms /sample Continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Driver Status	== FAILED (Injector control circuit external clock is no longer available)	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] > 6.41 [V] - - 40.00 [V]	8.00 failures out of 16.00 samples 12.5 ms /sample Continuous	
			Driver Status	== FAILED (the injector has been commanded ON for a time > 4,000.00 us)	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] > 6.41 [V] - - 40.00 [V]	**P062B_CSM_ASIC_TimeOutReached_FailLim** failures out of **P062B_CSM_ASIC_TimeOutReached-SmplLim** samples LoresC	
			Driver Status	== FAILED (Injector control circuit SPRAM and DPRAM corrupted)	Test enabled by calibration; and Battery voltage and Key ON	== 1 [Boolean] > 6.41 [V] -	**P062B_CSM_ASIC_RAMCorruption_FailLim** failures out of **P062B_CSM_ASIC_RAMCorruption_SmplLim** samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					and Engine is not cranking and Boost Voltage has achieved (at least one time)	- 40.00 [V]	LoresC	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Injector Driver Circuit Performance Bank 1	P062D	This DTC detects if there is: open circuit of the power supply line of the injector or Boost voltage fault or ECU internal fault The monitoring determines if the boost voltage is above a threshold or below another threshlod with hysteresis	Internal ECU Boost Voltage	> 60.00 [V] OR < hysteresis(40.00 , 41.00) [V]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking	== 1 [Boolean] > 11.00 [V] - -	37 failures out of 74 samples 6.25 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Glow Plug Circuit Low	P066A	This DTC checks the circuit for electrical integrity during operation. Glow plug 1 pin short to ground.	Test performed by HWIO A ground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. A ground short condition shall not be detected if the circuit impedance is higher than Rload_min. A ground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Glow Plug Circuit High	P066B	This DTC checks the circuit for electrical integrity during operation. Glow plug 1 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohm a power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohm a power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2 = 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankAcfive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Glow Plug Circuit Low	P066C	This DTC checks the circuit for electrical integrity during operation. Glow plug 2 pin short to ground.	Test performed by HWIO Aground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. Aground short condition shall not be detected if the circuit impedance is higher than Rload_min. Aground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle within a calibratable range; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankAcfive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Glow Plug Circuit High	P066D	This DTC checks the circuit for electrical integrity during operation. Glow plug 2 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2= 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankAcfive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Glow Plug Circuit Low	P066E	This DTC checks the circuit for electrical integrity during operation. Glow plug 3 pin short to ground.	Test performed by HWIO A ground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. A ground short condition shall not be detected if the circuit impedance is higher than Rload_min. A ground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle within a calibratable range; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Glow Plug Circuit High	P066F	This DTC checks the circuit for electrical integrity during operation. Glow plug 3 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2= 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankAcfive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Glow Plug Circuit/Open	P0671	This DTC checks the circuit for electrical integrity during operation. Glow plug 1 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankAcfive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Glow Plug Circuit/Open	P0672	This DTC checks the circuit for electrical integrity during operation. Glow plug 2 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankAcfive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Glow Plug Circuit/Open	P0673	This DTC checks the circuit for electrical integrity during operation. Glow plug 3 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Glow Plug Circuit/Open	P0674	This DTC checks the circuit for electrical integrity during operation. Glow plug 4 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Glow Plug Circuit/Open	P0675	This DTC checks the circuit for electrical integrity during operation. Glow plug 4 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankAcfive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Glow Plug Circuit/Open	P0676	This DTC checks the circuit for electrical integrity during operation. Glow plug 6 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankAc five = TRUE; VeEMDR_b_EngModeCra nk = FALSE; VeLVTR_b_RunCrankIgnl nRange = TRUE; GLO_GlowPlugSplyVoltC ktTFTKO >2.50 <97.50 [%] VeDRER_DiagSystemDs bl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 Glow Plug Circuit/Open	P0677	This DTC checks the circuit for electrical integrity during operation. Glow plug 7 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankAcfive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 Glow Plug Circuit/Open	P0678	This DTC checks the circuit for electrical integrity during operation. Glow plug 8 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankAcfive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Glow Plug Circuit Low	P067A	This DTC checks the circuit for electrical integrity during operation. Glow plug 4 pin short to ground.	Test performed by HWIO A ground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. A ground short condition shall not be detected if the circuit impedance is higher than Rload_min. A ground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle within a calibratable range; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Glow Plug Circuit High	P067B	This DTC checks the circuit for electrical integrity during operation. Glow plug 4 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2= 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankAcfive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_b_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Glow Plug Circuit Low	P067C	This DTC checks the circuit for electrical integrity during operation. Glow plug 5 pin short to ground.	Test performed by HWIO A ground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. A ground short condition shall not be detected if the circuit impedance is higher than Rload_min. A ground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle within a calibratable range; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Glow Plug Circuit High	P067D	This DTC checks the circuit for electrical integrity during operation. Glow plug 5 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2= 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankAcfive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_b_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Glow Plug Circuit Low	P067E	This DTC checks the circuit for electrical integrity during operation. Glow plug 6 pin short to ground.	Test performed by HWIO Aground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. Aground short condition shall not be detected if the circuit impedance is higher than Rload_min. Aground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle within a calibratable range; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankAcfive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Glow Plug Circuit High	P067F	This DTC checks the circuit for electrical integrity during operation. Glow plug 6 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2= 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankAcfive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_b_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 Glow Plug Circuit Low	P068C	This DTC checks the circuit for electrical integrity during operation. Glow plug 7 pin short to ground.	Test performed by HWIO Aground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. Aground short condition shall not be detected if the circuit impedance is higher than Rload_min. Aground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle within a calibratable range; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 Glow Plug Circuit High	P068D	This DTC checks the circuit for electrical integrity during operation. Glow plug 7 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2= 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_b_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 Glow Plug Circuit Low	P068E	This DTC checks the circuit for electrical integrity during operation. Glow plug 8 pin short to ground.	Test performed by HWIO A ground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. A ground short condition shall not be detected if the circuit impedance is higher than Rload_min. A ground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle within a calibratable range; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankAcfive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 Glow Plug Circuit High	P068F	This DTC checks the circuit for electrical integrity during operation. Glow plug 8 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2= 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_b_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 electrical resistance rationality check	P06C5	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 1 electrical resistance is outside a calibratable range	0.22 < NaGLOD_R_GlowPlug <2.00	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystemDsbl = FALSE; VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 4.00 VeGLOD_b_RunCrankVoltRec = FALSE;	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 electrical resistance rationality check	P06C6	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 2 electrical resistance is outside a calibratable range	0.22 < NaGLOD_R_GlowPlug <2.00	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystemDsbl = FALSE; VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 4.00 VeGLOD_b_RunCrankVoltRec= FALSE;	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 electrical resistance rationality check	P06C7	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 3 electrical resistance is outside a calibratable range	0.22 < NaGLOD_R_GlowPlug <2.00	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystemDsbl = FALSE; VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 4.00 VeGLOD_b_RunCrankVoltRec = FALSE;	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 electrical resistance rationality check	P06C8	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 4 electrical resistance is outside a calibratable range	0.22 < NaGLOD_R_GlowPlug <2.00	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystemDsbl = FALSE; VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 4.00 VeGLOD_b_RunCrankVoltRec = FALSE;	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 electrical resistance rationality check	P06C9	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 4 electrical resistance is outside a calibratable range	0.22 < NaGLOD_R_GlowPlug <2.00	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystem Dsbl = FALSE; VePMDR_b_RunCrankAc five = TRUE; VeEMDR_b_EngModeCra nk = FALSE; VeLVTR_b_RunCrankIgnl nRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 4.00 VeGLOD_b_RunCrankVol tRec = FALSE;	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 electrical resistance rationality check	P06CA	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 4 electrical resistance is outside a calibratable range	0.22 < NaGLOD R GlowPlug <2.00	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystemDsbl = FALSE; VePMDR_b_RunCrankAcfive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 4.00 VeGLOD_b_RunCrankVoltRec = FALSE;	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 electrical resistance rationality check	P06CB	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 4 electrical resistance is outside a calibratable range	0.22 < NaGLOD_R_GlowPlug <2.00	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystemDsbl = FALSE; VePMDR_b_RunCrankAcfive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 4.00 VeGLOD_b_RunCrankVoltRec = FALSE;	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 electrical resistance rationality check	P06CC	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 4 electrical resistance is outside a calibratable range	0.22 < NaGLOD_R_GlowPlug <2.00	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystemDsbl = FALSE; VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 4.00 VeGLOD_b_RunCrankVoltRec = FALSE;	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharge rVGTA Initial Position Exceeded Learning Limit (VGT Smart)	P100B	This monitor checks if the VGT smart travel (from fully closed to fully open position) measured at End Of Line during the learning procedure is plausibile	physical travel measured at End Of Line when VGT is fully closed < low threshold OR physical travel measured at End Of Line when VGT is fully closed > high threshold OR physical travel measured at End Of Line when VGT is fully open < low threshold OR physical travel measured at End Of Line when VGT is fully open > high threshold	<67.10 [%] OR > 87.90 [%] OR < 3.80 [%] OR > 21.20 [%]	Test enabled by calibration End Of Line Learning procedure at key off has been successfully completed End Of Trip event has elapsed No fault validated on smart VGT rolling counters	== 1.00 CFM_VGT_CommFA ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Rail Pressure deviation during cut off based on SQP	P1089	This diagnosis monitors the presence of rail pressure deviation during deceleration fuel cut-off, preventing the enablement of SQP learning. Rail pressure is the only SQP enabler that is not monitored with an accuracy enough to detect a failure that would prevent a correct SQP behavior. So high pressure fuel rail system shall be monitored to detect a rail pressure behavior that does not allow an SQP correct learning. As soon as SQP strategy requests a rail pressure set point a debounce shall start. After that the debounce time is expired or SQP starts to inject, the diagnosis in enabled and a timer shall start to count the SQP learning time on each SQP rail pressure levels. If on at least one rail pressure level: the timer is expired before that SQP strategy performs a learning on all cylinders, then the diagnosis shall report a Test Fail and the DTC	The timer is expired before that SQP strategy performs a learning on all cylinders	> **KaFADD_t_SQP_Max RailPresTrsh** [ms]	Test enabled by calibration All enabling conditions for SQP learning different from Rail Pressure steady state are satisfied Calibrateable delay time since SQP started to request rail pressure set-point has expired	1.00 FAD_SQA_LrnPresEnbl 1.50 [ms]	Time required to perform a learning with SQP on one rail pressure level. 1 Sample each SQP rail pressure level learning complete.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		is set. If on all rail pressure levels: the timer is not expired and SQP strategy performs a learning on all cylinders, then the diagnosis shall report a Test Pass and the DTC is unset.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Aftertreatment Fuel Injector A Supply Voltage Control Circuit Low	P10CD	This diagnosis detects HC Injector enable short circuit to ground.	HC injector Enable driver HWIO Short To Ground interface fault	=TRUE	Test Enabled by calibration Powertrain relay voltage in range Diagnostic system not disabled; HC Injector HWIO Enable pin Ground Short interface is different from indeterminate.	1.00	10.00 Failures over 20.00 samples. 100ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Aftertreatment Fuel Injector A Supply Voltage Control Circuit High	P10CE	This diagnosis detects HC Injector enable short circuit to power supply.	HC injector Enable driver HWIO Short To Power Supply interface fault	=TRUE	Test Enabled by calibration Powertrain relay voltage in range Diagnostic system not disabled; HC injector HWIO Enable pin Power Short interface is different from indeterminate. OR (HC injector HWIO Enable pin Power Short interface is equal to indeterminate; and HC injector HWIO Open interface fault and HC Injector Enable (High Side) Driver commanded OFF (i.e. open))	1.00 - - - == TRUE - -	19.00 failures over 25.00 samples. 100ms/sample.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Down Circuit Performance	P10D5	This monitor checks if the CAC down air temperature sensor is irrational at key on when compared with two reference temperature sensors after a long soak time	Charge air cooler down air temperature is compared at power up with an average temperature calculated using the intake manifold air temperature sensor and the fuel temperature sensor over a calibratable number of samples	>20.00 [°C]	Enablement calibration set to TRUE	==1.00	Test executed after a counter of 10.00 samples Functional task: 100 ms	Type B, 2 Trips
					Key on and engine not running or engine running for less than a calibratable time	< 1.00 [s]		
					Runk Crank Relay voltage in range	>11.00 [V]		
					The engine has not run for a calibratable time since last key off	>=28,800.00 [s]		
					No faults detected on engine off timer	EngineModeNotRunTimer Error ==FALSE		
					Absolute value of the difference between intake manifold air temperature and fuel temperature smaller than a calibratable threshold	<45.00 [°C]		
					No electrical or self-correlated faults detected on charge air cooler down air temperature sensors	CIT_CAC_DwnCktFA ==FALSE OR CIT_CAC_DwnSelfCorFA ==FALSE		
					No faults detected on intake manifold air	MnfdTempSensorFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					temperature sensor			
					No faults detected on fuel temperature sensor	FTS_FTS_Flt==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Down Circuit Low	P10D6	This monitor checks if the CAC down air temperature sensor is out of electrical range low	Charge air cooler down air temperature resistance value < low threshold	<7.11 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	==1.00 > 11.00 [V]	20.00 fail counter over 24.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Down Circuit High	P10D7	This monitor checks if the CAC down air temperature sensoris out of electrical range high	Charge air cooler down air temperature resistance value > high threshold	>753,016.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	==1.00 > 11.00 [V]	20.00 fail counter over 24.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Down Circuit Intermittent/ Erratic	P10D8	This monitor checks if the CAC down air temperature has an intermittent fault	Charge air cooler down air temperature value > T_MAX_threshold OR Charge air cooler down air temperature value < T_MIN_threshold where - T_MAX_threshold = (1 - alpha)*T_MAX + alpha*T_last_good - T_MIN_threshold = (1 - alpha)*T_MIN + alpha*T_last_good - alpha = e^(#fails + 1)*(ts/ tau) - #fails = number of consecutive samples where the test failed - ts = sensor sampling time - tau = sensor filter response time - T_MAX = sensor maximum actual reading - T_MIN = sensor minimum actual reading - T_last_good = last good temperature measured by the sensor	>300.00 [°C] <-40.00 [°C]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range No electrical faults detected on CAC down air temperature sensor	==1.00 >11.00 [V] CIT_CAC_DwnCktFA ==FALSE	40.00 fail counter over 50.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 1 key-on monitoring	P113B	This function has the purpose of warn the system/driver that the EGT sensor is malfunctioning (the EGT sensor read at key on is not comparable with the other system temperature at the beginning of the driving cycle).	The absolute difference between the EGT average and EGT temperature at key on in case block heater detectect a different threshold shall be use	>20.00 [°C] >30.00	Monitor enabled by dedicated calibration AND DiagSystemDsbl AND RunCrankIgnInRang AND Key-on Report done AND Ambient temperature greater than a calibration with hysteresis no out of range hi/low, lost comm and quick change error No engine not run timer error EGT_CED_B1S1_LostCommFA EGT_CED_B1S1_HiFA EGT_CED_B1S1_LoFA EGT_QED_B1S1_FA	1.00 [Boolean] ==FALSE ==TRUE ==FALSE > -10.00 2.00 ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE ==FALSE ==TRUE	2.00 fail samples out of 2.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					EGT_TempAvgVld EnginnotruntimerFA A calibratable delay time for the sensor initialization shall be elapsed	==FALSE ==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 2 key-on monitoring	P113C	This function has the purpose of warn the system/driver that the EGT sensor is malfunctioning (the EGT sensor read at key on is not comparable with the other system temperature at the beginning of the driving cycle).	The absolute difference between the EGT average and EGT temperature at key on in case block heater detectect a different threshold shall be use	>20.00 [°C] >25.00	Monitor enabled by dedicated calibration AND DiagSystemDsbl AND RunCrankIgnInRang AND Key-on Report done AND Ambient temperature greater than a calibration with hysteresis no out of range hi/low, lost comm and quick change error No engine not run timer error EGT_CED_B1S2_LostCommFA EGT_CED_B1S2_HiFA EGT_CED_B1S2_LoFA EGT_QED_B1S2_FA	1.00 [Boolean] ==FALSE ==TRUE ==FALSE > -15.00 2.00 ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE ==FALSE ==TRUE	2.00 fail samples out of 2.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					EGT_TempAvgVld EnginnotruntimerFA	==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 3 key-on monitoring	P113D	This function has the purpose of warn the system/driver that the EGT sensor is malfunctioning (the EGT sensor read at key on is not comparable with the other system temperature at the beginning of the driving cycle).	The absolute difference between the EGT average and EGT temperature at key on in case block heater detectect a different threshold shall be use	>20.00 [°C] >20.00	Monitor enabled by dedicated calibration AND DiagSystemDsbl AND RunCrankIgnInRang AND Key-on Report done AND Ambient temperature greater than a calibration with hysteresis no out of range hi/low, lost comm and quick change error No engine not run timer error EGT_CED_B1S3_LostCommFA EGT_CED_B1S3_HiFA EGT_CED_B1S3_LoFA EGT_QED_B1S3_FA	1.00 [Boolean] ==FALSE ==TRUE ==FALSE > -20.00 2.00 ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE ==FALSE ==TRUE	2.00 fail samples out of 2.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					EGT_TempAvgVld	==FALSE		
					EnginnotruntimerFA	==TRUE		
					A calibratable delay time for the sensor initialization shall be elapsed			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 4 key-on monitoring	P113E	This function has the purpose of warn the system/driver that the EGT sensor is malfunctioning (the EGT sensor read at key on is not comparable with the other system temperature at the beginning of the driving cycle).	The absolute difference between the EGT average and EGT temperature at key on in case block heater detectect a different threshold shall be use	>20.00 [°C] >20.00	Monitor enabled by dedicated calibration AND DiagSystemDsbl AND RunCrankIgnInRang AND Key-on Report done AND Ambient temperature greater than a calibration with hysteresis no out of range hi/low, lost comm and quick change error No engine not run timer error EGT_CED_B1S4_LostCommFA EGT_CED_B1S4_HiFA EGT_CED_B1S4_LoFA EGT_QED_B1S4_FA	1.00 [Boolean] ==FALSE ==TRUE ==FALSE > -20.00 2.00 ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE ==FALSE ==TRUE	2.00 fail samples out of 2.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					EGT_TempAvgVld EnginnotruntimerFA A calibratable delay time for the sensor initialization shall be elapsed	==FALSE ==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 5 key-on monitoring	P113F	This function has the purpose of warn the system/driver that the EGT sensor is malfunctioning (the EGT sensor read at key on is not comparable with the other system temperature at the beginning of the driving cycle).	The absolute difference between the EGT average and EGT temperature at key on in case block heater detectect a different threshold shall be use	>20.00 [°C] >20.00	Monitor enabled by dedicated calibration AND DiagSystemDsbl AND RunCrankIgnInRang AND Key-on Report done AND Ambient temperature greater than a calibration with hysteresis no out of range hi/low, lost comm and quick change error No engine not run timer error EGT_CED_B1S5_LostCommFA EGT_CED_B1S5_HiFA EGT_CED_B1S5_LoFA EGT_QED_B1S5_FA	1.00 [Boolean] ==FALSE ==TRUE ==FALSE > -20.00 2.00 ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE ==FALSE ==TRUE	2.00 fail samples out of 2.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					EGT_TempAvgVld EnginnotruntimerFA A calibratable delay time for the sensor initialization shall be elapsed	==FALSE ==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 0 2 Reference Voltage Circuit	P115E	This diagnosis verifies Engine Out NOx Sensor 0 2 binary reference voltage pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 0 2 Binary reference voltage (P+ pin)	open circuit on P+ pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 0 2 Reference Voltage Circuit Low Voltage	P115F	This diagnosis verifies Engine Out NOx Sensor binary reference voltage pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 0 2 Binary reference voltage (P+ pin)	groundshort on P+ pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 0 2 Reference Voltage Circuit High Voltage	P1160	This diagnosis verifies Engine Out NOx Sensor binary reference voltage pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 0 2 Binary reference voltage (P+ pin)	powershort on P+ pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 0 2 Signal Circuit	P116A	This diagnosis verifies Engine Out NOx Sensor linear lambda circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 0 2 Linear pin (P-)	open circuit on P- pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 O2 Signal Circuit Low Voltage	P116B	This diagnosis verifies Engine Out NOx Sensor linear lambda circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 O2 Linear pin (P-)	groundshort on P- pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 O2 Signal Circuit High Voltage	P116C	This diagnosis verifies Engine Out NOx Sensor linear lambda circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 O2 Linear pin (P-)	powershort on P- pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 O2 Pump Current Control Circuit	P116D	This diagnosis verifies Engine Out NOx Sensor O2 reference circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 O2 Reference pin(M1, auxiliary pumping current)	open circuit on M1 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 0 2 Pump Current Control Circuit Low Voltage	P116E	This diagnosis verifies Engine Out NOx Sensor 0 2 reference circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 0 2 Reference pin (M1, auxiliary pumping current)	groundshort on M1 pin	Powertrain relay voltage	>11.00V	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					CAN_InvalidDataFlt_BusB_NOxSnsr_A	FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 0 2 Pump Current Control Circuit High Voltage	P116F	This diagnosis verifies Engine Out NOx Sensor 0 2 reference circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 0 2 Reference pin (M1, auxiliary pumping current)	powershort on M1 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Temperature Not Plausible	P118B	This diagnosis detects a soot sensor temperature sensor damaged or a possible parassitic resistance on the wiring harness between the soot sensor heater and the soot sensor control unit	The absolute value of the difference between the soot sensor electrode temperature at power-up and the average of temperature sensors (EGT_Avg)	> 30.00 °C	Key is turned on		No time debounce	Type B, 2 Trips
					Ignition voltage in range	> 11.00		
					Soot Sensor bus relay is commanded on			
					No electrical fault active on Soot Sensor bus relay	NOT(SBR_RlyFA)		
					No faults of CAN communication loss with Soot Sensor	NOT(U02A3)		
					No Soot Sensor supply undervoltage detected, i.e. supply sensor voltage for a time	> 9.00 V > 0.10s		
					No electrical fault detected on Soot Sensor	NOT(SOT_ElecIFlt)		
					If enabled, the Soot Sensor temperature circuit low and high monitoring reported a test pass	TPTKO on P1477 TPTKO on P1478		
					Ambient Air pressure	>70.00 KPa		
					Ambient air pressure sensor not faulty	AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd		
					Temperature stored at last sensor power up is still reliable			
					Timer since Soot Sensor heating off is not affected	NOT(ModuleOflTimeErr)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					by error on module off timer			
					Calculation of the reference temperature at system start up is valid:	EGT_TempAvgVld		
					Minimum time from the previous key off to enable the reference temperature calculation	> 28,800.00		
					Diagnostic has not yet reported a pass or failure	NOT (TPTKO OR TFTKO) on P118B		
					Transmission fault with sensor control unit not present	NOT(P30BC)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 1	P118E	This function has the purpose of warning the system/driver that the exhaust gas temperature sensor reading for the 1st sensor on the 1st bank is not reliable, while engine running conditions have been met. The strategy compares the sensor reading with a reference modeled value; a fault condition is detected if the average deviation over a defined monitoring window exceeds a certain threshold on a certain number of samples. The monitor is expected to run continuously, once the enabling conditions are verified. In order to detect the fault in a robust way, it is needed to run the check when stationary conditions are met, the modeled temperature is reliable and there no particular combustion/ operating conditions that would prevent from correctly predict and model the sensor reading.	In order to give a fail, the mean difference bewteen sensed information and modeled signal, evaluated on a defined window, shall exceed a dedicated threshold.	Window length: 4.00 Diagnostic threshold: 200.00	No faults affecting the exhaust gas temperature model estimation Modeled temperature information in range Engine run time greater than a threshold Exhaust gas flow rate upstream the temperature sensor in range Exhaust gas flow rate variation less than a therhsold and then not exceeding an high hysteresis margin for a minimum time Run crank ignition in range Diagnostic system not disabled No fault active conditions detected on the sensor No error conditions affecting the sensor	Exhaust gas temperature sensor model fault = FALSE Modeled temperature > 130.00 and < 900.00 Engine run time > 210.00 Exhaust gas > 25.00 and < 900.00 Exhaust gas flow rate variation < 3.90 and then < 4.00 hysteresis) for a time > 17.00 Run crank ignition in range = TRUE Diagnostic system disabling = FALSE EGT_QED_B1S1_FA, EGT_KOD_B1S1_FA, EGT_CED_B1S1_HiFA, EGT_CED_B1S1_LoFA, EGT_CED_B1S1_LostCommFA and EGT_SRD_B1S1_FA = FALSE Quick change, key on rationality, electrical checks, stuck in range errors = FALSE	Fault validation on 6.00 fail sample over 8.00 samples. Debounce time increment every time an average value is available (4.00)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Diesel specific Reliable exhaust manifold pressure information Time after transition from each combustion mode greater than a dedicated threshold AND The combustion mode shall be suitable for running the monitor **Gasoline specific** Time after transition from GPF regeneration, scavenging and catalyst light-off greater than dedicated thresholds A calibratable delay time for the sensor initialization shall be elapsed	**Diesel specific** Exhaust manifold pressure reliability = TRUE Time after each combustion mode > **EGT_ERD_B1S1_CombModeDly** AND Current combustion mode enabling condition = **EGT_ERD_B1S1_CombModeEnbl** **Gasoline specific** Time after GPF regeneration > 900.00 Time after scavenging > 60.00 Time after catalyst light-off > 60.00 ==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 2	P118F	This function has the purpose of warning the system/driver that the exhaust gas temperature sensor reading for the 2nd sensor on the 1st bank is not reliable, while engine running conditions have been met. The strategy compares the sensor reading with a reference modeled value; a fault condition is detected if the average deviation over a defined monitoring window exceeds a certain threshold on a certain number of samples. The monitor is expected to run continuously, once the enabling conditions are verified. In order to detect the fault in a robust way, it is needed to run the check when stationary conditions are met, the modeled temperature is reliable and there no particular combustion/ operating conditions that would prevent from correctly predict and model the sensor reading.	In order to give a fail, the mean difference bewteen sensed information and modeled signal, evaluated on a defined window, shall exceed a dedicated threshold.	Window length: 4.00 Diagnostic threshold: 150.00	No faults affecting the exhaust gas temperature model estimation Modeled temperature information in range Engine run time greater than a threshold Exhaust gas flow rate upstream the temperature sensor in range Exhaust gas flow rate variation less than a therhsold and then not exceeding an high hysteresis margin for a minimum time Run crank ignition in range Diagnostic system not disabled No fault active conditions detected on the sensor No error conditions affecting the sensor	Exhaust gas temperature sensor model fault = FALSE Modeled temperature > 130.00 and < 900.00 Engine run time > 210.00 Exhaust gas > 25.00 and < 900.00 Exhaust gas flow rate variation < 9.90 and then < 10.00 hysteresis) for a time > 3.00 Run crank ignition in range = TRUE Diagnostic system disabling = FALSE EGT_QED_B1S2_FA, EGT_KOD_B1S2_FA, EGT_CED_B1S2_HiFA, EGT_CED_B1S2_LoFA, EGT_CED_B1S2_LostCommFA and EGT_SRD_B1S2_FA = FALSE Quick change, key on rationality, electrical checks, stuck in range errors = FALSE	Fault validation on 6.00 fail sample over 8.00 samples. Debounce time increment every time an average value is available (4.00)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Diesel specific Time after transition from each combustion mode greater than a dedicated threshold AND The combustion mode shall be suitable for running the monitor **Gasoline specific** Time after transition from GPF regeneration, scavenging and catalyst light-off greater than dedicated thresholds A calibratable delay time for the sensor initialization shall be elapsed	**Diesel specific** Time after each combustion mode > **EGT_ERD_B1S2_Comb ModeDly** AND Current combustion mode enabling condition = **EGT_ERD_B1S2_Comb ModeEnbl** **Gasoline specific** Time after GPF regeneration > 900.00 Time after scavenging > 60.00 Time after catalyst light-off > 60.00 ==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 0 2 Low Reference Circuit	P1192	This diagnosis verifies Engine Out NOx Sensor Low Reference Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 Low Reference pin (Ref)	open circuit on Ref pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 O2 Low Reference Circuit Low Voltage	P1193	This diagnosis verifies Engine Out NOx Sensor Low Reference Circuit for Short to Ground	Check if there is an short circuit to ground on NOx Sensor 1 Low Reference pin (Ref)	groundshort on Ref pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 0 2 Low Reference Circuit High Voltage	P1194	This diagnosis verifies Engine Out NOx Sensor Low Reference Circuit for Short to Battery	Check if there is an short circuit to power supply on NOx Sensor 1 Low Reference pin (Ref)	powershort on Ref pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 3	P1196	This function has the purpose of warning the system/driver that the exhaust gas temperature sensor reading for the 3rd sensor on the 1st bank is not reliable, while engine running conditions have been met. The strategy compares the sensor reading with a reference modeled value; a fault condition is detected if the average deviation over a defined monitoring window exceeds a certain threshold on a certain number of samples. The monitor is expected to run continuously, once the enabling conditions are verified. In order to detect the fault in a robust way, it is needed to run the check when stationary conditions are met, the modeled temperature is reliable and there no particular combustion/ operating conditions that would prevent from correctly predict and model the sensor reading.	In order to give a fail, the mean difference bewteen sensed information and modeled signal, evaluated on a defined window, shall exceed a dedicated threshold.	Window length: 4.00 Diagnostic threshold: 100.00	No faults affecting the exhaust gas temperature model estimation Modeled temperature information in range Engine run time greater than a threshold Exhaust gas flow rate upstream the temperature sensor in range Exhaust gas flow rate variation less than a therhsold and then not exceeding an high hysteresis margin for a minimum time Run crank ignition in range Diagnostic system not disabled No fault active conditions detected on the sensor No error conditions affecting the sensor	Exhaust gas temperature sensor model fault = FALSE Modeled temperature > 130.00 and < 900.00 Engine run time > 210.00 Exhaust gas > 25.00 and < 900.00 Exhaust gas flow rate variation < 29.00 and then < 30.00 hysteresis) for a time > 3.00 Run crank ignition in range = TRUE Diagnostic system disabling = FALSE EGT_QED_B1S3_FA, EGT_KOD_B1S3_FA, EGT_CED_B1S3_HiFA, EGT_CED_B1S3_LoFA, EGT_CED_B1S3_LostCommFA and EGT_SRD_B1S3_FA = FALSE Quick change, key on rationality, electrical checks, stuck in range errors = FALSE	Fault validation on 6.00 fail sample over 8.00 samples. Debounce time increment every time an average value is available (4.00)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Diesel specific Time after transition from each combustion mode greater than a dedicated threshold AND The combustion mode shall be suitable for running the monitor **Gasoline specific** Time after transition from GPF regeneration, scavenging and catalyst light-off greater than dedicated thresholds AND A calibratable delay time for the sensor initialization shall be elapsed	**Diesel specific** Time after each combustion mode > **EGT_ERD_B1S3_Comb ModeDly** AND Current combustion mode enabling condition = **EGT_ERD_B1S3_Comb ModeEnbl** **Gasoline specific** Time after GPF regeneration > 900.00 Time after scavenging > 60.00 Time after catalyst light-off > 60.00 ==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 4	P1197	This function has the purpose of warning the system/driver that the exhaust gas temperature sensor reading for the 4th sensor on the 1st bank is not reliable, while engine running conditions have been met. The strategy compares the sensor reading with a reference modeled value; a fault condition is detected if the average deviation over a defined monitoring window exceeds a certain threshold on a certain number of samples. The monitor is expected to run continuously, once the enabling conditions are verified. In order to detect the fault in a robust way, it is needed to run the check when stationary conditions are met, the modeled temperature is reliable and there no particular combustion/ operating conditions that would prevent from correctly predict and model the sensor reading.	In order to give a fail, the mean difference bewteen sensed information and modeled signal, evaluated on a defined window, shall exceed a dedicated threshold.	Window length: 4.00 Diagnostic threshold: 100.00	No faults affecting the exhaust gas temperature model estimation Modeled temperature information in range Engine run time greater than a threshold Exhaust gas flow rate upstream the temperature sensor in range Exhaust gas flow rate variation less than a therhsold and then not exceeding an high hysteresis margin for a minimum time Run crank ignition in range Diagnostic system not disabled No fault active conditions detected on the sensor No error conditions affecting the sensor	Exhaust gas temperature sensor model fault = FALSE Modeled temperature > 130.00 and < 900.00 Engine run time > 300.00 Exhaust gas > 25.00 and < 900.00 Exhaust gas flow rate variation < 29.00 and then < 30.00 hysteresis) for a time > 3.00 Run crank ignition in range = TRUE Diagnostic system disabling = FALSE EGT_QED_B1S4_FA, EGT_KOD_B1S4_FA, EGT_CED_B1S4_HiFA, EGT_CED_B1S4_LoFA, EGT_CED_B1S4_LostCommFA and EGT_SRD_B1S4_FA = FALSE Quick change, key on rationality, electrical checks, stuck in range errors = FALSE	Fault validation on 6.00 fail sample over 8.00 samples. Debounce time increment every time an average value is available (4.00)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Time after transition from each combustion mode greater than a dedicated threshold AND The combustion mode shall be suitable for running the monitor AND A calibratable delay time for the sensor initialization shall be elapsed	Time after each combustion mode > **EGT_ERD_B1S4_Comb ModeDly** AND Current combustion mode enabling condition = **EGT_ERD_B1S4_Comb ModeEnbl** ==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 5	P1198	This function has the purpose of warning the system/driver that the exhaust gas temperature sensor reading for the 5th sensor on the 1st bank is not reliable, while engine running conditions have been met. The strategy compares the sensor reading with a reference modeled value; a fault condition is detected if the average deviation over a defined monitoring window exceeds a certain threshold on a certain number of samples. The monitor is expected to run continuously, once the enabling conditions are verified. In order to detect the fault in a robust way, it is needed to run the check when stationary conditions are met, the modeled temperature is reliable and there no particular combustion/ operating conditions that would prevent from correctly predict and model the sensor reading.	In order to give a fail, the mean difference bewteen sensed information and modeled signal, evaluated on a defined window, shall exceed a dedicated threshold.	Window length: 4.00 Diagnostic threshold: 100.00	No faults affecting the exhaust gas temperature model estimation Modeled temperature information in range Engine run time greater than a threshold Exhaust gas flow rate upstream the temperature sensor in range Exhaust gas flow rate variation less than a therhsold and then not exceeding an high hysteresis margin for a minimum time Run crank ignition in range Diagnostic system not disabled No fault active conditions detected on the sensor No error conditions affecting the sensor	Exhaust gas temperature sensor model fault = FALSE Modeled temperature > 130.00 and < 900.00 Engine run time > 210.00 Exhaust gas > 25.00 and < 900.00 Exhaust gas flow rate variation < 29.00 and then < 30.00 hysteresis) for a time > 3.00 Run crank ignition in range = TRUE Diagnostic system disabling = FALSE EGT_QED_B1S5_FA, EGT_KOD_B1S5_FA, EGT_CED_B1S5_HiFA, EGT_CED_B1S5_LoFA, EGT_CED_B1S5_LostCommFA and EGT_SRD_B1S5_FA = FALSE Quick change, key on rationality, electrical checks, stuck in range errors = FALSE	Fault validation on 6.00 fail sample over 8.00 samples. Debounce time increment every time an average value is available (4.00)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Time after transition from each combustion mode greater than a dedicated threshold AND The combustion mode shall be suitable for running the monitor AND A calibratable delay time for the sensor initialization shall be elapsed	Time after each combustion mode > **EGT_ERD_B1S5_Comb ModeDly** AND Current combustion mode enabling condition = **EGT_ERD_B1S5_Comb ModeEnbl** ==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Signal Circuit	P119A	This diagnosis verifies Engine Out NOx Sensor NOx Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 NOx-related measurement pin (M2)	open circuit on M2	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Signal Circuit Low Voltage	P119B	This diagnosis verifies Engine Out NOx Sensor NOx Circuit for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 NOx-related measurement pin (M2)	groundshort on M2 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Signal Circuit High Voltage	P119C	This diagnosis verifies Engine Out NOx Sensor NOx Circuit for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 NOx-related measurement pin (M2)	powershort on M2 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Signal Circuit	P119D	This diagnosis verifies Post Catalyst NOx Sensor NOx Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 NOx-related measurement pin (M2)	open circuit on M2 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Signal Circuit Low Voltage	P119E	This diagnosis verifies Post Catalyst NOx Sensor NOx Circuit for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 NOx-related measurement pin (M2)	groundshort on M2 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Signal Circuit High Voltage	P119F	This diagnosis verifies Post Catalyst NOx Sensor NOx Circuit for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 NOx-related measurement pin (M2)	powershort on M2 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 0 2 Reference Voltage Circuit	P11BE	This diagnosis verifies Post Catalyst NOx Sensor binary reference voltage pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 0 2 Binary reference voltage (P+ pin)	open circuit on P+ pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 O2 Reference Voltage Circuit Low Voltage	P11BF	This diagnosis verifies Post Catalyst NOx Sensor binary reference voltage pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 O2 Binary reference voltage (P+ pin)	groundshort on P+ pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 0 2 Reference Voltage Circuit High Voltage	P11C0	This diagnosis verifies Post Catalyst NOx Sensor binary reference voltage pin for Short to Battery	Check if there is an short circuit to power supply on NOx Sensor 2 0 2 Binary reference voltage (P+ pin)	powershort on P+ pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Ground Circuit	P11C5	This diagnosis verifies Engine Out NOx Sensor heater ground circuit open	Check if there is an open circuit on NOx Sensor 1 heater reference pin (H-)	open circuit on H- pin	Sensor Heater type is high side		Time counter: 80 fails out of 160 samples Task=25ms	Type A, 1 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					CAN_InvalidDataFlt_BusB_NOxSnsr_A	FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Ground Circuit High Voltage	P11C6	This diagnosis verifies Engine Out NOx Sensor heater ground circuit Short to Battery	Check if there is short circuit to power supply on NOx Sensor 1 heater reference pin (H-)	powershort on H-	Sensor Heater type is high side		Time counter: 80 fails out of 160 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					CAN_InvalidDataFlt_BusB_NOxSnsr_A	FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Ground Circuit	P11C7	This diagnosis verifies Post Catalyst NOx Sensor heater ground circuit open	Check if there is an open circuit on NOx Sensor 2 heater reference pin (H-)	open circuit on H- pin	Sensor Heater type is high side Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range CAN_InvalidDataFlt_BusB_NOxSnsr_B	 >11.00V TRUE FALSE > 9.90 V FALSE	Time counter: 80 fails out of 160 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Ground Circuit High Voltage	P11C8	This diagnosis verifies Post Catalyst NOx Sensor heater ground circuit Short to Battery	Check if there is a short circuit to power on NOx Sensor 2 heater reference pin (H-)	powershort on H- pin	Sensor Heater type is high side		Time counter: 80 fails out of 160 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					CAN_InvalidDataFlt_BusB_NOxSnsr_B	FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 0 2 Signal Circuit	P11D0	This diagnosis verifies Post Catalyst NOx Sensor 0 2 reference circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 0 2 Linear pin (P-)	open circuit on P-	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 0 2 Signal Circuit Low Voltage	P11D1	This diagnosis verifies Post Catalyst NOx Sensor linear lambda circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 0 2 Linear pin (P-)	groundshort on P- pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 0 2 Signal Circuit High Voltage	P11D2	This diagnosis verifies Post Catalyst NOx Sensor linear lambda circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 0 2 Linear pin (P-)	powershort on P- pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Offset Learning At Min Limit - Bank 1 Sensor 1	P11D3	This diagnosis verifies if Engine Out NOx Sensor raw signal is affected by an offset	Check if NOx1 signal has an offset by learning the raw value in stable conditions during fuel cut off maneuver. A fault is detected if one of the following conditions is true: 1. Mean of all NOx Sensor readings (where every reading is the mean value of a sampling window) OR 2. Mean of all NOx Sensor readings (where every reading is the mean value of a sampling window)	< -57.20 ppm > 130.00 ppm	Combustion mode dependent enabling flag Engine is running Engine is not cranking Powertrain relay voltage NOx Sensor Bus relay is commanded ON Engine Out NOx Sensor is present in the exhaust Sensor heater is in range: a) (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence b) condition a) is fulfilled for time Sensor supply in range Sensor dewpoint is reached EGR measured position Exhaust mass flow is within a range DEF injection is within a range Engine speed is within a range Engine Out NOx Sensor	**NOX_S1_OfstMntrEnblCmbMode** TRUE TRUE >11.00V TRUE TRUE < 0.03% >-0.03% > 10.00 sec > 9.90 V TRUE < 100.00% < 400.00 g/s > 0.00 g/s < 700.00 mg/s > -1.00 mg/s < 4,500.00 rpm > 550.00 rpm < 325.00 °C > -20.00 °C	The monitor runs after fuel cut off maneuver, when air mass integral exceeds 55.00 g and Engine Out NOx signal is stable for at least 0.00 s. The NOx value used for the monitor is calculated after sampling up to 5.00 sampling windows (each one made up of 5.00 samples), averaging the mean values of every window. Once computed this value, the diagnostic provides a result. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					temperature is within a range			
					Fuel request is steady state when all the following conditions are verified: a) Fuel request derivative b) Fuel request within a range c) conditions a) and b) are fulfilled for a time	< 20.00 mm^3/s < 0.00 mm^3 > -1.00 mm^3 > 2.00 s		
					Intake manifold absolute pressure	< 1,000.00 kPa		
					No failure on intake manifold absolute pressure Sensor	MAP_SensorFA==FALSE		
					No electrical failure on NOx1 Sensor	NOX_Snsr1_FltSt ==FALSE		
					No current control failure on NOx1 Sensor	NOX_NOx1_StBitChkFlt ==FALSE		
					No out of range low failure on NOx1 Sensor	NOX_NOx1_OutOfRngLoFit ==FALSE		
					No out of range high failure on NOx1 Sensor	NOX_NOx1_OutOfRngHiFit ==FALSE		
					No failure on NOx1 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_A ==FALSE		
					No invalid data failure on NOx1 CAN frames	CAN_InvalidDataFlt_BusB_NOxSnsr_A == FALSE		
						EGR_PstnShtOffReqFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No failure on EGR valve actuator No failure on high pressure fuel rail system No failure on injectors No fault on any exhaust mass flow model input No failure on air control system No failure on NOx Sensor Bus relay circuit No failure on Upstream SCR temperature Sensor DFCO by-pass not enabled	FHPJnjLeakage ==FALSE FUL_GenericInjSysFlt ==FALSE EXM_TurbFlowNotValid ==FALSE AIC.AirShtOffReq ==FALSE SBR_RlyFA==FALSE NOX_Snsr1_TempFlt ==FALSE TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Offset Learning At Min Limit - Bank 1 Sensor 2 - Single DEF - EWMA not enabled	P11D5	This diagnosis verifies if Post Catalyst NOx Sensor raw signal is affected by an offset Use this section if EWMA filter is not enabled (1.00 == 0 [Boolean]).	Check if NOx2 signal has an offset by learning the raw value in stable conditions during afterrun maneuver. The diagnosis result is the average value of a sampling window. A fault is detected if one of the following conditions is true: 1. NOx raw average value OR 2. NOx raw average value	 < -30 ppm > 134 ppm	No failure on upstream SCR temperature Sensor No failure on Vehicle Speed Sensor No failure on SCR system No failure on HC injector No failure on NOx Sensor Bus relay circuit No failure on downstream SCR HC model inputs No failure on DEF system No 0 2 plausibility in load fault on NOx2 No failure on NOx2 CAN communication No electrical failure on NOx2 Sensor No out of range low failure on NOx2 Sensor No out of range high failure on NOx2 Sensor No current control failure	EGT_TempSCR_UpFlt ==FALSE VehicleSpeedSensor_FA ==FALSE EXF_TotExhSCR_UpFlt ==FALSE HCI_GenericShtOffReq ==FALSE SBR_RlyFA ==FALSE SCR_HC_SCR_DwnFlt ==FALSE SCR_DEFSysFlt_IUPR_DenDsbl ==FALSE OXY_NOx2ChkLoadFlt ==FALSE CAN_LostComm_FltN_BusB_NOxSnsr_B ==FALSE N0X_Snsr2_FltSt ==FALSE NOX_NOx2_OutOfRngLoFit ==FALSE NOX_NOx2_OutOfRngHiFit ==FALSE N0X_N0x2_StBitChkFlt	The monitor runs in afterrun, at 150 s after keyoff, once NOx2 Self Test diagnostic has been completed. The NOx value used for the monitor is calculated by sampling up to 100 samples. Once computed this value, the diagnostic provides a result. Test per trip: 1 Task = 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					on NOx2 Sensor	==FALSE		
					No invalid data failure on NOx2 CAN frames	CAN_InvalidDataFlt_BusB_NOxSnsr_B == FALSE		
					Powertrain relay voltage	> 11.00V		
						< 0.03% > - 0.03 %		
					Sensor heater is in range: a) (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence	> 45 s		
					b) condition a) is fulfilled for time	> 9.90 V		
						TRUE		
					Sensor supply in range			
						TRUE		
					Sensor dewpoint is reached	> 5 s		
					c) Sensor signal status is valid	TRUE		
					d) condition c) is fulfilled for time	TRUE		
						NOX_S2_OfstMntrEnblCmbMode		
					Post Catalyst NOx Sensor is present in the exhaust			
						> 15 s		
					Engine is not cranking			
					e) combustion mode dependent enabling flag	> 0rpm < 4.500 rpm		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					f) condition e) is fulfilled for time	> 1 s		
					g) engine speed	> Os		
					h) condition g) is fulfilled for time	> 180 °C < 300 °C		
					i) After injection pulse is not used for time	> Og/s < 400 g/s		
					j) upstream SCR temperature is in range	> 60s		
					k) exhaust mass flow is in range	>= Omg/s < 350mg/s		
					l) conditions]) k) are fulfilled for time	>= Omg/s < 350mg/s		
					m1) DEF1 injection is in range	> 0 s		
					m2) DEF2 injection (if present) is in range	< 100%		
					m) conditions m1) m2) are fulfilled for time	> 0 s		
					n) duty cycle applied to the HC injector driver	> 300 s		
					o) condition n) is fulfilled for time	< 2.50m/s^2		
					p) time between key off and last regen event			
					q) deceleration before kevoff	< 5koh		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						< 10kph		
					r) condition q) could be ignored if idle vehicle condition s.x) is fulfilled	> 1 s		
					s.1) vehicle speed in idle range	< 450 s		
					s.2) condition s.1) fulfilled for time	< 3 °C/s		
					t) idle before keyoff for a time	> Os		
					u) Upstream SCR temperatures derivative in range	< 3 °C/s		
					v) condition u) is fulfilled for a time	> 120s		
					w) upstream SCR temperature derivative overcomes threshold			
					x) condition w) has expired for a time	>0 s		
					timers of conditions v), x) are reset when condition w) is verified			
					y1) debounce time after last DEF RDP event on first injector elapsed before keyoff	TRUE		
						>= 1		
					z) DEF system ready to inject			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					z1) Number of DPF regeneration events successfully completed after vehicle extis from assembly plant (SCR catayst de-greened); z2) condition z1) is used only if KeNOXD_b_S2_Ofst_SCR_GreenCond is True A) In case of DEF Tank partially frozen or system in transient dosing, the following conditions is used, as well: A1) alpha ratio B) in case system comes out from condition A) during the driving cycle, then, time passed at key-off C) DEF strategy for emission reduction inhibition is not requested in case of DPF clogging Once all conditions above are fulfilled during the driving cycle, sensor raw signal average in a calibratable window is computed in afterrun when following conditions are fulfilled: D) stabilization timer to triqqer execution	KeNOXD_b_S2_Ofst_SCR_GreenCond = 1 >10.00 > 0 s TRUE > 150s TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					E) N0x2 Self Diag execution has been completed			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 0 2 Pump Current Control Circuit	P11D8	This diagnosis verifies Post Catalyst NOx Sensor 0 2 reference circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 0 2 Reference pin (M1, auxiliary pumping current)	open circuit on M1 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 O2 Pump Current Control Circuit Low Voltage	P11D9	This diagnosis verifies Post Catalyst NOx Sensor O2 reference circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 O2 Reference pin (M1, auxiliary pumping current)	groundshort on M1 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 O2 Pump Current Control Circuit High Voltage	P11DA	This diagnosis verifies Post Catalyst NOx Sensor O2 reference circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 O2 Reference pin (M1, auxiliary pumping current)	powershort on M1 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 0 2 Low Reference Circuit	P11FC	This diagnosis verifies Post Catalyst NOx Sensor Low Reference Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 Low Reference pin (Ref)	open circuit on Ref pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 0 2 Low Reference Circuit Low Voltage	P11FD	This diagnosis verifies Post Catalyst NOx Sensor Low Reference Circuit for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 Low Reference pin (Ref)	groundshort on Ref pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 0 2 Low Reference Circuit High Voltage	P11FE	This diagnosis verifies Post Catalyst NOx Sensor Low Reference Circuit for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 Low Reference pin (Ref)	powershort on Ref pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Supply Circuit	P122B	This monitor checks if the Throttle DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Control Circuit Shorted	P122C	This monitor checks if the Throttle commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 9 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Position Sensor Exceeded Learning Limit (SENT position sensor)	P122D	This monitor checks if the Throttle position SENT sensor has an offset with respect to the nominal position where the valve does the learning procedure (fully closed)	SENT position raw voltage when the valve is in fully closed position < low threshold OR SENT position raw voltage when the valve is in fully closed position > high threshold OR SENT position raw voltage when the valve is in wide open position < low threshold OR SENT position raw voltage when the valve is in wide open position > high threshold	< 85.00 [%5V] OR > 94.00 [%5V] < 80.00 [%5V] OR > 100.00 [%5V]	Test enabled by calibration Key signal is off Learning procedure at key off in fully closed and/or wide open positions have been successfully completed: - engine coolant temperature - no faults present on coolant temperature sensor - outside air temperature - no faults present on outside air temperature sensor - PT relay supply voltage No faults present on Throttle position sensor, Throttle valve, Throttle position deviation. End Of Trip event has elapsed	==1.00 >=30.00 [°C] <=150.00 [°C] ECT_Sensor_FA == FALSE >= -40.00 [°C] OAT_PtEstFiltFA == FALSE > 5.00 [V] TPS_PstnSnsrCktFlt== FALSE TPS_ActrFA == FALSE TPS_PstnDvtnFA == FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 Positive Voltage Control Circuit Shorted to Control Circuit	P1248	This DTC detects a shorted load on Injector 1	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 2 Positive Voltage Control Circuit Shorted to Control Circuit	P1249	This DTC detects a shorted load on Injector 2	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector3 Positive Voltage Control Circuit Shorted to Control Circuit	P124A	This DTC detects a shorted load on Injector 3	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderH and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderH	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 4 Positive Voltage Control Circuit Shorted to Control Circuit	P124B	This DTC detects a shorted load on Injector 4	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderE and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderE	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector5 Positive Voltage Control Circuit Shorted to Control Circuit	P124C	This DTC detects a shorted load on Injector 5	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 6 Positive Voltage Control Circuit Shorted to Control Circuit	P124D	This DTC detects a shorted load on Injector 6	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 7 Positive Voltage Control Circuit Shorted to Control Circuit	P124E	This DTC detects a shorted load on Injector 7	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderC and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderC	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector8 Positive Voltage Control Circuit Shorted to Control Circuit	P124F	This DTC detects a shorted load on Injector 8	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderD and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR CylinderD	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Supply Circuit	P1402	This monitor checks if the HP EGR DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration	==1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Control Circuit Shorted	P1407	This monitor checks if the HP EGR commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Current Range/ Performance	P140F	This monitor checks if an excessive current flows through the HP EGR DC-Motor (e.g. shunt circuit between load, HP EGR DC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 6.3 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on HP EGR DC Motor current range/performance H-Bridge driver is ON Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V] EGR.MtrCurrLimTFTKO ==FALSE	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Control Circuit Shorted (ECB DC Motor)	P1413	This monitor checks if the HP EGR cooler bypass valve commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	==1.00 > 11.00 [V]	106.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Current Range/ Performance (ECB DC Motor)	P1414	This monitor checks if an excessive current flows through the HP EGR cooler bypass DC-Motor (e.g. shunt circuit between load, HP EGR cooler bypass DC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 6.3 [A]	Test enabled by calibration	==1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					No faults present on HP EGR Cooler Bypass DC Motor current range/ performance	CEB_MtrCurrLimTFTKO == FALSE		
					H-Bridge driver is ON			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Motor Overtemperature	P1425	This monitor checks if the temperature of the Throttle DC-Motor increases too much (e.g. Throttle DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Supply Circuit (ECB DC Motor)	P1438	This monitor checks if the HP EGR cooler bypass DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	==1.00 > 11.00 [V]	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Closed Loop Particulate Filter Regeneration Control At Limit - Stage 2 Temperature Too Low	P144E	HC Injector Control Temperature Deviation diagnostic monitors the exhaust gas temperature Upstream the DPF to determine whether the temperature deviation between the control setpoint and the temperature read by the sensor is within a prescribed deviation range. Temperature deviation diagnostic shall diagnose a too low temperature, that means a Positive temperature deviation temperature. The diagnosis runs during regeneration mode and when the temperature closed loop is active. The monitoring is divided into 2 logics, in particular the DPF warm up state logic, that has only the Positive deviation monitoring, and the DPF steady state logic, that has both deviation monitoring.	**Low Temperature monitoring (Positive Deviation):** Temperature DPF Upstream control setpoint - DPF upstream sensor reading (EGT4)	 >150.00 [degC]	Test enabled by calibration flag Regeneration state in warm up DPF Mode HCI temperature closed loop control shall be enabled Battery voltage No fault on exhaust mass flow No Fault on DPF upstream temperature sensor Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request Exhaust mass flow AND Exhaust mass flow Filtered Exhaust mass flow variation (absolute value)	1.00 [Boolean] ==TRUE DPF_DPF_St == WarmJJp EGT_HC_CL_Enbl [Boolean] ==TRUE > 11.00 [V] EXM_TurbFlowNotValid [Boolean] ==FALSE EGT_SnsrDPF_UpFlt [Boolean] ==FALSE **EnginePointEnable_HC_TempDeviation** [Boolean] < 250.00 [g/s] > 8.00 [g/s] < 100.00 [g/s]	3,750.00 fail samples out of 4,625.00 samples Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Time in which the system is in cut off	<= 30.00 [sec]		
					All the above enabling conditions are met for at least a timer	> 10.00 [sec]		
			Low Temperature monitoring (Positive Deviation):		Test enabled by calibration flag	1.00 [Boolean] ==TRUE	3,750.00 fail samples out of 4,625.00 samples Function task: 100ms	
			Temperature DPF Upstream control setpoint - DPF upstream sensor reading (EGT4)	> 150.00 [degC]	Regeneration state in Steady state DPF Mode	DPF_DPF_St== Steady_state		
					HCI temperature closed loop control shall be enabled	EGT_HC_CL_Enbl [Boolean] ==TRUE		
					Battery voltage	> 11.00 [V]		
					No fault on exhaust mass flow	EXM_TurbFlowNotValid [Boolean] ==FALSE		
					No Fault on DPF upstream temperature sensor	EGT_SnsrDPF_UpFlt [Boolean] ==FALSE		
					Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request	**EnginePointEnable_HC_TempDeviation** [Boolean]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Exhaust mass flow AND Exhaust mass flow	< 250.00 [g/s] > 8.00 [g/s]		
					Filtered Exhaust mass flow variation (absolute value)	< 100.00 [g/s]		
					Time in which the system is in cut off	<= 30.00 [sec]		
					All the above enabling conditions are met for at least a timer	> 10.00 [sec]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Closed Loop Particulate Filter Regeneration Control At Limit - Stage 2 Temperature Too High	P144F	HC Injector Control Temperature Deviation diagnostic monitors the exhaust gas temperature Upstream the DPF to determine whether the temperature deviation between the control setpoint and the temperature read by the sensoris within a prescribed deviation range. Temperature deviation diagnostic shall diagnose a too high temperature, that means a Negative temperature deviation temperature. The diagnosis runs during regeneration mode and when the temperature closed loop is active. The monitoring runs only in DPF steady state logic.	**High Temperature monitoring (Negative Deviation):** Temperature DPF Upstream control setpoint - DPF upstream sensor reading (EGT4)	 < -100.00 [degC]	Test enabled by calibration flag Regeneration state in Steady state DPF Mode HCI temperature closed loop control shall be enabled Battery voltage No fault on exhaust mass flow No Fault on DPF upstream temperature sensor Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request Exhaust mass flow AND Exhaust mass flow Filtered Exhaust mass flow variation (absolute	1.00 [Boolean] ==TRUE DPF_DPF_St== Steady_state EGT_HC_CL_Enbl [Boolean] ==TRUE > 11.00 [V] EXM_TurbFlowNotValid [Boolean] ==FALSE EGT_SnsrDPF_UpFlt [Boolean] ==FALSE **EnginePointEnable_HC_TempDeviation** [Boolean] < 250.00 [g/s] > 8.00 [g/s] < 100.00 [g/s]	1,500.00 fail samples out of 1,850.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					value)			
					Time in which the system is in cut off	<= 30.00 [sec]		
					All the above enabling conditions are met for at least a timer	> 10.00 [sec]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Supply Voltage Circuit High	P1473	This diagnosis detects a short to power on the soot sensor voltage supply line	Soot Sensor Control Unit supply voltage	> 17.30 V OR < 8.40 V	Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor	 NOT(SBR_RlyFA) NOT(U02A3)	Time counter: 11.00 consecutive failures OR 11.00 failures out of 40.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Electrode Supply Circuit Low	P1475	This diagnosis detects a short to ground on the soot sensor electrode supply line	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Electrode supply voltage	U <41.55 V OR U > 49.72 V	Soot Sensor Control Unit conditions: Soot Sensor Electrode Voltage ON ECU conditions: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	 NOT(SBR_RlyFA) NOT(U02A3) NOT(P1473)	Time counter: 24.00 consecutive failures OR 24.00 failures out of 96.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Electrode Supply Circuit High	P1476	This diagnosis detects a short to power on the soot sensor electrode supply line	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Electrode supply voltage	> 2 V	Soot Sensor Control Unit conditions: Soot Sensor Electrode Voltage OFF ECU conditions: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply IDE monitors that run during sensor regeneration have completed a report and 41 seconds had passed from that event (Diagnostic is enabled also prior the execution of the sensor regeneration)	 NOT(SBR_RlyFA) NOT(U02A3) NOT(P1473)	Time counter: 23.00 consecutive failures OR 23.00 failures out of 92.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Shunt Circuit High Current	P147B	This diagnosis detects a no more efficient soot sensor	Soot Sensor Electrode raw current	>6.70	Soot Sensor bus relay is commanded on			Type B, 2 Trips
					No electrical fault active on Soot Sensor bus relay	NOT(SBR_RlyFA)		
					No faults of CAN communication loss with Soot Sensor	NOT (SOT_SootSnsr_SrlLcFA)		
					No electrical fault detected on Soot Sensor	NOT(SOT_EleclFlt)		
					Soot Sensor is in measurement phase or Shunt circuit diagnostic mode has been triggered			
					Soot Sensor Electrode current measurement enabled			
					Transmission fault with sensor control unit not present	NOT (SOT_SootSnsr_SrlFsFA)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sesnor Sensing Element Internal Supply Circuit High Voltage	P1497	This diagnosis detects internal errors to the IDE Supply voltage (SCU internal error)	IDE Supply voltage signal	<= 4.7 V	Soot Sensor bus relay is commanded on No Electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	 NOT(SBR_RlyFA) NOT (SOT_SootSnsr_SrlLcFA) NOT(P1473)	Time counter: 9.00 consecutive failures OR 9.00 failures out of 32.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Control Module Internal Supply Voltage Circuit	P1498	This diagnosis detects internal errors to the sensor Supply voltage (SCU internal error)	Sensor supply voltage (SRC Low voltage treshold) OR Sensor supply voltage (SRC High voltage treshold)	< 1.1 V >4.9 V	Soot sensor bus relay is commanded on for a time No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Engine is not in cranking phase	>(1.00) NOT(SBR_RlyFA) NOT (SOT_SootSnsr_SrlLcFA)	Time counter: 4.00 consecutive failures OR 4.00 failures out of 12.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor "A" Tampering Detected	P1981	This diagnosis detects any tampering of the IDE due to the installation of a fixed resistor in place of the electrode.	Difference between two raw IDE currents, read at the end of the regeneration phase at two different temperatures	< 0.50	Soot sensor bus relay is commanded on No electrical fault active on Soot sensor bus relay Soot sensor is in a regeneration state No electrical faults present on soot sensor No faults of CAN communication loss with Soot Sensor Transmission fault with sensor control unit not present Sensor Control Unit is transmitting the associated tampering currents	 NOT(SBR_RlyFA) NOT(SOT_ElecIFlt) NOT (SOT_SootSnsr_SrlLcFA) NOT (SOT_SootSnsr_SrlFsFA)	No fault maturation required	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Particulate Filter Efficiency Below Threshold Bank 1 - (EWMA filter used)	P2002	This diagnosis detects a cracked Diesel Particulate Filter	{The soot sensor current filtered by using EWMA filter is} OR {The soot sensor current filtered by using EWMA filter is AND - DPF Efficiency Below Threshold Bank 1 previously detected (TRUE -> fault active) }	>11.16 > 11.16 DPF_1DK_ModelNotVld ===TRUE	Test enabled by calibration Ignition voltage in range for a time Engine running or engine cranking or in auto-stop phase No faults on soot sensor and faults which inhibit sensor to stay in measurement Engine out soot model realiable Note: the not reliability shall be verified for 1 s before to be declared No faults on downstream DPF temperature sensor or model No faults on downstream DPF mass airflow No faults on engine out soot model Ambient temperature	1.00 ==TRUE > 0.00 [s] ==TRUE SOT_SootSnsrFlt ==FALSE EXM_PM_TurbFlowNotRlb ==FALSE SOT_ExhTempSootSnsrVld ==TRUE SOT_TotExhSootSnsrVld ==TRUE SOT_PM_DPF_UpFlt ==FALSE > -20.00 [°C]	Test per Trip: 1. If Fast Initial Response (FIR) mode is active then 2.00 tests per trip are allowed. If Rapid Response (RR) mode is active then 2.00 tests per trip are allowed. The signal for the monitor check is filtered by means of a first-order filter. The filter step change can assume the following values: - 0.90 if FIR is active - 0.74 if RR is active - 0.54 if neither FIR nor RR are active. Initial filter value: - 0.07 when FIR is activated - 0.07	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					During sensor measurement phase, Number of Autostop events	< 20.00 [Cnt]	when RR is activated	
					During sensor measurement phase, Duration of Autostop phase	< 200.00 [s]		
					During sensor measurement phase, no heavy transient manoeuvers detected , i.e. the maximum fuel request during a transient manoeuver is	<=150.00 [mm^3]		
					EWMA filter is enabled AND number of diagnostic run for driving cycle is	1.00 ==TRUE < 1 (when FIR and RR are not active) <1.00 (when FIR is active) < 1.00 (when RR is active) NOT (INM_EGR_RateNotVld)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					EGR rate signal not valid			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Particulate Filter Over Temperature Bank (DOC1 SCR _DOC2_DPF)(EGT5)	P200C	This diagnosis verify if the exahust gas temperature on DPF Downstream (EGT_DPF_Dwn) is above its maximum allowed temperature	**Excursion Event monitoring:** DPF Downstream Exhaust gas temperature	> 800.00 [°C]	Test enabled by calibration (TRUE-> enable FALSE -> disable) and with Battery voltage and with Engine running and with No fault on DPF Downstream Temperature sensor	1.00 [Boolean] > 11.00 [V] == TRUE [Boolean] EGT_SnsrDPF_DwnFlt [Boolean]	**In Normal mode:** 300.00 fail samples out of 450.00 samples Function task: 100ms	Type A, 1 Trips
			Extreme Event monitoring: DPF Downstream Exhaust gas temperature	> 900.00 [°C]	Test enabled by calibration (TRUE-> enable FALSE -> disable) and with Battery voltage and with Engine running and with	1.00 [Boolean] > 11.00 [V] == TRUE [Boolean] EGT_SnsrDPF_DwnFlt [Boolean]	50.00 fail samples out of 70.00 samples Function task: 100ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No fault on DPF Downstream Temperature sensor			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Catalyst System Over Temperature Bank 1 (DOC1_SCR_DOC2_DPF) (EGT2)	P200E	This diagnosis verify if the exahust gas temperature on ccDOC Downstream (EGT_DOC1_Dwn) is above its maximum allowed temperature	**Excursion Event monitoring:** Exhaust gas temperature on ccDOC Downstream	> 800.00 [°C]	Test enabled by calibration (TRUE-> enable FALSE -> disable) and with Battery voltage and with Engine running and with No fault on ccDOC Downstream Temperature sensor (EGT2)	1.00 > 11.00 == TRUE EGT_SnsrCatDwnFlt	**In Normal mode:** 300.00 fail samples out of 450.00 samples Function task: 100ms	Type A, 1 Trips
			Extreme Event monitoring: Exhaust gas temperature on ccDOC Downstream	> 900.00	Test enabled by calibration (TRUE-> enable FALSE -> disable) and with Battery voltage and with Engine running and with No fault on ccDOC Downstream	1.00 > 11.00 == TRUE EGT_SnsrCatDwnFlt	50.00 fail samples out of 70.00 samples Function task: 100ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Temperature sensor (EGT2)			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 2 out of range monitoring Low	P2032	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature velue in case of digital sensor) with a minimum threshold.	**Analog sensor:** The monitor compares the EGT 2 raw value (resistance value) with a minimum threshold; if this threshold is overcome, a OOR Low error is detected. **Digital termocouple sensor:** The monitor compares the EGT 2 raw value (temperature value) with a minimum threshold;	<1.00 [Ohm] <-72.80 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status Lost communication error AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail samples ove 25.00 rsamples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 2 out of range monitoring High	P2033	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature value in case of digital sensor) with a maximum threshold.	**Analog sensor:** The monitor compares the EGT 2 raw value (resistance value) with a maximum threshold; if this threshold is overcome, a OOR High error is detected. **Digital termocouple sensor:** The monitor compares the EGT 1 raw value (temperature value) with a maximum threshold;	>100,000,000.00 [Ohm] >1,289.85 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status Lost communication error AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail samples over 25.00 samples Function task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Temperature Sensor Circuit Range/ Performance Bank 1 Sensor 1	P2080	the test compare (the difference between a max temperature calculated for a calibratable time and the temperature at key on define after a calibratable soaking time) with a calibratable map function of temperature freezed at rising edge of the enabling condition met. if there difference is below this calibratalbe Map a issue is detected. The failure mode capable to detect is sensor out of the pipe, or information stuck for other motivation.	The difference between the max temperature calculated for a calibratable time and the temperature frozen after a soaking time is less	< **EGT_Bank1_Sensor1_Temp MAP**	Monitor enabled by dedicated calibration	1.00	no debounce	Type B, 2 Trips
					Engine in not run mode for a calibratale time	>7,200.00		
					Engine not run timer error	==FALSE		
					Diag system disable	==FALSE		
					Run cranck in range	==TRUE		
					Engine Run	==TRUE		
					No lost comm /check hi/ check low / quick change puntual errore present	==TRUE		
					Diagnosis not abborted	==TRUE		
					No report done	==TRUE		
					No Key on fault	EGT_KOD_B1S1_FA		
					No quick change fault	EGT_QED_B1S1_FA		
					no out of range high fault	EGT_CED_B1S1_HiFA		
					no out of range low fault	EGT_CED_B1S1_LoFA		
					no lost of comm fault	EGT_CED_B1S1_LostCommFA		
					no fault affected engine not run timer	==TRUE		
					AND			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					A calibratable delay time for the sensor initialization shall be elapsed	==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 1 quick change monitoring	P2081	This function has the purpose of warning the system/driver that EGT 1 sensor signal is varying too fast with respect to the expected signal dynamic. Failure modes: - Sensor internal malfunctions - Wiring harness deterioration - Connectors electrical issues	The Absolute EGT temperature sensor raw difference value	> 100.00 [°C]	Monitor enabled by dedicated calibration	1.00 [Boolean]	12.00 fail samples out of 25.00 samples Function task: 100ms	Type B, 2 Trips
					AND			
					RunCrankIgnInRang	==TRUE		
					AND			
					RunCrankActive	==TRUE		
					AND			
					DiagSystemDsbl	==FALSE		
					AND			
					EngModeCrank	==FALSE		
					AND			
					Lost Communication Error	==FALSE		
					AND			
					No electrical fault s affecting the sensor	EGT_ExhGas1_Flt		
					AND			
					Unfitered temperatature value	>=140.00 <=1,070.00		
					AND	==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					A calibratable delay time for the sensor initialization shall be elapsed			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Temperature Sensor Circuit Range/ Performance Bank 1 Sensor 2	P2084	the test compare (the difference between a max temperature calculated for a calibratable time and the temperature at key on define after a calibratable soaking time) with a calibratable map function of temperature freezed at rising edge of the enabling condition met. if there difference is below this calibratalbe Map a issue is detected. The failure mode capable to detect is sensor out of the pipe, or information stuck for other motivation.	The difference between the max temperature calculated for a calibratable time and the temperature frozen after a soaking time is less	< **EGT_Bank1_Sensor2_Temp MAP**	Monitor enabled by dedicated calibration Engine in not run mode for a calibratale time Engine not run timer error Diag system disable Run cranck in range Engine Run No lost comm /check hi/ check low / quick change puntual errore present Diagnosis not abborted No report done No Key on fault No quick change fault no out of range high fault no out of range low fault no lost of comm fault no fault affected engine not run timer AND	1.00 >7,200.00 ==FALSE ==FALSE ==TRUE ==TRUE ==TRUE ==TRUE ==TRUE EGT_KOD_B1S2_FA EGT_QED_B1S2_FA EGT_CED_B1S2_HiFA EGT_CED_B1S2_LoFA EGT_CED_B1S2_LostCommFA ==TRUE	no debounce	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					A calibratable delay time for the sensor initialization shall be elapsed	==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 2 quick change monitoring	P2085	This function has the purpose of warning the system/driver that EGT 2 sensor signal is varying too fast with respect to the expected signal dynamic. Failure modes: - Sensor internal malfunctions - Wiring harness deterioration - Connectors electrical issues	The Absolute EGT temperature sensor raw difference value	>100.00 [C]	Monitor enabled by dedicated calibration AND RunCrankIgnInRang AND RunCrankActive AND DiagSystemDsbl AND EngModeCrank AND Lost Communication Error AND No electrical fault affecting the sensor AND Unfiltered temperatature	1.00 [Boolean] ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE EGT_ExhGas2_Flt >= 140.00	12.00 fail samples out of 25.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND	<= 1,070.00		
					A calibratable delay time for the sensor initialization shall be elapsed	==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Aftertreatment Fuel Injector A Control Circuit/Open	P20CB	This diagnosis detects HC Injector Command/ Enable pin/wire in open circuit	HC injector HWIO Low Side Driver Open interface fault	=TRUE (i.e. If the voltage at the AUXINJ output in the OFF state stays below Volt (1.95 to 2.175V) and Volt (2.9 V to 3.2 V) for a time longer than tdiag (40ps to 70ps)	Test Enabled by calibration Powertrain relay voltage in range Diagnostic system not disabled HC Injector Enable (High Side) Driver commanded ON (i.e. closed) HC injector HWIO Low Side Driver Open interface is different from indeterminate	1.00 - - - -	19.00 failures over 25.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Aftertreatment Fuel Injector A Control Circuit Low	P20CD	This diagnosis detects a HC Injector Command pin /wire shortcut to ground	HC injector command driver HWIO Short To Ground interface fault Note: If DTC failed, it will be healed only after a calibratable counter --> KeHCIO_Cnt_ReqlnjEnblClsd (CALIBRAZIONE DA INSERIRE) <-- or after ECU Reset event	=TRUE (i.e If the voltage at the AUXINJ output in the OFF state stays below Vltvt (1,95V to 2,175V) for a time longer than tdiag (40ps to 70ps)	Test Enabled by calibration Powertrain relay voltage in range Diagnostic system not disabled HC injector HWIO command pin Short to Ground interface is different from indeterminate HC Injector Enable (High Side) Driver commanded ON (i.e. closed)	1.00	15.00 failures over 20.00 samples. 100 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Aftertreatment Fuel Injector A Control Circuit High	P20CE	This diagnosis detects HC Injector Command pin /wire shortcut to power supply	HC injector command driver HWIO Short To Power Supply interface fault	=TRUE (i.e. If the current through the AUXINJ output in the ON state is higher than Ioci (8Ato 11A) for a time longer than toc1 = 36ps OR If the current through the AUXINJ output in ON state is higher than Ioc2 (16 A to 22A)	Test Enabled by calibration Powertrain relay voltage in range Diagnostic system not disabled HC injector HWIO command pin Short to Power supply interface is different from indeterminate	1.00	17.00 failures over 23.00 samples. 100 ms/samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 1 Low Voltage	P2147	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 1 (injector 1 and 4)	Voltage high across High Side Driver of bank 1 (injector 1 and 4) during On state indicates short to ground	impedence between HS pin of injector 1 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 4 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR CylinderA OR FUL_OutEnblCyl_CiEPSR CylinderE) and (FUL_FuelInjectedCyl_CiEPSR CylinderA OR FUL_FuelInjectedCyl_CiEPSR CylinderE)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 1 High Voltage	P2148	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 1 (injector 1 and 4)	Voltage low across High side drive of bank 1 (injector 1 and 4) during off state indicates short to power	impedence between HS pin of injector 1 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 4 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR CylinderA OR FUL_OutEnblCyl_CiEPSR CylinderE) and (FUL_FuelInjectedCyl_CiEPSR CylinderA OR FUL_FuelInjectedCyl_CiEPSR CylinderE)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 2 Low Voltage	P2150	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 2 (injector 2 and 5)	Voltage high across High Side Driver of bank 2 (injector 2 and 5) during On state indicates short to ground	impedence between HS pin of injector 2 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 5 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR CylinderB OR FUL_OutEnblCyl_CiEPSR CylinderF) and (FUL_FuelInjectedCyl_CiEPSR CylinderB OR FUL_FuelInjectedCyl_CiEPSR CylinderF)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 2 High Voltage	P2151	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 2 (injector 2 and 5)	Voltage low across High side drive of bank 2 (injector 2 and 5) during off state indicates short to power	impedence between HS pin of injector 2 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 5 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR CylinderB OR FUL_OutEnblCyl_CiEPSR CylinderF) and (FUL_FuelInjectedCyl_CiEPSR CylinderB OR FUL_FuelInjectedCyl_CiEPSR CylinderF)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 3 Low Voltage	P2153	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 3 (injector 6 and 7)	Voltage high across High Side Driver of bank 3 (injector 6 and 7) during On state indicates short to ground	impedence between HS pin of injector 6 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 7 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR CylinderG OR FUL_OutEnblCyl_CiEPSR CylinderC) and (FUL_FuelInjectedCyl_CiEPSR CylinderG OR FUL_FuelInjectedCyl_CiEPSR CylinderC)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 3 High Voltage	P2154	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 3 (injector 6 and 7)	Voltage low across High side drive of bank 3 (injector 6 and 7) during off state indicates short to power	impedence between HS pin of injector 6 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 7 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR CylinderG OR FUL_OutEnblCyl_CiEPSR CylinderC) and (FUL_FuelInjectedCyl_CiEPSR CylinderG OR FUL_FuelInjectedCyl_CiEPSR CylinderC)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 4 Low Voltage	P2156	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 4 (injector 3 and 8)	Voltage high across High Side Driver of bank 4 (injector 3 and 8) during On state indicates short to ground	impedence between HS pin of injector 3 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 8 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR CylinderH OR FUL_OutEnblCyl_CiEPSR CylinderD) and (FUL_FuelInjectedCyl_CiEPSR CylinderH OR FUL_FuelInjectedCyl_CiEPSR CylinderD)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 4 High Voltage	P2157	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 4 (injector 3 and 8)	Voltage low across High side drive of bank 4 (injector 3 and 8) during off state indicates short to power	impedence between HS pin of injector 3 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 8 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR CylinderH OR FUL_OutEnblCyl_CiEPSR CylinderD) and (FUL_FuelInjectedCyl_CiEPSR CylinderH OR FUL_FuelInjectedCyl_CiEPSR CylinderD)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Circuit Range/ Performance Bank 1 Sensor 1	P2201	This diagnosis verifies that Engine Out NOx Sensor embedded current control circuit status is healthy	Check if the NOx1 Sensor embedded stability criteria of Nox/Lambda current control circuit are violated NOx stability flag: (OFF_Time/TOTAL_time) Lambda stability flag: (OFF_Time/TOTAL_time) Note: TOTAL_time= ON_time +OFF_Time	Stability flag for NOx signal is set to OFF if one of the following condition is not fulfilled: a) V2 within an interval of 40mV around its set point b) Delta Ip2 <426nA/10msec c) Delta Ip1 < 2.34 uA aorund its set point Stability flag for Lambda signal is set to OFF if one of the following condition is not fulfilled: a) Delta IpO < 300 uA/10 msec b) Delta Ip1 < 2.34 uA around its set point > 0.50 % > 0.50 %	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Engine is not cranking Sensor dewpoint is reached Sensor heater is in range: a) (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence b) condition a) is fulfilled for time Engine is running No electrical failure on NOx1 Sensor Combustion mode dependent enabling flag Fuel request: a) fuel request derivative is within a range b) condition a) is fulfilled for time CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE TRUE < 0.03 % >- 0.03% > 10.00 sec TRUE NOX_Snsr1_FltSt ==FALSE **NOX_S1_StBitChkEnblCmbMode** <= 35.00 mm^3/s >= -50.00 mm^3/s >5.00 sec FALSE	NOx stability flag time counter: 2 fails out of 2 samples Lambda stability flag time counter: 2 fails out of 2 samples Task=12.5ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Circuit Low Bank 1 Sensor 1	P2202	This diagnosis verifies Engine Out NOx sensor read out of range low	Check if the NOx1 sensor NOx concentration raw read is out of lower range: NOx raw read	 <-90 ppm	Fuel injection quantity request Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx1 CAN communication Sensor supply in range Sensor dewpoint is reached No current control failure on NOx1 sensor No electrical failure on NOx1 sensor Combustion mode dependent enabling flag No invalid data failure on NOx1 CAN frames	>-1 mm^3 >11.00V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_A == FALSE > 9.90 V TRUE NOX_NOx1_StBitChkFlt ==FALSE NOX_Snsr1_ElecFA ==FALSE **NOX_S1_OutRngMinCmbMode** CAN_InvalidDataFlt_BusB_NOxSnsr_A == FALSE	Time counter: 100 fails out of 200 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Circuit High Bank 1 Sensor 1	P2203	This diagnosis verifies Engine Out NOx Sensor read out of range high	Check if the NOx1 Sensor NOx concentration raw read is out of higher range: NOx raw read	 >2,500 ppm	Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx1 CAN communication Sensor supply in range Sensor dewpoint is reached No current control failure on NOx1 Sensor No electrical failure on NOx1 Sensor Combustion mode dependent enabling flag Engine running for a time longer than No invalid data failure on NOx1 CAN frames Air system control is active	>11.00V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_A == FALSE > 9.90 V TRUE NOX_NOx1_StBitChkFlt ==FALSE NOX_Snsr1_FltSt ==FALSE **NOX_S1_OutRngMaxCmbMode** 0.00 s CAN_InvalidDataFlt_BusB_NOxSnsr_A == FALSE TRUE	Time counter: 200 fails out of 250 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Control Circuit	P2205	This diagnosis verifies Engine Out NOx Sensor Heater Control pin Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 Heater Control pin	open circuit on Heater Control pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V FALSE	Time counter: 80 fails out of 160 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Control Circuit Low Voltage	P2206	This diagnosis verifies Engine Out NOx Sensor Heater Control pin for Short to Ground	Check if there is an short circuit to ground on NOx Sensor 1 Heater Control pin	groundshort on Heater Control pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Control Circuit High Voltage	P2207	This diagnosis verifies Engine Out NOx Sensor Heater Supply pin for Short to Battery	Check if there is an short circuit to power supply on NOx Sensor 1 Heater Control pin	powershort on Heater Control pin	Powertrain relay voltage	>11.00V	Time counter: 80 fails out of 160 samples Task=25ms	Type B, 2 Trips
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					CAN_InvalidDataFlt_BusB_NOxSnsr_A	FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Sense Circuit	P2208	This diagnosis verifies Engine Out NOx Sensor Heater sense resistance measurement pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 Heater Sense pin (HTemp)	open circuit on HTemp pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Heater Sense Circuit Range/ Performance Bank 1 Sensor 1	P2209	This diagnosis verifies if the Engine Out NOx Sensor Heater raw resistance is in range	This diagnosis verifies if the Engine Out NOx Sensor Heater raw resistance is out of speficied range: (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence	>0.03 <- 0.03	Powertrain relay voltage CAN_LostComm_FltN_BusB_NOxSnsr_A NOx Sensor Bus relay is commanded ON Delay timer once sensor supply is in range (> 10.8 V) Delay timer once sensor dewpoint is reached Delay timer once engine is overrun a) Combustion mode dependent enabling flag b) condition a) is fulfilled for time CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V FALSE TRUE > 45 sec > 180 sec > 5 sec **NOX_S1_HtrPerfEnblCmbMode** > 0 sec FALSE	Time counter: 50 fails out of 100 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Supply Voltage Circuit Bank 1 Sensor 1	P220A	This diagnosis verifies if the supply voltage of the Engine Out Nox Sensor is out of range	Check if NOx Sensor 1 supply voltage status is out of range	Sensor supply voltage <9.90 V	Engine is running Powertrain relay voltage NOx Sensor Bus relay is commanded ON a) NOx Sensor Dewpoint is reached b) condition a) shall be fulfilled for time CAN_LostComm_FltN_BusB_NOxSnsr_A CAN_InvalidDataFlt_BusB_NOxSnsr_A	TRUE >11.00V TRUE TRUE >0sec FALSE FALSE	Time counter: 120 fails out of 240 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Supply Voltage Circuit Bank 1 Sensor 2	P220B	This diagnosis verifies if the supply voltage of the Post Catalyst NOx Sensor is out of range	Check if NOxSensor 2 supply voltage status is out of range	Sensor supply voltage < 9.90 V	Engine is running	TRUE	Time counter: 120 fails out of 240 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					a) NOx Sensor Dewpoint is reached	TRUE		
					b) condition a) shall be fulfilled for time	>0sec		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					CAN_InvalidDataFlt_BusB_NOxSnsr_B	FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Sense Circuit Low Voltage	P2210	This diagnosis verifies Engine Out NOx Sensor Heater sense resistance measurement pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 Heater Sense pin (HTemp)	groundshort on HTemp pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Sense Circuit High Voltage	P2211	This diagnosis verifies Engine Out NOx Sensor Heater sense resistance measurement pin for Short to Battery	Check if there is a short circuit to power supply NOx Sensor 1 Heater Sense pin (HTemp)	powershort on HTemp pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
0 2 Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2297	This DTC aims to detect a drift of measured 0 2 value (A) from an estimated concentration (B) when the latter can be considered stable during overrun condition.	(A - B) in overrun condition is out of plausible range	> 5.00 [%] < -5.00 [%]	Engine running System voltage in range Sensor is fully operative Diagnosis runs in overrun when SQP learning is enabled if KeOXYD_b_NOx1_PlausOvrrnEnbl_SQP OR Diagnosis runs if KeOXYD_b_NOx1_PlausOvrrnEnbl_SQP AND No SQP learning is active Enabled in combustion mode No Exhaust Brake active i.e. intake manifold pressure No pending or confirmed DTCs	> 11.00 [V] OXY_NOx1_O2_RawNotRib == FALSE ==TRUE(1.00) ==FALSE (1.00) FAD_SQA_LrnET_Enbl == FALSE refer to supporting table (**KaOXYD_b_NOx1OvrnChkCmbModeEnbl**) < 1,000.00 [kPa] NOX_Snsr1_NotVld NOX_Snsr1_PresFlt OXY_O2_NOx1PlausMdlFit OXY_NOx1SignRngChkFlt	Time counter: (140 +1) failures out of 240 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						FHPJnjLeakageFA		
						EGR.PstnShtOffReqFA		
						(MAF_MAF_SnsrFA AND MAF_MAF_SnsrTFTKO)		
						(MAP_SensorFA AND MAP_SensorTFTKO)		
					Stable fuel cut-off condition has been reached i.e. following conditions are met for a calibrateable time:	> 3.50 [s]		
					a. Engine speed in operating range	> 800 [rpm] < 3,000 [rpm]		
					b. EGR position	< 25.00 [%]		
					c. No fuel injected			
					d. Air mass per cylinder in operating range	> 200.00 [mg] < 1,800.00 [mg]		
					Estimated 0 2 concentration stable i.e. difference between initial and actual value	< 0.50 [%]		
					Air mass flown since fuel cut-off condition	> 0.30 [g]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Circuit Range/ Performance Bank 1 Sensor 2	P229F	This diagnosis verifies that Post Catalyst NOx Sensor embedded current control circuit status is healthy	Check if the NOx2 Sensor embedded stability criteria of Nox/Lambda current control circuit are violated NOx stability flag: (OFF_Time/TOTAL_time) Lambda stability flag: (OFF_Time/TOTAL_time) Note: TOTAL_time= ON_time+OFF_Time	Stability flag for NOx signal is set to OFF if one of the following condition is not fulfilled: a) V2 within an interval of 40mV around its set point b) Delta Ip2 <426nA/10msec c) Delta Ip1 < 2.34 uA aorund its set point Stability flag for Lambda signal is set to OFF if one of the following condition is not fulfilled: a) Delta IpO < 300 uA/10 msec b) Delta Ip1 < 2.34 uA around its set point > 0.50 % > 0.50 %	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Engine is not cranking Sensor dewpoint is reached Sensor heater is in range: a) (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence b) condition a) is fulfilled for time Engine is running No 0 2 plausibility in load fault on NOx2 No electrical failure on NOx2 Sensor Combustion mode dependent enabling flag Fuel request: a) fuel request derivative is within a range	> 11.00V TRUE FALSE > 9.90 V TRUE TRUE <0.03 >- 0.03 > 10.00 sec TRUE OXY_NOx2ChkLoadFlt == FALSE NOX_Snsr2_FltSt ==FALSE **NOX_S2_StBitChkEnblCmbMode** <= 35.00 mm^3/s >= -50.00 mm^3/s >5.00 sec	NOx stability flag time counter: 2 fails out of 2 samples. Lambda stability flag time counter: 2 fails out of 2 samples Task=12.5ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					b) condition a) is fulfilled for time CAN_InvalidDataFlt_BusB_NOxSnsr_B	FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Circuit Low Bank 1 Sensor 2	P22A0	This diagnosis verifies Post Catalyst NOx Sensor read out of range low	Check if the NOx2 Sensor NOx concentration raw read is out of lower range: NOx raw read	 <-90 ppm	Fuel injection quantity request Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx2 CAN communication Sensor supply in range Sensor dewpoint is reached No current control failure on NOx2 Sensor No electrical failure on NOx2 Sensor Combustion mode dependent enabling flag No 0 2 plausibility in load fault on NOx2 No invalid data failure on NOx2 CAN frames	>-1 mm^3 >11.00V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_B == FALSE > 9.90 V TRUE N0X_N0x2_StBitChkFlt ==FALSE N0X_Snsr2_FltSt ==FALSE **NOX_S2_OutRngMinCmbMode** OXY_NOx2ChkLoadFlt ==FALSE CAN_InvalidDataFlt_BusB_NOxSnsr_B == FALSE	Time counter: 100 fails out of 200 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Circuit High Bank 1 Sensor 2	P22A1	This diagnosis verifies Post Catalyst NOx Sensor read out of range high	Check if the NOx1 Sensor NOx concentration raw read is out of higher range:		Powertrain relay voltage	>11.00V	Time counter: 200 fails out of 250 samples Task=25ms	Type B, 2 Trips
					NOx Sensor Bus relay is commanded ON	TRUE		
			NOx raw read	>2,500 ppm	No failure on NOx2 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_B == FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					No current control failure on NOx2 Sensor	N0X_N0x2_StBitChkFlt ==FALSE		
					No electrical failure on NOx2 Sensor	N0X_Snsr2_FltSt ==FALSE		
					Combustion mode dependent enabling flag	**NOX_S2_OutRngMaxCmbMode**		
					No 0 2 plausibility in load fault on NOx2	OXY_NOx2ChkLoadFlt ==FALSE		
					Engine running for a time longer than	> Os		
					No invalid data failure on NOx2 CAN frames	CAN_InvalidDataFlt_BusB_NOxSnsr_B == FALSE		
					One of the following conditions is fulfilled (OR logic):			
					a) Air system control is active	TRUE		
					b) DEF system is ready to	TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					inject and DEF strategy for emission reduction inhibition is not requested in case of DPF clogging			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Control Circuit	P22A3	This diagnosis verifies Post Catalyst NOx Sensor Heater Control pin Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 Heater Control pin	open circuit on Heater Control pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V FALSE	Time counter: 80 fails out of 160 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Control Circuit Low Voltage	P22A4	This diagnosis verifies Post Catalyst NOx Sensor Heater Control pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 Heater Control pin	groundshort on Heater Control pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Control Circuit High Voltage	P22A5	This diagnosis verifies Post Catalyst NOx Sensor Heater Control pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 Heater Control pin	powershort on Heater Control pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Sense Circuit	P22A6	This diagnosis verifies Post Catalyst NOx Sensor Heater sense resistance measurement pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 Heater Sense pin (HTemp)	open circuit on HTemp pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Heater Sense Circuit Range/ Performance Bank 1 Sensor 2	P22A7	This diagnosis verifies if the Post Catalyst NOx Sensor Heater raw resistance is in range	This diagnosis verifies if the Post Catalyst NOx Sensor Heater raw resistance is out of speficied range: (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence	<0.03 >- 0.03	Powertrain relay voltage CAN_LostComm_FltN_BusB_NOxSnsr_B NOx Sensor Bus relay is commanded ON Delay timer once Sensor supplyisin range (> 10.8 V) Delay timer once Sensor dewpoint is reached Delay timer once engine is overrun a) Combustion mode dependent enabling flag b) condition a) is fulfilled for time CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V FALSE TRUE > 45 sec > 180 sec > 5 sec **NOX_S2_HtrPerfEnblCmbMode** > Osec FALSE	Time counter: 50 fails out of 100 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Sense Low Voltage	P22A8	This diagnosis verifies Post Catalyst NOx Sensor Heater sense resistance measurement pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 Heater Sense pin (HTemp)	groundshort on HTemp	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Sense High Voltage	P22A9	This diagnosis verifies Post Catalyst NOx Sensor Heater sense resistance measurement pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 Heater Sense (HTemp)	powershort on HTemp pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2 Sensor Pumping Current Trim Circuit Low Bank 1 Sensor 2	P22B6	This DTC detects if O2 signal is lower than physical minimum value.	O2 signal lower than a minimum value	< -6.00 [%]	Engine running System voltage in range Sensor is fully operative Enabled in combustion mode No pending or confirmed DTC	 > 11.00 [V] OXY_NOx2_O2_RawNotRib == FALSE refer to supporting table **KaOXYD_b_NOx2SigRn (gEnblCmbMode**) NOX_Snsr2_NotVld	Time counter: 200 failures out of 250 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2 Sensor Pumping Current Trim Circuit High Bank 1 Sensor 2	P22B7	This DTC detects if O2 signal is higher than physical maximum value	O2 signal higher than a maximum value	> 29.00 [%]	Engine running System voltage in range Sensor is fully operative Exhaust gas pressure No Exhaust Brake active i.e. intake manifold pressure No pending or confirmed DTCs		Time counter: 100 failures out of 200 samples. Time task 25 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Performance - Slow Response Low to High Bank 1 Sensor 1	P22F9	This diagnosis verifies the dynamic behaviour of Engine Out NOx Sensor during increasing NOx concentration transient	Check if there is a slow dynamic behaviour of Engine Out NOx Sensor raw signal read during increasing NOx concentration maneuver (load increase) Delay_Timer_NOx_Raw Delay time starts when NOx model concentration reaches 30 ppm and completes when NOx1 Sensor raw reaches 30 ppm. Relative_timer= (Timer_NOx_Raw- Timer_NOx_Model) / Timer_NOx_Model Timer_NOx_Raw Time starts once NOx1 raw signal reaches 30 ppm and completes once the raw signal reaches 220 ppm. Timer_NOx_Model Time starts once NOx model concentration reaches 30 ppm and completes once the raw signal reaches 220 ppm.	Delay_Timer_NOx_Raw and Relative_timer are processed with First Order Lag Filter Logic: > 2 sec OR > 10 %	Engine is running Powertrain relay voltage Combustion mode dependent enabling flag NOx Sensor Bus relay is commanded ON No failure on NOx1 CAN communication No invalid data failure on NOx1 CAN frames No electrical failure on NOx1 Sensor No out of range low failure on NOx1 Sensor No out of range high failure on NOx1 Sensor No current control failure on NOx1 Sensor Sensor dewpoint is reached No failure on high pressure fuel rail system No failure on injectors No failure on intake manifold absolute	TRUE >11.00V **NOX_NOx1_IncrDynCmbMode** TRUE CAN_LostComm_FltN_BusB_NOxSnsr_A ==FALSE CAN_InvalidDataFlt_BusB_NOxSnsr_A == FALSE NOX_Snsr1_FltSt ==FALSE NOX_NOx1_OutOfRngLoFit ==FALSE NOX NOx1 OutOfRngHiFit ==FALSE NOX_NOx1_StBitChkFlt ==FALSE TRUE FHPJnjLeakage ==FALSE FUL_GenericlnjSysFlt ==FALSE MAP_SensorFA==FALSE	More test per trip are allowed with First Order Lag Filter Logic. Total_Timer NOx Sensor dynamic observation maximum time is 8 sec. Once reached the diagnostic provides a result.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					pressure Sensor			
					No failure on mass air flow Sensor	MAF_MAF_SnsrFA ==FALSE		
					No failure on EGR valve actuator	EGR.PstnShtOffReqFA ==FALSE		
					No failure on any input used by the Engine Out NOx model	EXM_NOxMdl_ExhMnfdNotVld ==FALSE		
					Intake manifold absolute pressure	< 950 kPa		
					DFCO by-pass not enabled	TRUE		
					Engine Out NOx Sensor raw concentration	< 20 ppm		
					Engine working point stability conditions: a) Modeled Engine Out NOx concentration	< 40 ppm		
					b) Engine speed	> 600 rpm <3,500 rpm		
					c) Injection fuel quantity requested	> 3 mm^3		
					d) condition a) b) c) are fulfilled for time	> 0 sec		
					Once all condition above are fulfilled diagnostic run whenever all the following condition are verified (fuel			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					stepdetection logic within a time window): e) Injected fuel quantity request f) condition e) is fulfilled for time	 > 12mm^3 <(1 sec+ 3 sec)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Performance - Sensing Element Bank 1 Sensor 1	P22FB	This diagnosis verifies the plausibility of Engine Out NOx Sensor signal	Check if (Engine Out NOx Sensor signal - NOx Model)/NOx Model with EWMA filter is above or below two calibratable thresholds	< -36 % OR > 77.00 %	Engine is running Powertrain relay voltage No failure on any NOx model inputs No failure on NOx1 CAN communication No invalid data failure on NOx1 CAN frames No electrical failure on NOx1 Sensor No out of range low failure on NOx1 Sensor No out of range high failure on NOx1 Sensor No current control failure on NOx1 Sensor No failure on outside air temperature Sensor No failure on ambient air temperature Sensor no falut on upstream catalyst exhaust pressure model inputs No failure on engine	TRUE >11.00V EXM_NOxMdl_ExhMnfdNotVld ==FALSE CAN_LostComm_FltN_BusB_NOxSnsr_A ==FALSE CAN_InvalidDataFlt_BusB_NOxSnsr_A == FALSE NOX_Snsr1_FltSt ==FALSE NOX_NOx1_OutOfRngLoFit ==FALSE NOX_NOx1_OutOfRngHiFit ==FALSE NOX_NOx1_StBitChkFlt ==FALSE OAT_PtEstFiltFA ==FALSE AmbPresDfltdStatus ==FALSE EGP.PresCatUpFlt ==FALSE	Test per trip: 1 If Fast Initial Response EWMA is active then 1 test per trip are allowed If Rapid Response EWMA is active then 2 test per trip are allowed The signal for the monitor check is calculated at first collecting and averaging 200.00 samples, than filtering the resulting mean value by means of a first-order filter. The filter gain calibration (1) can assume the following values: -0.66 if FIR is active - 0.30 if RR is active -0.20 if neither FIR and RR are active (1)The EWMA	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					coolant temperature Sensor No failure on injectors No failure on high pressure fuel rail system No failure on intake manifold absolute pressure Sensor Modeled Engine Out NOx concentration Steady state detection: a) Modeled Engine Out NOx concentration step at 100 ms. b) condition a) is fulfilled for time Ambient air pressure Outside air temperature Combustion mode dependent enabling flag Intake manifold absolute pressure Injection fuel quantity requested	ECT_Sensor_FA ==FALSE FUL_GenericInjSysFlt ==FALSE FHPJnjLeakage ==FALSE MAP_SensorFA==FALSE >50 ppm <5 ppm >5.00 sec >72 kPa <200 kPa > -20 °C < 80 °C **NOX_S1_PlausChkEnblCmbMode** < 250 kPA For normal combustion mode: > 15.00mm^3 < 60.00 mm^3	filter is active if the filter gain is calibrated with a value lower than 1, otherwise EWMA filter is cal-out.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Engine speed Engine coolant temperature Sensor dewpoint is reached DFCO by-pass not enabled EGR cooler Bypass condition: a) EGR cooler not in bypass mode b) condition a) is used only if KeNOXD_b_Snsr1_PlausEGR_Cooler is True Diagnostic test results during EWMA FIR mode	For other combustion modes: > 15mm^3 < 15mm^3 For normal combustion mode: > 1,200 rpm < 1,450 rpm For other combustion modes: >1,200 rpm <3,200 rpm >70 °C <129 °C TRUE TRUE TRUE KeNOXD_b_Snsr1_PlausEGR_Cooler= 0.00 < 1		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Performance - Sensing Element Bank 1 Sensor 2	P22FE	This diagnosis verifies the Post Catalyst NOx Sensor sensing cells integrity during afterrun	Check if there is any clogging in the Post Catalyst NOx Sensor measurement cavities that could result in reduced NOx-sensitivity. The Sensor internal operating current set-points are changed such way, that the 02 concentration in 2nd Sensor cavity is around 1000ppm. One test result is measured in fresh Sensor state (at supplier plant) and stored in the Sensor E2prom as diagnosis reference value. The diagnosis result is the ratio of current diagnosis value/reference value. The diagnosis result is processed with EWMA logic.	>140% OR <68%	No electrical failure on NOx2 Sensor No out of range low failure on NOx2 Sensor No out of range high failure on NOx2 Sensor No failure on NOx2 CAN communication No invalid data failure on NOx2 CAN frames No failure on NOx1 Sensor No failure on 02 from NOx1 plausibility diagnostics No failure on SCR system No failure on downstream SCR HC model inputs No failure on exhaust temperature Sensor (downstream SCR) No failure on HC injector No failure on Vehicle Speed Sensor	N0X_Snsr2_ElecFA ==FALSE NOX_NOx2_OutOfRngLo Fit ==FALSE N0X_N0x2_0ut0fRngHi Fit ==FALSE CAN_LostComm_FltN_BusB_NOxSnsr_B ==FALSE CAN_InvalidDataFlt_BusB_NOxSnsr_B == FALSE N0X_Snsr1_N0x_Flt ==FALSE 0XY_N0x1_02_Flt ==FALSE EXF_TotExhSCR_UpFlt ==FALSE SCR_HC_SCR_DwnFlt ==FALSE EGT_TempSCR_DwnFlt ==FALSE HCI_GenericShtOffReq ==FALSE VehicleSpeedSensor_FA ==FALSE	Test per trip: 1 If Fast Initial Response EWMA is active then 2 test per trip are allowed If Rapid Response EWMA is active then 2 test per trip are allowed Task=500ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No failure on any input of SCR chemical model	SCR_ChemicalMdlFlt ==FALSE		
					No current control failure on NOx2 Sensor	N0X_N0x2_StBitChkFlt ==FALSE		
					No 0 2 plausibility in load fault on N0x2	OXY_NOx2ChkLoadFlt ==FALSE		
					Powertrain relay voltage	>11.00V		
					N0x2 sensor supply in range	> 9.90 V		
					N0x2 sensor dewpoint is reached	TRUE		
					(N0x2 Sensor heater raw resistance - N0x2 Sensor heater target resistance) / N0x2 Sensor heater target resistence	< 0.03 % >- 0.03%		
					a)combustion mode dependent enabling flag	**NOX_NOx2SelfTstEnblCmbMode**		
					b) condition a) is fulfilled for time	>0sec		
					c) engine speed	>0rpm <1,500 rpm		
					d) condition c) is fulfilled for time	> 1 sec		
					e) After injection pulse is not used for time	>0sec		
					f) exhaust temperature Sensor (downstream	> -20 °C < 265 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					SCR)	< 40 g/s		
					g) exhaust mass flow	> 5 sec		
					h) conditions f) g) are fulfilled for time	> 10 %		
					j) 0 2 concentration from N0x1	< 300 ppm		
					k) NOx concentration from N0x1	>0sec		
					i) conditions]) k) are fulfilled for time	< 1 %		
					I) duty cycle applied to the HC injector driver	> 5 sec		
					m) condition I) is fulfilled for time	> 15 sec		
					n) time between key off and last overrun	> 15 sec		
					o) time between key off and last DPF regen	< 800 rpm		
					p) engine speed in idle range	<20mm^3		
					q) fuel request in idle range	< 1,800 sec		
					r) conditions p) q) is fulfilled for time			
					s) timer of condition r) is reset if one of the following condition is fulfilled (idle off recoanition - t)	> -20 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					conditions):			
					s.1) exhaust temperature (downstream SCR)	> 5 sec		
					s.2) condition s.1) is fulfilled for time (once idle has been detected)	> 5mph		
						> 5 sec		
					s.3) vehicle speed			
					s.4) condition s.3) is fulfilled for time (once idle has been detected)	> 40 g/sec		
						> 5 sec		
					s.5) exhaust mass flow			
					s.6) condition s.5) is fulfilled for time (once idle has been detected)	< 10g/s		
					t) HC mass flow (SCR downstream)			
					Once t) condition is fulfilled the following additional t.x) conditions shall be fulfilled to enable the monitor (AND logic)	> -20 g/s		
					t.1) exhaust temperature (downstream SCR)	> 20 sec		
					t.2) condition t.1) is fulfilled for time (once condition t) has been detected)	>=5mph		
						> 10 sec		
					t.3) vehicle speed			
					t.4) condition t.3) is	> 20 a/s		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					fulfilled for time (once condition t) has been detected)	> 5 sec		
					t.5) exhaust mass flow	< 5.00m/s^2		
					t.6) condition t.5) is fulfilled for time (once condition t) has been detected)			
					u) deceleration before keyoff.	< I.OOrpm < 10.00rpm		
					v) condition u) could be ignored if idle engine condition v.x) is fulfilled	> 8.00 s		
					v.1) engine speed in idle range	TRUE		
					v.2) condition v.1) fulfilled for time	N/A		
					w) DFCO by-pass not enabled			
					x)debounce time after last DEF RDP event on second injector (if present) elapsed before keyoff. Debounce time needed is the output of a calibratable curve (f [temperature SCR2 upstream during RDP2 event])			
					Once all conditions above are fulfilled during the drivinq cvcle, ECM	> 30.00 s		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					requires diagnostic test execution at key off when following conditions are fulfilled: y) O2 stabilization timer z) O2 concentration from NOx2	> -1,000.00 pct		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Temperature Sensor Circuit Range/ Performance Bank 1 Sensor 3	P242B	the test compare (the difference between a max temperature calculated for a calibratable time and the temperature at key on define after a calibratable soaking time) with a calibratable map function of temperature freezed at rising edge of the enabling condition met. if there difference is below this calibratalbe Map a issue is detected. The failure mode capable to detect is sensor out of the pipe, or information stuck for other motivation.	The difference between the max temperature calculated for a calibratable time and the temperature frozen after a soaking time is less	< **EGT_Bank1_Sensor3 _Temp MAP**	Monitor enabled by dedicated calibration	1.00	no debounce	Type B, 2 Trips
					Engine in not run mode for a calibratale time	>10,800.00		
					Engine not run timer error	==FALSE		
					Diag system disable	==FALSE		
					Run cranck in range	==TRUE		
					Engine Run	==TRUE		
					No lost comm /check hi/ check low / quick change puntual errore present	==TRUE		
					Diagnosis not abborted	==TRUE		
					No report done	==TRUE		
					No Key on fault	EGT_KOD_B1S3_FA		
					No quick change fault	EGT_QED_B1S3_FA		
					no out of range high fault	EGT_CED_B1S3_HiFA		
					no out of range low fault	EGT_CED_B1S3_LoFA		
					no lost of comm fault	EGT_CED_B1S3_LostCommFA		
					no fault affected engine not run timer	==TRUE		
					AND			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					A calibratable delay time for the sensor initialization shall be elapsed	==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 3 out of range monitoring Low	P242C	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature velue in case of digital sensor) with a minimum threshold.	**Analog sensor:** The monitor compares the EGT 3 raw value (resistance value) with a minimum threshold; if this threshold is overcome, a OOR Low error is detected. **Digital termocouple sensor:** The monitor compares the EGT 3 raw value (temperature value) with a minimum threshold;	<1.00 [Ohm] <-72.80 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status AND lost communication error AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail samples over 25.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 3 out of range monitoring High	P242D	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature value in case of digital sensor) with a maximum threshold.	**Analog sensor:** The monitor compares the EGT 3 raw value (resistance value) with a maximum threshold; if this threshold is overcome, a OOR High error is detected. **Digital termocouple sensor:** The monitor compares the EGT 3 raw value (temperature value) with a maximum threshold;	>100,000,000.00 [Ohm] > 1,289.85 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status loss comunication error AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail 25.00 samples over samples Function task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 3 quick change monitoring	P242E	This function has the purpose of warning the system/driver that EGT 3 sensor signal is varying too fast with respect to the expected signal dynamic. Failure modes: - Sensor internal malfunctions - Wiring harness deterioration - Connectors electrical issues	The Absolute EGT temperature sensor raw difference value	> 100.00 [C]	Monitor enabled by dedicated calibration AND RunCrankIgnInRang AND RunCrankActive AND DiagSystemDsbl AND EngModeCrank AND Lost Communication Error AND No electrical fault affecting the sensor AND Unfiltered temperatature	1.00 [Boolean] ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE EGT_ExhGas3_Flt >=140.00 <=1,070.00	12.00 fail samples out of 25.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND A calibratable delay time for the sensor initialization shall be elapsed	==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooling System Performance (OBDII market only) (non-MDE applications)	P2457	This monitor checks the HP EGR Cooler efficiency deterioration, that would cause vehicle's emissions to exceed specific emission levels.	HP EGR Cooler Efficiency (averaged over a calibrate-able cumulative transient time) is compared with a threshold. HP EGR Cooler efficiency is computed as the ratio between (HP EGR cooler upstream temperature - HP EGR cooler downstream temperature) and (HP EGR cooler upstream temperature - Engine coolant temperature).	< 59.06 [%]	Calibration on diagnostic enabling	1.00==TRUE	Test executed after 225.00 samples are collected and their average is computed	Type B, 2 Trips
					Diagnostic has not run in current driving cycle yet	==TRUE		
					PT Relay voltage in range	Powertrain relay voltage > 11.00 [V]	functional task 100 ms	
					Engine is running or cranking	==TRUE		
					HP EGR cooler upstream temperature in range	>95.00 [°C] <600.00 [°C]		
					Ambient Temperature	>=-12.00 [°C]		
					Ambient pressure	>= 69.60 [kPa]		
					Air Control is Active	Refer to "Air Control Active" Free Form		
					Engine Coolant Temperature (OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	>70.00 [°C] ==TRUE <130.00 [°C]		
					HP EGR Cooler bypass	>8.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					not active for a time			
					Time after combustion mode change	>4.00 [s]		
					HP EGR filtered flow in range	< **P2457: Maximum HP EGR filtered flow for HP EGR cooler efficiency monitor enabling** [g/s] > **P2457: Minimum HP EGR filtered flow for HP EGR cooler efficiency monitor enabling** [g/s]		
					for a time	>= **P2457: Minimum time for HP EGR cooler efficiency monitor enabling** [s]		
					HP EGR flow estimation is valid	EGR_VlvTotFlowNotValid ==FALSE		
					Engine speed in range	<3,100.00 [rpm] >600.00 [rpm]		
					No fault on HP EGR cooler upstream temperature sensor	CET_UPSS_FA==FALSE		
					No fault on HP EGR	CET_DNSS_FA==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					cooler downstream temperature sensor			
					No fault on Ambient Temperature sensor	OAT_PtEstFiltFA ==FALSE		
					No fault on ambient pressure sensor	AAP_AmbientAirPresDfltd ==FALSE		
					No fault on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					No fault on engine speed	Crank8ensor_FA ==FALSE		
					No fault on HP EGR Cooler Bypass	CEB_ActrCktLoFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Particulate Filter Regeneration Frequency	P2459	This diagnostic detects a too high DPF regeneration frequency due to inefficient combustion, inefficient regeneration, soot overestimated by models or leaks in the exhaust or the intake line. When a new regeneration is started, the diagnostic computes a ratio between the soot level estimated by the model that has triggered the regeneration and the soot level estimated by the Nominal Engine Out soot model, which gives information about the expected soot level in the DPF. If the ratio is greater than a threshold, the diagnostic will report a fail. In case the regeneration is started based on miles travelled or time passed since last regeneration, the diagnostic will always report a pass. The test results can be optionally filtered by an EWMA filter.	When the regeneration is started by the Ranked soot model, the ratio between the soot level from that model and the soot level estimated by the Nominal engine out model is calculated. Monitor configuration: *EWMA Enable* = 1.00 **a)** In case of EWMA filter not enabled *(EWMA Enable* == 0), the calculated ratio is **b)** In case of EWMA filter enabled *(EWMA Enable* == 1), the calculated ratio is OR, if a P2459 fault is already active, the calculated ratio is	>= 6.19 >= 6.19 >= 6.19	Test enabled by calibration A new DPF regeneration is started The number of regenerations completed successfully is The previous regeneration was completed successfully The regeneration is started by the Ranked soot model, distance or time criteria (in the case of distance and time the ranked model percentage must be greater than a calibratable threshold) The regeneration is requested at service The regeneration is requested in advance due to a failure condition The Ranked soot model was valid for the whole duration of the soot loading phase	1.00 == TRUE >1.00 == TRUE == TRUE (>60.00) == FALSE == FALSE DPF_RankedModelNotVId EXM_PM_TurbFlowNotVId_2 = FALSE >11.00V	No time required, the malfunction criteria are evaluated as soon as a new DPF regeneration is started. Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						< 255.00 mm3/s		
					The nominal engine out soot model was valid for the whole duration of the soot loading phase	< 74.00		
					Run/Crank voltage in range	< -50.00		
					Extreme transient engine operation was not detected, i.e. the delta fuel request during the soot loading time was			
					During the previous regeneration more than 50 % of the time was not spent at ambient pressure			
					During the previous regeneration the cumulative elevation gain is			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Control Circuit (ECB DC Motor)	P245A	This monitor checks if the HP EGR cooler bypass valve commands are in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	> 200 [kOhm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is OFF Valve requested in a position different from fully closed (default position) Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Performance (ECB DC Motor)	P245B	This monitor detects an obstruction on the actuator (obstruction found during the HP EGR Cooler Bypass valve opening or closing) checking the setpoint position against the position measured by the HP EGR Cooler Bypass Position Sensor	|HP EGR Cooler Bypass Position Tracking Error| (setpoint position - measured position) > maximum threshold	> 13.00 [%]	Cold Start strategy NOT enabled Test enabled by calibration Diagnostic system enabled (no clear code or EOT in progress) System out of the cranking phase PT relay supply voltage in range HP EGR Cooler Bypass position closed loop control active (no faults present on HP EGR Cooler Bypass position sensor, HP EGR Cooler Bypass flap, HP EGR Cooler Bypass position control deviation) HP EGR Cooler Bypass position setpoint in steady state conditions for minimum time Engine coolant temperature higher or	==TRUE ==1.00 >11.00 [V] CEB_PstnSnsrFlt ==FALSE CEB_ActrFlt==FALSE CEB_ObstructionTFTKO ==FALSE <160.00 [%/s] >-160.00 [%/s] for >=0.40 [s] >=55.00 [°C]	1,280.00 fail counts out of 1,600.00 sample counts 640.00 fail counts to enable the open circuit check (P245A) Function task: 6.25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening)			
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature higher or equal to minimum threshold	>=-23.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		
					No mechanical stop soft approach in progress			
					No anti-sticking procedure in progress			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Control Circuit Low (ECB DC Motor)	P245C	This monitor checks if the HP EGR cooler bypass valve commands are shorted to ground	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration	==1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					H-Bridge driver is ON			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Control Circuit High (ECB DC Motor)	P245D	This monitor checks if the HP EGR cooler bypass valve commands are shorted to power supply	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration	==1.00	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					H-Bridge driver is ON			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Particulate Filter Soot Accumulation	P2463	This diagnostic detects a clogged DPF needing to be regeneration at service	(Soot model based on Delta pressure measure plus configurable correction block (CCB) AND DPF_DPF_St = CeDPFR_e_SootLoading) (Soot model based on Delta pressure measure plus configurable correction block (CCB) AND DPF_DPF_St != CeDPFR_e_SootLoading) Soot model based on Delta pressure measure plus configurable correction block (CCB)	> 140.00 [Pct] > 160.00 [Pct]	Test enabled by calibration No fault on DPF pressure sensor (electrical, rationality and offset) No fault on upstream DPF temperature sensor (electrical and rationality; if not present, no fault on downstream catalyst temperature sensor) with the exception of the fault on downstream DPF temperture sensor No fault on air flow meter No fault on atmospheric pressure sensor Engine speed No fault on exhaust mass flow estimation	1.00==TRUE EGP_DiffPresSnsrFlt ==FALSE EGT_SnsrDPF_UpFlt ==FALSE (if sensor not present, EGT_SnsrCatDwnFlt ==FALSE) Exception: above condition ==TRUE AND EGT_SnsrDPF_DwnFlt ==TRUE MAF_MAF_SnsrFA ==FALSE AND MAF_MAF_SnsrTFTKO ==FALSE AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd > 600.00 [rpm] EXF_TotExhDPF_UpFA ==FALSE >60.00 [l/s]	If DPF_DPF_St = CeDPFR_e_SootLoading 120.00 failures over 150.00 samples elseif DPF_DPF_St != CeDPFR_e_SootLoading 120.00 over 150.00 samlples function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Exhaust gas volume flow greater than a calibrateable threshold for more than a calibratable time Exhaust gas temperature at DPF inlet is between two thresholds for a minimum calibrateable time Engine Coolant Temperature OR OBD Coolant Enable Criteria Ambient Temperature Soot model based on Delta Pressure plus configurable correction block (CCB) is valid for a time Soot model based on Delta Pressure is always valid for a time Icing risk for delta pressure sensor's pipes is low	for > 2.00 [s] >0.00 [DegC] AND < 700.00 [DegC] for > 5.00 [s] > -40.00 [DegC] ==TRUE > -40.00 [DegC] > =0.20% of the soot loading >= 5.00 s == TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Temperature Sensor Circuit Range/ Performance Bank 1 Sensor 4	P246F	the test compare (the difference between a max temperature calculated for a calibratable time and the temperature at key on define after a calibratable soaking time) with a calibratable map function of temperature freezed at rising edge of the enabling condition met. if there difference is below this calibratalbe Map a issue is detected. The failure mode capable to detect is sensor out of the pipe, or information stuck for other motivation.	The difference between the max temperature calculated for a calibratable time and the temperature frozen after a soaking time is less	< **EGT_Bank1_Sensor4 _Temp MAP**	Monitor enabled by dedicated calibration	1.00	no debounce	Type B, 2 Trips
					Engine in not run mode for a calibratale time	>10,800.00		
					Engine not run timer error	==FALSE		
					Diag system disable	==FALSE		
					Run cranck in range	==TRUE		
					Engine Run	==TRUE		
					No lost comm /check hi/ check low / quick change puntual errore present	==TRUE		
					Diagnosis not abborted	==TRUE		
					No report done	==TRUE		
					No Key on fault	EGT_KOD_B1S4_FA		
					No quick change fault	EGT_QED_B1S4_FA		
					no out of range high fault	EGT_CED_B1S4_HiFA		
					no out of range low fault	EGT_CED_B1S4_LoFA		
					no lost of comm fault	EGT_CED_B1S4_LostCo mmFA		
					no fault affected engine not run timer AND	==TRUE		
					A calibratable delay time	==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					for the sensor initialization shall be elapsed			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 4 out of range monitoring Low	P2470	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature velue in case of digital sensor) with a minimum threshold.	**Analog sensor:** The monitor compares the EGT 4 raw value (resistance value) with a minimum threshold; if this threshold is overcome, a OOR Low error is detected. **Digital termocouple sensor:** The monitor compares the EGT4 raw value (temperature value) with a minimum threshold;	<1.00 [Ohm] < -72.80 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status AND lost communication error AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail samples over 25.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 4 out of range monitoring High	P2471	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature value in case of digital sensor) with a maximum threshold.	**Analog sensor:** The monitor compares the EGT 4 raw value (resistance value) with a maximum threshold; if this threshold is overcome, a OOR High error is detected. **Digital termocouple sensor:** The monitor compares the EGT 4 raw value (temperature value) with a maximum threshold;	> 100,000,000.00 [Ohm] > 1,289.85 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status AND lost communication error AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail samples over 25.00 samples Function task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 4 quick change monitoring	P2472	This function has the purpose of warning the system/driver that EGT 4 sensor signal is varying too fast with respect to the expected signal dynamic. Failure modes: - Sensor internal malfunctions - Wiring harness deterioration - Connectors electrical issues	The Absolute EGT temperature sensor raw difference value	>100.00 [C]	Monitor enabled by dedicated calibration AND RunCrankIgnInRang AND RunCrankActive AND DiagSystemDsbl AND EngModeCrank AND Lost Communication Error AND No electrical fault affecting the sensor AND Unfiltered temperatature	1.00 [Boolean] ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE EGT_ExhGas4_Flt >= 140.00 <=	12.00 fail samples out of 25.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND A calibratable delay time for the sensor initialization shall be elapsed	1,070.00 ==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 5 out of range monitoring Low	P2481	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature value in case of digital sensor) with a maximum threshold.	**Analog sensor:** The monitor compares the EGT 5 raw value (resistance value) with a minimum threshold; if this threshold is overcome, a OOR Low error is detected. **Digital termocouple sensor:** The monitor compares the EGT 4 raw value (temperature value) with a minimum threshold;	<1.00 [Ohm] <-72.80 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status AND lost communication error AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail samples over 25.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 5 out of range monitoring High	P2482	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature value in case of digital sensor) with a maximum threshold.	**Analog seonsor:** The monitor compares the EGT 5 raw value (resistance value) with a maximum threshold; if this threshold is overcome, a OOR High error is detected. **Digital termocouple sensor:** The monitor compares the EGT 5 raw value (temperature value) with a maximum threshold;	>100,000,000.00 [Ohm] > 1,289.85 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status AND lost communication error AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail samples over 25.00 samples Function task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Temperature Sensor Circuit Range/ Performance Bank 1 Sensor 5	P2483	the test compare (the difference between a max temperature calculated for a calibratable time and the temperature at key on define after a calibratable soaking time) with a calibratable map function of temperature freezed at rising edge of the enabling condition met. if there difference is below this calibratalbe Map a issue is detected. The failure mode capable to detect is sensor out of the pipe, or information stuck for other motivation.	The difference between the max temperature calculated for a calibratable time and the temperature frozen after a soaking time is less	< **EGT_Bank1_Sensor5 _Temp MAP**	Monitor enabled by dedicated calibration	1.00	no debounce	Type B, 2 Trips
					Engine in not run mode for a calibratale time	>10,800.00		
					Engine not run timer error	==FALSE		
					Diag system disable	==FALSE		
					Run cranck in range	==TRUE		
					Engine Run	==TRUE		
					No lost comm /check hi/ check low / quick change puntual errore present	==TRUE		
					Diagnosis not abborted	==TRUE		
					No report done	==TRUE		
					No Key on fault	EGT_KOD_B1S5_FA		
					No quick change fault	EGT_QED_B1S5_FA		
					no out of range high fault	EGT_CED_B1S5_HiFA		
					no out of range low fault	EGT_CED_B1S5_LoFA		
					no lost of comm fault	EGT_CED_B1S5_LostCo mmFA		
					no fault affected engine not run timer	==TRUE		
					AND			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					A calibratable delay time for the sensor initialization shall be elapsed	==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 5 quick change monitoring	P2484	This function has the purpose of warning the system/driver that EGT 5 sensor signal is varying too fast with respect to the expected signal dynamic. Failure modes: - Sensor internal malfunctions - Wiring harness deterioration - Connectors electrical issues	The Absolute EGT temperature sensor raw difference value	> 100.00 [C]	Monitor enabled by dedicated calibration AND RunCrankIgnInRang AND RunCrankActive AND DiagSystemDsbl AND EngModeCrank AND Lost Communication Error AND No electrical fault affecting the sensor AND Unfiltered temperatature AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE EGT_ExhGas5_Flt >=140.00 <=1,070.00 ==TRUE	12.00 fail samples out of 25.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Position Sensor Circuit Low (analog position sensor)	P2494	This monitor checks if the HP EGR cooler bypass position analog sensor is out of electrical range low	analog position raw voltage < low threshold	< 1.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	= 1.00 >11.00 [V]	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Position Sensor Circuit High (analog position sensor)	P2495	This monitor checks if the HP EGR cooler bypass position analog sensor is out of electrical range high	analog position raw voltage > high threshold	> 99.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	= 1.00 >11.00 [V]	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Closed Loop DPF Regeneration Control At Limit - Temperature Too Low	P24A0	DPF Control Temperature Deviation diagnostic monitors the exhaust gas temperature downstream the 1st ccDOC to determine whether the temperature deviation between the control setpoint and the temperature read by the sensor is within a prescribed deviation range. Temperature deviation diagnostic shall diagnose a too low temperature, that means a Positive temperature deviation temperature. The diagnosis runs during regeneration mode and when the temperature closed loop is active. The monitoring is divided into 2 logics, in particular the DPF warm up state logic and the DPF steady state logic.	**LowTemperature monitoring (Positive Deviation):** **(c1)** Temperature ccDOC Downstream control setpoint - ccDOC Downstream sensor reading (EGT2) **(c2)** Temperature DPF Upstream control setpoint - DPF Upstream sensor reading (EGT3)	>100.00 [degC]	Test enabled by calibration flag Regeneration state in warm up DPF Mode DPF temperature closed loop control shall be enabled Battery voltage No fault on exhaust mass flow No Fault on DOC downstream temperature sensor (only SCR forward architectures) No Fault on DPF upstream temperature model (only SCRF architectures) No Fault on DPF upstream temperature sensor (only DPF forward architectures) No Fault on ambient temperature sensor (only SCR forward	1.00 [Boolean] ==TRUE DPF_DPF_St== WarmJJp EGT_DsblCL== Enable temperature Closed loop control [Boolean] > 11.00 [V] EXM_TurbFlowNotValid [Boolean] ==FALSE EGT_SnsrCatDwnFlt [Boolean] ==FALSE EGT_TempDPF_UpFlt [Boolean] ==FALSE EGT_SnsrDPF_UpFlt [Boolean] ==FALSE OAT_PtEstFiltFA [Boolean] ==FALSE	810.00 fail samples out of 1,000.00 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					architectures)			
					No Fault on ambient pressure sensor (only SCR forward architectures)	AAP_AmbientAirPresDfltd [Boolean] ==FALSE AND AAP_AmbPresSnsrTFTK 0 [Boolean] ==FALSE		
					Combustion mode different from LNT Desox Lean and LNT Engine Protection	==TRUE		
					Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request	**EnginePointEnable_DPF _TempDeviation** [Boolean]		
					Exhaust mass flow AND Exhaust mass flow	< 250.00 [g/s] > 8.00 [g/s]		
					Filtered Exhaust mass flow variation (absolute value)	< 150.00 [g/s]		
					Time in which the system is in cut off	<= 30.00 [sec]		
					All the above enabling conditions are met for at	> 10.00 [sec]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					least a timer			
			Low Temperature monitoring (Positive Deviation):		Test enabled by calibration flag	1.00 [Boolean] ==TRUE	810.00 fail samples out of 1,000.00 samples Function task: 100ms	
			(c1) Temperature ccDOC Downstream control setpoint - ccDOC Downstream sensor reading (EGT2) **(c2)** Temperature DPF Upstream control setpoint - DPF Upstream sensor reading (EGT3)	>100.00 [degC]	Regeneration state in Steday state DPF Mode	DPF_DPF_St== Steady state		
					DPF temperature closed loop control shall be enabled	EGT_DsblCL == Enable temperature Closed loop control [Boolean]		
					Battery voltage	> 11.00 [V]		
					No fault on exhaust mass flow	EXM_TurbFlowNotValid [Boolean] ==FALSE		
					No Fault on DOC downstream temperature sensor (only SCR forward architectures)	EGT_SnsrCatDwnFlt [Boolean] ==FALSE		
					No Fault on DPF upstream temperature model (only SCRF architectures)	EGT_TempDPF_UpFlt [Boolean] ==FALSE		
					No Fault on DPF upstream temperature sensor (only DPF forward architectures)	EGT_SnsrDPF_UpFlt [Boolean] ==FALSE		
					No Fault on ambient	OAT_PtEstFiltFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					temperature sensor (only SCR forward architectures)	[Boolean] ==FALSE		
					No Fault on ambient pressure sensor (only SCR forward architectures)	AAP_AmbientAirPresDfltd [Boolean] ==FALSE AND AAP_AmbPresSnsrTFTK 0 [Boolean] ==FALSE		
					Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request	**EnginePointEnable_DPF _TempDeviation** [Boolean]		
					Exhaust mass flow AND Exhaust mass flow	< 250.00 [g/s] > 8.00 [g/s]		
					Filtered Exhaust mass flow variation (absolute value)	< 150.00 [g/s]		
					Time in which the system is in cut off	<= 30.00 [sec]		
					All the above enabling conditions are met for at least a timer	> 10.00 [sec]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Closed Loop DPF Regeneratio n Control At Limit - Temperature Too High	P24A1	DPF Control Temperature Deviation diagnostic monitors the exhaust gas temperature downstream the 1st ccDOC to determine whether the temperature deviation between the control setpoint and the temperature read by the sensor is within a prescribed deviation range. Temperature deviation diagnostic shall diagnose a too high temperature, that means a Negative temperature deviation temperature. The diagnosis runs during regeneration mode and when the temperature closed loop is active. The monitoring runs only in DPF steady state logic.	**Hi Temperature monitoring (Negative Deviation):**		Test shall be enabled by calibratable flag	1.00 [Boolean]	810.00 fail samples out of 1,000.00 samples	Type B, 2 Trips
			(c1) Temperature ccDOC Downstream control setpoint - ccDOC Downstream sensor reading (EGT2)	< -100.00 [degC]	Regeneration state in Steday state DPF Mode	DPF_DPF_St== Steady state	Function task: 100ms	
			(c2) Temperature DPF Upstream control setpoint - DPF Upstream sensor reading (EGT3)		DPF temperature closed loop control shall be enabled	EGT_DsblCL== Enable temperature Closed loop control [Boolean]		
					Battery voltage	> 11.00 [V]		
					No fault on exhaust mass flow	EXM_TurbFlowNotValid [Boolean]		
					No Fault on DOC downstream temperature sensor (only SCR forward architectures)	EGT_SnsrCatDwnFlt		
					No Fault on DPF upstream temperature model (only SCRF architectures)	EGT_TempDPF_UpFlt [Boolean]		
					No Fault on DPF upstream temperature	EGT_SnsrDPF_UpFlt [Boolean]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					sensor (only DPF forward architectures)			
					No Fault on ambient temperature sensor (only SCR forward architectures)	OAT_PtEstFiltFA [Boolean]		
					No Fault on ambient pressure sensor (only SCR forward architectures)	AAP_AmbientAirPresDfltd AND AAP_AmbPresSnsrTFTK 0 [Boolean]		
					Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request	**EnginePointEnable_DPF _TempDeviation** [Boolean]		
					Exhaust mass flow	< 250.00 [g/s]		
					AND Exhaust mass flow	> 8.00 [g/s]		
					Filtered Exhaust mass flow variation (absolute value)	< 150.00 [g/s]		
					Time in which the svstem	<= 30.00 [seel		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					is in cut off			
					All the above enabling conditions are met for at least a timer	> 10.00 [sec]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Particulate Filter Restriction - Ash Accumulation	P24A4	This diagnostic detects a clogged DPF that has to be replaced	(Soot model based on Delta pressure measure plus configurable correction block (CCB) AND DPF_DPF_St = CeDPFR_e_SootLoading) (Soot model based on Delta pressure measure plus configurable correction block (CCB) AND DPF_DPF_St != CeDPFR_e_SootLoading) Soot model based on Delta pressure measure plus configurable correction block (CCB) Soot model based on Delta pressure measure plus configurable correction block (CCB)	> 350.00 [Pct] >400.00 [Pct]	Test enabled by calibration No fault on DPF pressure sensor (electrical, rationality and offset) No fault on upstream DPF temperature sensor (electrical and rationality; if not present, no fault on downstream catalyst temperature sensor) with the exception of the fault on downstream DPF temperture sensor No fault on air flow meter No fault on atmospheric pressure sensor Engine speed No fault on exhaust mass flow estimation	1.00==TRUE EGP_DiffPresSnsrFlt ==FALSE EGT_SnsrDPF_UpFlt ==FALSE (if sensor not present, EGT_SnsrCatDwnFlt ==FALSE) Exception: above condition ==TRUE AND EGT_SnsrDPF_DwnFlt ==TRUE MAF_MAF_SnsrFA ==FALSE AND MAF_MAF_SnsrTFTKO ==FALSE AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd > 600.00 [rpm] EXF_TotExhDPF_UpFA ==FALSE >60.00 [l/s]	If DPF_DPF_St = CeDPFR_e_SootLoading 20.00 failures over 40.00 samples elseif DPF_DPF_St != CeDPFR_e_SootLoading 20.00 failures over40.00 samples function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Exhaust gas volume flow greater than a calibrateable threshold for more than a calibratable time Exhaust gas temperature at DPF inlet is between two thresholds for a minimum calibrateable time Engine Coolant Temperature OR OBD Coolant Enable Criteria Ambient Temperature Soot model based on Delta Pressure plus configurable correction block (CCB) is valid for a time Soot model based on Delta Pressure is always valid for a time Icing risk for delta pressure sensor's pipes is low	for > 2.00 [s] >0.00 [DegC] AND < 700.00 [DegC] for > 5.00 [s] > -40.00 [DegC] ==TRUE > -40.00 [DegC] > =0.20% of the soot loading >= 5.00 s ==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Control Stuck (ECB DC Motor)	P24A5	This monitor detects the HP EGR Cooler Bypass mechanically stuck in a certain position different from its defaulted position (fully closed, cooling mode) when the actuator is no longer driven (missing dafaulted position)	Measured HP EGR Cooler Bypass position > maximum threshold (not cooling position)	>15.00 [%]	P245B is already set		No debounce is present: DTC sets as soon as the error is present Function task: 6.25 ms	Type A, 1 Trips
					Waiting time after driver shut off > minimum threshold (needed for the spring to drive the vanes in their defaulted position)	> 1.00 [s]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					HP EGR Cooler Bypass position closed loop control active (no faults present on HP EGR Cooler Bypass position sensor, HP EGR Cooler Bypass flap, HP EGR Cooler Bypass position control deviation)	CEB_PstnSnsrFlt ==FALSE CEB_ActrFlt==FALSE CEB_ObstructionTFTKO ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Circuit Range/ Performance	P24AF	This diagnosis detects a soot sensor memory corruption	Soot sensor state machine command (ECM) is different from SCU feedback		Soot Sensor bus relay is commanded on for a time No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Transmission fault with sensor control unit not present Soot sensor state machine command is different from initialization state or error state Time between states transition	> 1.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P30BC) > 120.00	Time counter: 160.00 failures out of 200.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Circuit Low	P24B0	This diagnosis detects an open circuit on the soot sensor electrode signal or a cracked electrode	Soot Soot Electrode raw current measured at setpoint temperature 1 - Soot Soot Electrode raw current measured at setpoint temperature 2	<1.30	Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor No Electrical faults present on Soot Sensor Soot Sensor is in regeneration phase Soot Sensor Electrode current measurement enabled Transmission fault with sensor control unit not present Sensor is commanded in a regeneration state	 NOT(SBR_RlyFA) NOT (SOT_SootSnsr_SrlLcFA) NOT(SOT_ElecIFlt) NOT (SOT_SootSnsr_SrlFsFA)		Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Circuit High	P24B1	This diagnosis detects a short to power the soot sensor electrode signal	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Electrode supply voltage (measured ADC voltage for electrode current)	>4.1 V	Soot Sensor Control Unit conditions: No conditions ECU conditions: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply IDE Temperature is lower than In case of overthreshold event the diagnostic will be re-enabled by passing (hysteresis)	NOT(SBR_RlyFA) NOT(U02A3) NOT(P1473) 550.00 500.00	Time counter: 24.00 consecutive failures OR 24.00 failures out of 92.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Heater Control Circuit Low	P24B5	This diagnosis detects a short to ground on the soot sensor heater line	Diagnosis executed in Sensor Control Unit: Soot Sensor Heater current Number of SCG error events	1< 0.5 A OR 1> 15 A > 100	Soot Sensor Control Unit conditions: Soot Sensor Heater Commanded on, i.e., heater duty cycle ECU conditions: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	> 0 % NOT(SBR_RlyFA) NOT(U02A3) NOT(P1473)	Time counter: 9.00 consecutive failures OR 9.00 failures out of 32.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Heater Control Circuit High	P24B6	This diagnosis detects a short to power on the soot sensor heater line	<u>Diagnosis executed in Soot Sensor Control Unit:</u> Soot Sensor Heater output voltage OR Soot Sensor Heater switch input (off state) OR Soot Sensor Heater switch current in PWM OFF state	 > 6 V in PWM OFF state = 1 0.5 A < I < 15 A	<u>Soot Sensor Control Unit conditions:</u> No conditions <u>ECU conditions:</u> Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	 NOT(SBR_RlyFA) NOT(U02A3) NOT(P1473)	Time counter: 25.00 consecutive failures OR 24.00 failures out of 96.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Position Sensor Exceeded Learning Limit (analog position sensor)	P24C4	This monitor checks if the HP EGR cooler bypass position analog sensor has an offset with respect to the nominal position where the valve does the learning procedure (cooling position and bypass position)	analog position raw voltage when the valve is in cooling position < low threshold OR analog position raw voltage when the valve is in cooling position > high threshold OR analog position raw voltage when the valve is in bypass position < low threshold OR analog position raw voltage when the valve is in bypass position > high threshold	< 16.00 [%5V] OR > 24.00 [%5V] OR < 60.90 [%5V] OR > 91.40[%5V]	Test enabled by calibration Learning procedure at key off in fully closed and fully open position has been successfully completed: - engine coolant in range; - no faults present on engine coolant temperature. No faults present on HP EGR cooler bypass position sensor, HP EGR cooler bypass valve, HP EGR cooler bypass position deviation End Of Trip event has elapsed	= 1.00 >= 30.00 [°C] <= 129.00 [°C] ECT_Sensor_FA == FALSE CEB_ActrFlt == FALSE CEB_PstnSnsrFlt == FALSE CEB_ObstructionTFTKO == FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Particulate Matter Sensor Temperature Circuit Performance	P24C7	This diagnosis detects a soot sensor removed from the exhaust line, a soot sensor temperature sensor damaged or a possible parasitic resistance on the wiring harness between the soot sensor heater and the soot sensor control unit.	The absolute value of the difference between the Soot Sensor Electrode and the electrode temperature model	>100.00 °C	Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Engine in running mode No electrical fault detected on Soot Sensor Soot Sensor heater is not commanded Soot Sensor is in measurement operating status Exhaust gas temperature model is valid	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(SOT_ElecIFlt) SOT_ExhTempSootSnsrVld AND SOT_TotExhSootSnsrVld AND NOT(OAT_PtEstFiltFA) AND AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd AND NOT (VehicleSpeedSensor_FA)	Time counter: 250.00 failures out of 255.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Exhaust gas temperature model is reliable, i.e.:			
					(Ambient air pressure	> 70.00 kPa		
					Ambient air temperature	> -20.00 °C		
					Exhaust gas volumetric flow at soot sensor)	> 50.00 mg/s		
					Time after sensor regeneration	>300.00 s OR > 100.00 °C		
					Temperature estimated by the sensor probe temperature model - Electrode temperature	> 100.00 °C		
						NOT(P30BC)		
						> 300.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Temperature estimated by the sensor probe temperature model - Outside air temperature Transmission fault with sensor control unit not present Heating during measurement is not active or heater off condition			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Temperature Circuit High	P24C9	This diagnosis detects a short to power or an open circuit on the soot sensor temperature signal	Diagnosis executed in Soot Sensor Control Unit: Voltage of Soot Sensor temperature meander (TM) signal Soot Sensor Temperature meander (TM) refernce voltage signal	< 0.3 V OR > 3.5 V <4.5 V	Soot Sensor Control Unit conditions: No conditions ECU conditions: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	NOT(SBR_RlyFA) NOT(U02A3) NOT(P1473)	Time counter: 24.00 consecutive failures OR 24.00 failures out of 96.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Regeneratio n Incomplete	P24D1	This diagnosis detects a degradation of the soot sensor heater	the Soot Sensor Electrode Temperature is during the steady state soot sensor regeneration, for a consecutively time	<=(725.00-10.00)°C < 43.00 s	Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor No electrical fault detected on Soot Sensor Volumetric flow estimation is valid The power ratio timer the power ratio timer increments during the steady state of soot sensor regeneration, when the ratio between power demand and power available is Soot sensor transitioned from regeneration to	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(SOT_ElecIFlt) SOT_TotExhSootSnsrVld AND SOT_ExhTempSootSnsrVId AND SOT_ExhPresSootSnsrVId < 5.00 s r<= 1.00	no debouncing time	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					measurement status Transmission fault with sensor control unit not present	NOT(P30BC)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Exhaust Sample Error Bank 1 - (EWMA filter used)	P24DA	This diagnosis detects a soot sensor that has been removed from exhaust line or is clogged	{Heater power filtered using EWMA filter is}	< 1.66	Key is turned on		No debounce time	Type A, 1 Trips
			OR		Ignition voltage in range	> 11.00		
				SOT_SnsrB_ExhGasInChkFA == TRUE	Engine in running mode			
			{Particulate Matter Sensor Exhaust Sample Error Bank 1 previously detected (TRUE -> fault active)		Soot Sensor bus relay is commanded on			
			active)	< 1.66	No electrical fault active on Soot Sensor bus relay	NOT(SBR_RlyFA)		
			AND					
			Heater power filtered using EWMA filter is}		No faults of CAN communication loss with Soot Sensor	(U02A3)		
					No Soot Sensor supply undervoltage detected	NOT(P24DO)		
					No electrical fault detected on Soot Sensor	NOT(SOT_ElecIFlt)		
					No fault on exhaust gas pressure estimation at sensor location	SOT_ExhPresSootSnsrVld		
					No fault on exhaust gas temperature estimation at sensor location	SOT_ExhTempSootSnsrVld		
					No fault on gas mass flow estimation at sensor location	SOT_TotExhSootSnsrVld		
					Diagnostic active only during Soot Sensor protection heating phase OR during Soot Sensor protection heating phase	0.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					and Soot sensor regeneration phase			
					Derivative in volumetric flow for a time	3.00 < d2V < 100.00 > = 0.00 s		
					At InitCntrlr time since engine off	> 28,800.00 s		
					At InitCntrlr time since engine off is valid	NOT EngineModeNotRunTimer Error		
					The time from the Soot Sensor Heater is controlled in closed loop	> 22.00 s		
					As soon as Soot Sensor is supplied the time since PM sensor heating off (module off plus heating off)	> 600.00 s		
					Exhaust gas temperature at Soot Sensor	-20.00 < T <200.00 °C		
					Environmental pressure	> 70.0 kPa		
					Diagnostic has not yet reported a pass or failure			
					The sign of derivative in volumetric flow does not change for a time	>= 0.00 s		
					Transmission fault with sensor control unit not present	NOT(P30BC)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharge rVGTA Stuck Closed (VGT Smart)	P2599	This monitor detects the VGT vanes mechanically stuck in a certain position different from their defaulted position (fully open) when the actuator is no longer driven (missing defaulted position)	Position after P0046 has set > threshold	>26.00 [%]	P0046 is already set Diagnostic system enabled (no clear code or EOT in progress) Waiting time after driver shut off > minimum threshold (needed for the spring to drive the valve in its defaulted position) No faults present on VGT position sensor, VGT vanes, VGT position control deviation	 >2.00 [s] VGT_PstnSnsrOfstFA ==FALSE VGT_SmartActrFA ==FALSE CFM_VGT_CommFA == FALSE	No debounce is present: DTC sets as soon as the error is present Function task: 25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2 Sensor Pumping Current Trim Circuit Low Bank 1 Sensor 1	P2627	This DTC detects if O2 signal is lower than physical minimum value.	O2 signal lower than a minimum value	< -6.00 [%]	Engine running System voltage in range Sensor is fully operative Enabled in combustion mode No pending or confirmed DTC	 > 11.00 [V] OXY_NOx1_O2_RawNotRib == FALSE refer to supporting table **KaOXYD_b_NOx1SigRn(gEnblCmbMode**) NOX_Snsr1_NotVld	Time counter: 200 failures out of 250 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2 Sensor Pumping Current Trim Circuit High Bank 1 Sensor 1	P2628	This DTC detects if O2 signal is higher than physical maximum value.	O2 signal higher than a maximum value	> 29.00 [%]	Engine running System voltage in range Sensor is fully operative Exhaust gas pressure No Exhaust Brake active i.e. intake manifold pressure No pending or confirmed DTCs	 > 11.00 [V] OXY_NOx1_O2_RawNot Rib == FALSE < 1,000.00 [kPa] < 1,000.00 [kPa] NOX_Snsr1_NotVld NOX_Snsr1_PresFlt (MAP_SensorFA AND MAP SensorTFTKO)	Time counter: 100 failures out of 200 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Injector Data Incompatible	P268C	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 1 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 1 EIA code not written via DID (DID $60).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Injector Data Incompatible	P268D	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 2 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 2 EIA code not written via DID (DID $61).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Injector Data Incompatible	P268E	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 3 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 3 EIA code not written via DID (DID $62).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Injector Data Incompatible	P268F	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 4 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 4 EIA code not written via DID (DID $63).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Injector Data Incompatible	P2690	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 5 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 5 EIA code not written via DID (DID $64).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Injector Data Incompatible	P2691	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 6 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 6 EIA code not written via DID (DID $65).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 Injector Data Incompatible	P2692	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 7 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 7 EIA code not written via DID (DID $66).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 Injector Data Incompatible	P2693	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 8 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 8 EIA code not written via DID (DID $67).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Diesel Intake Air Flow "A" Control Performance	P2957	This monitor detects an obstruction on the actuator (obstruction found during the Throttle valve opening or closing) checking the setpoint position against the position measured by the Throttle Position Sensor.	(Throttle Position Tracking Error| (setpoint position - measured position) > maximum threshold	> 16.00 [%]	Cold Start strategy enabled	== TRUE	1,280.00 fail counts out of 1,600.00 sample counts Function task: 6.25 ms	Type B, 2 Trips
					Test enabled by calibration	==1.00		
					Diagnostic system enabled (no clear code or EOT in progress)			
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening)	>0.00 [°C]		
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature higher or equal to minimum threshold	>=-23.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No faults present on outside air temperature sensor Throttle position setpoint in steady state conditions for minimum time Throttle position closed loop control active	OAT_PtEstFiltFA ==FALSE > -160.00 [%/s] < 160.00 [%/s] for >= 0.40 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Turbocharge rVGTA Circuit Range/ Performance	P2958	This monitor detects an obstruction on the actuator (obstruction found during the vanes opening or closing) checking the setpoint position against the position measured by the VGT Position Sensor	Absolute value of position tracking error (setpoint position - measured position)	> 16.00 [%]	Cold Start strategy enabled	== TRUE	420.00 fail counts out of 520.00 sample counts Function task: 6.25 ms	Type B, 2 Trips
					Test enabled by calibration	== 1.00		
					Diagnostic system enabled (no clear code or EOT in progress)			
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					VGT position closed loop control active			
					VGT position setpoint in steady state conditions for minimum time	> -100.00 [%/s] < 100.00 [%/s] for >= 0.50 [s]		
					Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature	>0.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					reached (thermostat opening)			
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature higher or equal to minimum threshold	>= -60.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Exhaust Gas Recirculation Cooler Bypass Valve Performance (ECB DC Motor)	P2959	This monitor detects an obstruction on the actuator (obstruction found during the HP EGR Cooler Bypass valve opening or closing) checking the setpoint position against the position measured by the HP EGR Cooler Bypass Position Sensor	|HP EGR Cooler Bypass Position Tracking Error| (setpoint position - measured position) > maximum threshold	> 21.00 [%]	Cold Start strategy enabled	==TRUE	1,280.00 fail counts out of 1,600.00 sample counts Function task: 6.25 ms	Type B, 2 Trips
					Test enabled by calibration	==1.00		
					Diagnostic system enabled (no clear code or EOT in progress)			
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					HP EGR Cooler Bypass position closed loop control active (no faults present on HP EGR Cooler Bypass position sensor, HP EGR Cooler Bypass flap, HP EGR Cooler Bypass position control deviation)	CEB_PstnSnsrFlt ==FALSE CEB_ActrFlt==FALSE CEB_ObstructionTFTKO ==FALSE		
					HP EGR Cooler Bypass position setpoint in steady state conditions for minimum time	<160.00 [%/s] >-160.00 [%/s] for >=0.40 [s]		
					Engine coolant temperature higher or	>=0.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					equal to minimum threshold (calculated with a table ECT/OAT) OR Engine cooling system target temperature reached (thermostat opening)			
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature higher or equal to minimum threshold	>=-23.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit Range/ Performance Bank 1 Sensor 1	P2A00	This DTC aims to detect a drift of measured 02 value (A) from an estimated concentration (B) when the latter can be considered stable during full load condition.	(A - B) in full load condition is out of plausible range	> 5.00 [%] < -5.00 [%]	Engine running System voltage in range Sensor is fully operative Enabled in combustion mode (No After injection release AND Boolean Flag used to enable After injection status is TRUE) No pending or confirmed DTCs DFCO by-pass Strategy NOT active Stable fuel cut-off condition has been	> 11.00 [V] OXY_NOx1_O2_RawNotRib == FALSE refer to supporting table (**KaOXYD_b_NOx1LoadChkCmbModeEnbl**) 0 [boolean] NOX_Snsr1_NotVld NOX_Snsr1_PresFlt OXY_NOx1SignRngChkFlt OXY_O2_NOx1PlausMdlFit FHPJnjLeakageFA (MAF_MAF_SnsrFA AND MAF_MAF_SnsrTFTKO) EGR_VlvTotFlowNotValid	Time counter: (140+1) failures out of 255 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					reached i.e. following conditions are met for a calibrateable time: a. Engine speed in operating range b. EGR mass flow c. Injected fuel quantity in operating range d. Air mass per cylinder in operating range Estimated 02 concentration stable i.e. difference between initial and actual value Air mass flown since fuel cut-off condition	> 1.00 [s] > 1,100 [rpm] < 2,000 [rpm] < 1,000.00 [mg] > 20.00 [mm^3] < 50.00 [mm^3] > 400.00 [mg] < 1,800.00 [mg] < 1.00 [%] >0.30 [g]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit Range/ Performance Bank 1 Sensor 2	P2A01	This DTC aims to detect a drift of Sensor 2 0 2 measured value (A) from Sensor 1 0 2 measured value (B) when the latter can be considered stable during full load condition.	(A - B) in full load condition is out of plausible range	> 5.00 [%] < -5.00 [%]	Engine running		Time counter: (140+1) failures out of 240 samples. Time task 25[ms]	Type B, 2 Trips
					System voltage in range	> 11.00 [V]		
					Sensor is fully operative	OXY_O2_NOx2_PresCmpNotRIb == FALSE		
					Sensori is fully operative	OXY_O2_NOx1_PresCmpNotRIb == FALSE		
					No pending or confirmed DTCs	NOX_Snsr2_NotVld NOX_Snsr2_PresFlt OXY_NOx2SignRngChkFlt OXY_NOx1_O2_Flt (MAF_SensorFA AND MAF_SensorTFTKO)		
					DTC P2A00 is running	(see P2A00 Fault code)		
					Air mass flown since P2A00 enabled	>0.30 [g]		
					Air mass flown since P2A00 disabled	> 10.00[g]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Cooler Bypass Valve Motor Overtemperature (ECB DC Motor)	P2AA5	This monitor checks if the temperature of the HP EGR cooler bypass DC-Motor increases too much (e.g. HP EGR cooler bypass DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	==1.00 > 11.00 [V]	160.00 fail counts out of 200.00 sample counts Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

Particulate Matter Sensor Processor Performance	P2AB0	This diagnosis detects internal errors to the current switcher (SCU internal error).	NOT
			{
			Soot Sensor Electrode current read in small range
			>=
			Minimum current value in small range
			
			AND
			
			Soot Sensor Electrode current read in small range
			<=
			Maximum current value in small range
			}
					Soot sensor is in regeneration phase
					
					Soot Sensor bus relay is commanded on
					
					No electrical fault active on Soot Sensor bus relay
					
					No faults of CAN communication loss with Soot Sensor
					
					No Electrical faults present on Soot Sensor
					
					Transmission fault with sensor control unit not present
					
					Soot Sensor Electrode current measurement enabled
					
					Soot Sensor Electrode current read in large range
						NOT(SBR_RlyFA)
						
						NOT (SOT_SootSnsr_SrlLcFA)
						
						NOT(SOT_EleclFlt)
						
						NOT (SOT_SootSnsr_SrlFsFA)
						
						{<=
						400.00
						
						AND
						
						<=
						1.40
								Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Exhaust Gas Temperature Sensors Bank 1 Sensor 5	U01D2	This function has the purpose to detect is there any problem of the SENT sensor wiring harness or sensor internal faults that cause the SENT signal to be switched off,sensor internal faults that cause the SENT protocol communication faults.In this case two DTC shall be set, the DTC relative to a Modulel or Module2, it detende at which module the EGT sensore is connected.	Message Faults OR Message Age	>0 >100.00 [s]	Monitor enable by a dedicated calibration AND RunCranckActive AND EngineModeCranck AND RunCranklgnln Range AND Diagnostic System Disabled AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 ==TRUE ==FALSE ==FALSE ==TRUE	19.00 fail sample out of 25.00 Functional task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Exhaust Gas Temperature Sensors Bank 1 Sensor 1	U061F	This function has the purpose to detect is there any problem of the SENT sensor wiring harness or sensor internal faults that cause the SENT signal to be switched off,sensor internal faults that cause the SENT protocol communication faults.In this case two DTC shall be set, the DTC relative to a Modulel or Module2, it detende at which module the EGT1 sensore is connected.	Message Faults OR Message Age	>0 >100.00 [s]	Monitor enable by a dedicated calibration AND RunCranckActive AND EngineModeCranck AND RunCrankIgnIn Range AND Diagnostic System Disabled AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 ==TRUE ==FALSE ==FALSE ==TRUE	19.00 fail sample out of 25.00 Functional task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Exhaust Gas Temperature Sensors Bank 1 Sensor 2	U0620	This function has the purpose to detect is there any problem of the SENT sensor wiring harness or sensor internal faults that cause the SENT signal to be switched off,sensor internal faults that cause the SENT protocol communication faults.In this case two DTC shall be set, the DTC relative to a Modulel or Module2, it detende at which module the EGT2 sensore is connected.	Message Faults OR Message Age	>0 >100.00 [s]	Monitor enable by a dedicated calibration AND RunCranckActive AND EngineModeCranck AND RunCranklgnln Range AND Diagnostic System Disabled AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 ==TRUE ==FALSE ==FALSE ==TRUE	19.00 fail sample out of 25.00 Functional task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Diesel Intake Air Flow "A" Position Sensor	U0654	This monitor checks if the Throttle position sensor protocol is out of range low, out of range high or has performance problems	(HWIO counter of valid Throttle SENT position indications no longer updated > threshold (age error = TRUE) AND HWIO Throttle SENT position protocol status) OR (HWIO time counter since last valid Throttle SENT position was transmitted > threshold (age error = TRUE) AND HWIO Throttle SENT position protocol status) OR (HWIO message fault on Throttle SENT position == TRUE OR	> 6.25 [ms] AND == STEADY LOW > 6.25 [ms] AND == STEADY HIGH message error==TRUE OR	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress)	== 1.00 >11.00 [V]	200.00 fail counts out of 250.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			(number of Throttle SENT position counters has been updated AND HWIO time counter since last valid Throttle SENT position was transmitted > threshold (age error = TRUE)))	 ------------- AND > 6.25 [ms]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Exhaust Gas Temperature Sensors Bank 1 Sensor 3	U069A	This function has the purpose to detect is there any problem of the SENT sensor wiring harness or sensor internal faults that cause the SENT signal to be switched off,sensor internal faults that cause the SENT protocol communication faults.In this case two DTC shall be set, the DTC relative to a Modulel or Module2, it detende at which module the EGT sensore is connected.	Message Faults OR Message Age	>0 >100.00 [s]	Monitor enable by a dedicated calibration AND RunCranckActive AND EngineModeCranck AND RunCranklgnln Range AND Diagnostic System Disabled AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 ==TRUE ==FALSE ==FALSE ==TRUE	19.00 fail sample out of 25.00 Functional task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Exhaust Gas Temperature Sensors Bank 1 Sensor 4	U069B	This function has the purpose to detect is there any problem of the SENT sensor wiring harness or sensor internal faults that cause the SENT signal to be switched off,sensor internal faults that cause the SENT protocol communication faults.In this case two DTC shall be set, the DTC relative to a Modulel or Module2, it detende at which module the EGT sensore is connected.	Message Faults OR Message Age	>0 >100.00 [s]	Monitor enable by a dedicated calibration AND RunCranckActive AND EngineModeCranck AND RunCranklgnln Range AND Diagnostic System Disabled AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 ==TRUE ==FALSE ==FALSE ==TRUE	19.00 fail sample out of 25.00 Functional task: 100ms	Type A, 1 Trips

Initial Supporting table - EnginePointEnable DPF TempDeviation

Description: Map to enable DPF Control Temperature Deviation monitoring, function of engine speed and desired fuel.

y/x	850	900	2,000	2,500	3,000	3,500	4,000	5,000
0	0	0	0	0	0	0	0	0
1	0	1	1	1	1	1	1	1
10	0	1	1	1	1	1	1	1
13	0	1	1	1	1	1	1	1
20	0	1	1	1	1	1	1	1
30	0	1	1	1	1	1	1	1
40	0	1	1	1	1	1	1	1
80	0	1	1	1	1	1	1	1
90	0	0	0	0	0	0	0	0

Initial Supporting table - EnginePointEnable HC TempDeviation

Description: Map to enable HC Injector Control Temperature Deviation monitoring, function of engine speed and desired fuel.

y/x	850	900	1,100	1,200	1,800	2,000	2,800	3,500
0	0	1	1	1	1	1	1	1
5	0	1	1	1	1	1	1	1
10	0	1	1	1	1	1	1	1
15	0	1	1	1	1	1	1	1
20	0	1	1	1	1	1	1	1
50	0	1	1	1	1	1	1	1
80	0	1	1	1	1	1	1	1
120	0	1	1	1	1	1	1	1
140	0	1	1	1	1	1	1	1

Initial Supporting table - P0128 Maximum Acculated Energy - Primary

Description: KtETHD_E_EOR_WrmllpEnrgyLimTestO

Value Units: Cooling system energy failure threshold (kJ)
X Unit: Minimum ECT for the key cycle (°C)

y/x	-20.0	-7.0	10.0	30.0	45.0	60.0	75.0
1.0	39,374.1	34,343.9	27,765.8	20,026.9	14,222.8	8,148.6	8,418.6

Initial Supporting table - P0128 Maximum Acculated Energy - Secondary

Description: KtETHD_E_EOR_WrmllpEnrgyLimTest1

Value Units: Cooling system energy failure threshold (kJ)
X Unit: Minimum ECT for the key cycle (°C)

y/x	-20.0	-7.0	10.0	30.0	45.0	60.0	75.0
1.0	39,930.8	33,133.6	24,245.1	13,788.0	5,945.1	5,945.1	5,945.1

Initial Supporting table - P0128 Maximum Acculated Energy - Tertiary

Description: KtETHD_E_EOR_WrmlIpEnrgyLimTest2

Value Units: Cooling system energy failure threshold (kJ)
X Unit: Minimum ECT for the key cycle (°C)

y/x	-20.0	-7.0	10.0	30.0	45.0	60.0	75.0
1.0	39,930.8	33,133.6	24,245.1	13,788.0	5,945.1	5,945.1	5,945.1

Initial Supporting table - P01F01 - Heat To Coolant Min 2D

Description: KtETHD_P_CDD_HeatToCoolantMin

Value Units: Indicated Power (kW)
X Unit: Firing Fraction
Y Units: Ambient temperature (°C)

y/x	0.00	0.25	0.50	0.75	1.00
-9.0	15.0	15.0	15.0	15.0	15.0
0.0	15.0	15.0	15.0	15.0	15.0
10.0	30.0	30.0	30.0	30.0	30.0
20.0	30.0	30.0	30.0	30.0	30.0
50.0	30.0	30.0	30.0	30.0	30.0

Initial Supporting table - P026A: Efficiency Offset

Description: Charge Air Cooler Efficiency Offset, function of compressor total flow and water pump speed

Value Units: [%]
X Unit: [g/s]
Y Units: [rpm]

y/x	0	1	2	3	4	5	6
20	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0
200	0	0	0	0	0	0	0
250	0	0	0	0	0	0	0

Initial Supporting table - P062B_CSM_ASIC_RAMCorruption_FailLim

Description: Fail Limit for Controller Status Monitoring - ASIC in case of RAM Corruption fail: CeFULD_Cnt_RAMCorruptionFailLim

y/x	1
1	4

Initial Supporting table - P062B_CSM_ASIC_RAMCorruption_SmplLim

Description: Sample Limit for Controller Status Monitoring - ASIC in case of RAM Corruption: CeFULD_Cnt_RAMCorruptionSmplLim

y/x	1
1	5

Initial Supporting table - P062B_CSM_ASIC_TimeOutReached_FailLim

Description: Fail Limit for Controller Status Monitoring - ASIC in case of TimeOut Reached fail: CeFULD_Cnt_TimeOut_FailLim

y/x	1
1	1

Initial Supporting table - P062B_CSM_ASIC_TimeOutReached_SmplLim

Description: Sample Limit for Controller Status Monitoring - ASIC in case of TimeOut Reached: CeFULD_Cnt_TimeOut_SmplLim

y/x	1
1	2

Initial Supporting table - PmpPerf: Tabel to estimate the eixpected pump AC current based on the pump speed.

Description: Tabel to estimate the expected pump AC current based on the pump speed.

Value Units: [A] Expected AC current
X Unit: [rpm] KnlCPD_n_CAC_PumpSpeed

y/x	0	600	1,400	2,100	2,800	3,500	4,160
-40	0	1	1	2	2	3	4
-30	0	0	1	1	2	3	3
25	0	0	0	1	1	1	2
90	0	0	0	1	1	1	2
120	0	0	0	1	1	2	3

Initial Supporting table - P04DB: Crankcase Pressure Noise Normalization for Engine Speed, high case

Description: Value to normalize the Crankcase Pressure signal noise based on engine speed, high case

Value Units: Scaling Factor for Noise (Unitless)
X Unit: Engine Speed (RPM)
Y Units: None

y/x	1,450	1,619	1,788	1,956	2,125	2,294	2,463	2,631	2,800
1	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00

Initial Supporting table - P04DB: Crankcase Pressure Noise Normalization for Engine Speed, low case

Description: Value to normalize the Crankcase Pressure signal noise based on engine speed, low case

Value Units: Scaling Factor for Noise (Unitless)
X Unit: Engine Speed (RPM)
Y Units: None

y/x	1,450	1,619	1,788	1,956	2,125	2,294	2,463	2,631	2,800
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Initial Supporting table - P04DB: Crankcase Pressure Signal Normalization for Air Flow, high case

Description: Value to normalize the Crankcase Pressure signal based on engine air flow, low case

Value Units: Scaling Factor for Signal (Unitless)
X Unit: Engine Air Flow (Grams/Second)
Y Units: None

y/x	10	15	20	25	30	35	40	45	50
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - P04DB: Crankcase Pressure Signal Normalization for Air Flow, low case

Description: Value to normalize the Crankcase Pressure signal based on engine air flow, low case

Value Units: Scaling Factor for Signal (Unitless)
X Unit: Engine Air Flow (Grams/Second)
Y Units: None

y/x	125	146	168	189	210	231	253	274	295
1	5.27	3.76	2.88	2.31	1.89	1.59	1.35	1.16	1.00

Initial Supporting table - P04DB: MAP Transient Delay Active Time

Description: MAP Transient Delay Active Time

Value Units: MAP Transient Delay (seconds*10)
X Unit: MAP Transient Delta (kPa)
Y Units: None

y/x	175.0	185.0	196.0	207.0	218.0	239.0	240.0
1	0	0	0	0	0	0	0

Initial Supporting table - P04DB: MAP Transient Delta Threshold

Description: MAP Transient Delta Threshold

Value Units: MAP Transient Delta (kPa)
X Unit: Engine Speed (RPM)
Y Units: None

y/x	500	800	1,100	1,400	1,700	2,000	2,300
1	175.0	185.0	196.0	207.0	218.0	239.0	240.0

Initial Supporting table - PmpSpdPerfDiagDly

Description:

y/x	-40	-30	25	90	120
1	60	20	10	5	5

Initial Supporting table - PumpSpdPerfErrorLim

Description:

y/x	0	600	1,400	2,100	2,800	3,500	4,160
1	550	550	750	750	750	750	750

Initial Supporting table - SCR_Eff1_CombMode_Enbl

Description:

SCR_Eff1_CombMode_Enbl - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	0

SCR_Eff1_CombMode_Enbl - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

SCR_Eff1_CombMode_Enbl - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

SCR_Eff1_CombMode_Enbl - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - EnginePointEnable DPF TempDeviation

Description:

y/x	850	900	2,000	2,500	3,000	3,500	4,000	5,000
0	0	0	0	0	0	0	0	0
1	0	1	1	1	1	1	1	1
10	0	1	1	1	1	1	1	1
13	0	1	1	1	1	1	1	1
20	0	1	1	1	1	1	1	1
30	0	1	1	1	1	1	1	1
40	0	1	1	1	1	1	1	1
80	0	1	1	1	1	1	1	1
90	0	0	0	0	0	0	0	0

Initial Supporting table - EnginePointEnable HC TempDeviation

Description:

y/x	850	900	1,100	1,200	1,800	2,000	2,800	3,500
0	0	1	1	1	1	1	1	1
5	0	1	1	1	1	1	1	1
10	0	1	1	1	1	1	1	1
15	0	1	1	1	1	1	1	1
20	0	1	1	1	1	1	1	1
50	0	1	1	1	1	1	1	1
80	0	1	1	1	1	1	1	1
120	0	1	1	1	1	1	1	1
140	0	1	1	1	1	1	1	1

Initial Supporting table - Inrush current profile

Description: This table shows the Inrush current profile to detect a ground short condition

y/x	1	2
1	Time [s]	Irms [A]
2	0	0
3	0	65
4	0	50
5	0	45
6	0	42
7	0	38
8	1	35
9	1	33
10	1	32
11	1	31
12	1	31
13	1	30
14	1	29
15	1	28
16	1	26
17	1	25
18	2	24
19	2	23
20	2	23
21	2	22
22	2	22
23	2	21
24	2	21
25	2	21
26	2	21
27	2	21
28	3	21
29	3	20
30	3	20
31	3	20
32	3	20
33	3	20
34	3	20
35	3	20

Initial Supporting table - Inrush current profile

36	3	20
37	3	20
38	4	20
39	4	20
40	4	20
41	4	20
42	4	20
43	4	20
44	4	20
45	4	20
46	4	20
47	4	20
48	5	20
49	5	20
50	5	20
51	5	20
52	5	20
53	5	20
54	6	15
55	7	13
56	8	13
57	9	13
58	10	13
59	11	13
60	12	13
61	13	13
62	14	13
63	15	13
64	16	13
65	17	13
66	18	13
67	20	13

Initial Supporting table - KaFADC_n_DFSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12
1	5	5	5	5	5	5	5	5	5	5	5	5	5

Initial Supporting table - KaFADC_n_FSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	1	1	0	0	4	4	4	4	4	4

Initial Supporting table - KaOXYD_b_NOx1LoadChkCmbModeEnbl

Description: This array indicates what are the combustion mode in which Plausibility Diagnosis in Full Load condition is enabled

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	0	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 5

y/x				
1				

Initial Supporting table - KaOXYD_b_NOx1OvrnChkCmbModeEnbl

Description: This array indicates what are the combustion mode in which Plausibility Diagnosis in Overrun condition is enabled

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	0

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 5

y/x				
1				

Initial Supporting table - KaOXYD_b_NOx1SigRngEnblCmbMode

Description: This array indicates what are the combustion mode in which Signal Range Diagnosis is enabled

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	1	1	1

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	1	1	1	1

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	1	0	0	0

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 5

y/x				
1				

Initial Supporting table - KaOXYD_b_NOx2SigRngEnblCmbMode

Description: This array indicates what are the combustion mode in which Signal Range Diagnosis is enabled

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	1	1	1

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	1	1	1	1

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	1	0	0	0

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 5

y/x				
1				

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	80	100	120
450	12	13	12	15	18	21	23	28	30	33
700	12	13	14	16	18	21	23	28	30	33
950	12	13	16	18	19	21	23	28	30	33
1,200	12	13	17	20	22	23	24	29	30	33
1,450	12	13	17	20	23	25	26	31	32	34
1,700	12	13	17	20	23	26	30	33	34	35
1,950	12	13	17	20	23	26	30	35	36	38
2,200	12	13	17	20	23	26	30	35	38	41
2,800	12	13	17	20	23	26	30	35	38	41
3,200	12	13	17	20	23	26	30	35	38	41

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	80	100	120
450	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
700	-8	-8	-10	-10	-10	-10	-10	-10	-10	-10
950	-8	-10	-11	-11	-11	-11	-11	-11	-11	-11
1,200	-9	-10	-12	-12	-12	-12	-12	-12	-12	-12
1,450	-10	-11	-12	-13	-13	-13	-13	-13	-13	-13
1,700	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
1,950	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
2,200	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
2,800	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
3,200	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14

Initial Supporting table - KtFADC_V_FSA_MaxFuelFall

Description: Upper bound of fuel quantity range to enable the F8A learning phase depending on the engine speed

Value Units: mm^3

y/x	510	511	800	1,000	1,500	1,750	2,250	2,750	3,000	3,250
1	0	30	60	70	100	120	110	110	100	70

Initial Supporting table - KtGLOD_U_VoltLoDelMax(KnGLOD_I_GP_Curr)

Description: Maximum delta voltage table data for low rationality error check.

y/x	0	4	8	12	16	20	24	28
1	5	5	5	5	5	5	5	5

Initial Supporting table - NOX_NOx1_IncrDynCmbMode

Description: Combustion mode dependent diag enable for Engine Out NOx Sensor dynamic check in increasing direction

NOX_NOx1_IncrDynCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

NOX_NOx1_IncrDynCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_NOx1_IncrDynCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

NOX_NOx1_IncrDynCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - NOX_NOx2SelfTstEnblCmbMode

Description: Combustion mode dependent diag enable for Post Catalyst NOx Sensor selt-test monitoring

NOX_NOx2SelfTstEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

NOX_NOx2SelfTstEnblCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_NOx2SelfTstEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

NOX_NOx2SelfTstEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - NOX_S1_OfstMntrEnblCmbMode

Description:

N0X_S1JDfstMntrEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCRJ/VarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

N0X_S1JDfstMntrEnblCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

N0X_S1JDfstMntrEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

NOX_S1_OfstMntrEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - NOX_S1_OutRngMaxCmbMode

Description: Combustion mode dependent diag enable for Engine Out NOx Sensor OOR high monitor

NOX_S1_OutRngMaxCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

NOX_S1_OutRngMaxCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	1	1	1

NOX_S1_OutRngMaxCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	1	1	1	0

NOX_S1_OutRngMaxCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - NOX_S1_OutRngMinCmbMode

Description: Combustion mode dependent diag enable for Engine Out NOx Sensor OOR low monitor

NOX_S1_OutRngMinCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

NOX_S1_OutRngMinCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	1	1	1

NOX_S1_OutRngMinCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	1	1	1	0

NOX_S1_OutRngMinCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - NOX_S1_PlausChkEnblCmbMode

Description: Combustion mode dependent diag enable for Engine Out NOx Sensor plausibility

NOX_S1_PlausChkEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	0	0	0

NOX_S1_PlausChkEnblCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S1_PlausChkEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

NOX_S1_PlausChkEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - NOX_S1_StBitChkEnblCmbMode

Description: Combustion mode dependent diag enable for Engine Out NOx Sensor stability monitor

NOX_S1_StBitChkEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

NOX_S1_StBitChkEnblCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S1_StBitChkEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

NOX_S1_StBitChkEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - NOX_S2_OfstMntrEnblCmbMode

Description:

NOX_S2_OfstMntrEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

NOX_S2_OfstMntrEnblCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S2_OfstMntrEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

NOX_S2_OfstMntrEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - NOX_S2_OutRngMaxCmbMode

Description: Combustion mode dependent diag enable for Post Catalyst NOx Sensor OCR high monitor

NOX_S2_OutRngMaxCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

NOX_S2_OutRngMaxCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	1	1	1

NOX_S2_OutRngMaxCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	1	1	1	0

NOX_S2_OutRngMaxCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - NOX_S2_OutRngMinCmbMode

Description: Combustion mode dependent diag enable for Post Catalyst NOx Sensor OCR low monitor

NOX_S2_OutRngMinCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

NOX_S2_OutRngMinCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	1	1	1

NOX_S2_OutRngMinCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	1	1	1	0

NOX_S2_OutRngMinCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - NOX_S2_StBitChkEnblCmbMode

Description: Combustion mode dependent diag enable for Post Catalyst NOx Sensor stability monitor

NOX_S2_StBitChkEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

NOX_S2_StBitChkEnblCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S2_StBitChkEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

NOX_S2_StBitChkEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - P0106, P2227, P227B, P00C7: Maximum pressure difference

Description: Maximum delta pressure allowed between the three pressure sensors without setting the fault. It is function of the measured airflow.

Value Units: kPa
X Unit: g/s

y/x	20	25	30	35	40	45	50	55
1	25	30	34	37	40	42	44	46

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for DPF

Description: Hysteresis high threshold for engine coolant temperature too low shut off condition evaluation during DPF combustion modes and SCR service warm up combustion mode. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-10	0	10	20	30
1	10	10	10	10	10	10

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for others

Description: Hysteresis high threshold for engine coolant temperature too low shut off condition evaluation. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-15	-10	0	10	20	30
1	28	15	10	10	10	10

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for DPF

Description: Hysteresis low threshold for engine coolant temperature too low shut off condition evaluation during DPF combustion modes and SCR service warm up combustion mode. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-10	0	10	20	30
1	8	8	8	8	8	8

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for others

Description: Hysteresis low threshold for engine coolant temperature too low shut off condition evaluation. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-15	-10	0	10	20	30
1	26	13	8	8	8	8

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel High Threshold for D1 and D3

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation during D1 and D3 combustion modes. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	60	60	60	60	60	60	60	60

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel Low Threshold for D1 and D3

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation during D1 and D3 combustion modes. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	600	1,000	1,400	1,800	2,200	2,600	3,000	3,400
1	50	50	50	50	50	50	50	50

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for C2

Description: Fuel threshold above which the pressure closed loop control is enabled in C2 mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	50	50	50	30	20	15	10	10	10	10	10	10	10

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for D1 and D3

Description: Fuel threshold above which the pressure closed loop control is enabled in D1 and D3 modes. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	45	43	43	30	25	25	20	20	15	15

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for D4

Description: Fuel threshold above which the pressure closed loop control is enabled in D4 mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	45	43	43	30	25	25	20	20	15	15

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for others

Description: Fuel threshold above which the pressure closed loop control is enabled. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	40	25	20	20	20	20	20	20	20	15	15

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for V3

Description: Fuel threshold above which the pressure closed loop control is enabled in V3 mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	40	25	20	15	15	15	15	15	15	15	15

Initial Supporting table - AIC_BstCntrlCL: On Threshold for V1

Description: Threshold above which the pressure closed loop control is enabled in V1 mode. It is function of engine speed.

Value Units: composite
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	45	40	40	30	25	25	20	20	15	15

Initial Supporting table - AIC_BstCntrlCL: On Threshold for V2

Description: Threshold above which the pressure closed loop control is enabled in V2 mode. It is function of engine speed.

Value Units: composite
X Unit: rpm

y/x	500	700	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,600	2,800	3,400
1	80	80	65	35	20	20	20	20	20	20	20	15	15

Initial Supporting table - Down Stream Stk Temp Vrtn

Description: Minimum temperature movement required to pass the stuck diagnostic.

Value Units: Minimum temperature movement (degC)
X Unit: Downstream Temp sensor temp (degC)

Down Stream Stk Temp Vrtn - Part 1

y/x	-40	0	20	40
1	2	4	5	5

Down Stream Stk Temp Vrtn - Part 2

y/x	60	80	89	90
1	5	4	4	-1

Initial Supporting table - DPFtoRichConversion

Description: This map converts the test result generated by the DPF regeneration portion to the rich combustion expected range.

y/x	1	2	3	4	5	6	7	8
1	1	1	1	1	1	1	1	1

Initial Supporting table - KaFADC_Cnt_SQP_PulsPerStrk

Description: Number of single injection pulses that shall be injected for each stroke. This label is function of SQP rail pressure level.

y/x	0	1	2	3	4	5
1	1	1	1	1	1	1

Initial Supporting table - KaFADC_n_SQP_HiThrshDelt

Description: Delta engine speed threshold to request SQP rail pressure set-point. This label is function of SQP rail pressure level.

KaFADC_n_SQP_HiThrshDelt - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4
1	100	100	100	100

KaFADC_n_SQP_HiThrshDelt - Part 2

y/x	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGr9	CeTGRR_e_TransGr10
1	100	100	100	100

KaFADC_n_SQP_HiThrshDelt - Part 3

y/x	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7
1	100	100	100	100

KaFADC_n_SQP_HiThrshDelt - Part 4

y/x	CeTGRR_e_TransGr8			
1	100			

Initial Supporting table - KaFADC_n_SQP_HysThrsh

Description: Hysteresis on Engine speed thresholds. This label is function of SQP rail pressure level.

KaFADC_n_SQP_HysThrsh - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4
1	50	50	50	50

KaFADC_n_SQP_HysThrsh - Part 2

y/x	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGr9	CeTGRR_e_TransGr10
1	50	50	50	50

KaFADC_n_SQP_HysThrsh - Part 3

y/x	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7
1	50	50	50	50

KaFADC_n_SQP_HysThrsh - Part 4

y/x	CeTGRR_e_TransGr8			
1	50			

Initial Supporting table - KaFADC_t_SQP_MaxAdptDeltET

Description: Maximum DeltaET that can be written in SQP NVM map. This value is also used for maximum authority monitoring.

y/x	0	1	2	3	4	5
1	105	81	60	48	47	47

Initial Supporting table - KaFADC_t_SQP_MinAdptDeltET

Description: Minimum DeltaET that can be written in SQP NVM map. This value is also used for maximum authority monitoring.

y/x	0	1	2	3	4	5
1	-92	-65	-61	-53	-53	-53

Initial Supporting table - KaFADD_Cnt_SQP_ECM_PulsStpET

Description: Number of injection pulses to be performed for each pressure level for quantity injected calculation (quantity averaged over this pulses).

y/x	0	1	2	3	4	5
1	7	10	7	7	7	7

Initial Supporting table - KaFADD_t_SQP_MaxRailPresTrsh

Description: Timer thresholds function of rail pressure levels to set the DTC of rail pressure deviation during cut-off diagnosis. Maximum SQP learning time acceptable for each rail pressure level.

y/x	0	1	2	3	4	5
1	150	150	150	150	150	150

Initial Supporting table - KaFADR_V_SQA_Test

Description: Target quantities to be injected during SQP. One for each rail pressure level.

y/x	CeFADR_e_SQA_LrnPresO	CeFADR_e_SQA_LrnPres1	CeFADR_e_SQA_LrnPres2	CeFADR_e_SQA_LrnPres3	CeFADR_e_SQA_LrnPres4	CeFADR_e_SQA_LrnPres5
1	4	4	4	4	4	4

Initial Supporting table - NOX_S1_HtrPerfEnblCmbMode

Description:

NOX_S1_HtrPerfEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

NOX_S1_HtrPerfEnblCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S1_HtrPerfEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

NOX_S1_HtrPerfEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - NOX_S2_HtrPerfEnblCmbMode

Description:

NOX_S2_HtrPerfEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

NOX_S2_HtrPerfEnblCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S2_HtrPerfEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

NOX_S2_HtrPerfEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - P0234, P0299: Boost pressure control deviation enabling

Description: Calibration map for the enabling of boost pressure control deviation monitoring, function of combustion mode.

Value Units: boolean

y/x	1
1	1

Initial Supporting table - P0234: Maximum boost pressure for overboost monitor enabling

Description: Maximum desired boost pressure below which the overboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	86	90	100
1	180	180	220	220

Initial Supporting table - P0234: Minimum boost pressure for overboost monitor enabling

Description: Minimum desired boost pressure above which the overboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	86	90	100
1	136	136	170	170

Initial Supporting table - P0234: Negative boost deviation threshold (throttle control active)

Description: Boost pressure deviation threshold for the negative boost pressure control deviation monitor when the throttle control is active. It identifies an overboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	70	80	90	100	110	120	130	140	150	160	170	180	200	220	240
1,200	-11	-11	-11	-10	-9	-9	-9	-9	-9	-9	-9	-11	-8	-8	-8
1,300	-11	-11	-11	-10	-7	-7	-7	-7	-5	-5	-7	-10	-9	-10	-10
1,400	-11	-11	-11	-10	-7	-7	-7	-7	-6	-6	-14	-15	-11	-8	-10
1,500	-11	-11	-11	-10	-7	-7	-7	-7	-8	-8	-6	-11	-11	-14	-16
1,600	-11	-11	-11	-10	-7	-7	-7	-7	-10	-9	-7	-11	-13	-15	-17
1,700	-11	-11	-11	-10	-7	-7	-7	-7	-15	-9	-7	-10	-16	-20	-22
1,800	-11	-11	-11	-10	-7	-7	-7	-7	-8	-9	-10	-11	-15	-25	-27
1,900	-11	-11	-11	-10	-7	-7	-7	-7	-8	-9	-9	-17	-22	-33	-35
2,000	-11	-11	-11	-10	-7	-7	-7	-7	-8	-11	-15	-23	-32	-41	-43
2,200	-11	-11	-11	-10	-7	-7	-7	-7	-15	-15	-21	-27	-25	-25	-25

Initial Supporting table - P0234: Negative boost deviation threshold (throttle control not active)

Description: Boost pressure deviation threshold for the negative boost pressure control deviation monitor when the throttle control is not active. It identifies an overboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	70	80	90	100	110	120	130	140	150	160	170	180	200	220	240
1,200	-11	-11	-11	-10	-9	-9	-9	-9	-9	-9	-9	-11	-8	-8	-8
1,300	-11	-11	-11	-10	-7	-7	-7	-7	-5	-5	-7	-10	-9	-10	-10
1,400	-11	-11	-11	-10	-7	-7	-7	-7	-6	-6	-14	-15	-11	-8	-10
1,500	-11	-11	-11	-10	-7	-7	-7	-7	-8	-8	-6	-11	-11	-14	-16
1,600	-11	-11	-11	-10	-7	-7	-7	-7	-10	-9	-7	-11	-13	-15	-17
1,700	-11	-11	-11	-10	-7	-7	-7	-7	-15	-9	-7	-10	-16	-20	-22
1,800	-11	-11	-11	-10	-7	-7	-7	-7	-8	-9	-10	-15	-20	-25	-27
1,900	-11	-11	-11	-10	-7	-7	-7	-7	-8	-9	-9	-21	-27	-33	-35
2,000	-11	-11	-11	-10	-7	-7	-7	-7	-8	-11	-15	-23	-32	-41	-43
2,200	-11	-11	-11	-10	-7	-7	-7	-7	-15	-15	-21	-27	-25	-25	-25

Initial Supporting table - P0234: Overboost barometric correction

Description: Ambient air pressure multiplicative correction to the base threshold for overboost monitoring. It is function of ambient air pressure (Y axis) and desired boost pressure (X axis).

Value Units: const [-8, 8]
X Unit: kPa
Y Units: kPa

y/x	70	80	90	100	110	120	130	140	150	160	170	180	200	220	240
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
86	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0234: Overboost monitor delay timer

Description: Delay timer before enabling the overboost deviation monitoring once all entry conditions are fulfilled. This map is function of engine speed.

Value Units: s
X Unit: rpm

y/x	1,200	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,200
1	2	2	2	2	2	1	1	1	1	0

Initial Supporting table - P0299: Maximum boost pressure for underboost monitor enabling

Description: Maximum desired boost pressure below which the underboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	86	90	100
1	200	200	200	200

Initial Supporting table - P0299: Minimum boost pressure for underboost monitor enabling

Description: Minimum desired boost pressure above which the underboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	86	90	100
1	102	102	140	140

Initial Supporting table - P0299: Positive boost deviation threshold (throttle control active)

Description: Boost pressure deviation threshold for the positive boost pressure control deviation monitor when the throttle control is active. It identifies an underboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210
1,200	13	10	10	11	10	10	16	21	28	40	49	61	60	60	60
1,300	13	11	11	11	10	10	15	21	28	36	49	57	71	60	60
1,400	13	11	11	11	10	10	15	21	29	35	42	57	69	87	87
1,500	13	11	11	11	11	12	15	18	27	32	42	49	63	87	87
1,600	13	11	11	11	11	14	15	20	28	34	43	49	63	85	85
1,700	13	11	11	11	11	14	17	19	27	34	40	49	62	85	85
1,800	13	11	11	11	12	14	17	21	27	33	40	45	58	50	50
1,900	12	11	11	11	11	14	17	21	27	34	39	46	53	50	50
2,000	11	10	10	10	10	14	17	22	30	34	39	45	49	50	50
2,100	10	8	8	8	8	14	17	21	23	30	34	35	37	38	38

Initial Supporting table - P0299: Positive boost deviation threshold (throttle control not active)

Description: Boost pressure deviation threshold for the positive boost pressure control deviation monitor when the throttle control is not active. It identifies an underboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210
1,200	13	10	10	11	10	10	16	21	28	40	49	61	60	60	60
1,300	13	11	11	11	10	10	15	21	28	36	49	57	71	60	60
1,400	13	11	11	11	10	10	15	21	29	35	42	57	69	87	87
1,500	13	11	11	11	11	12	15	18	27	32	42	49	63	87	87
1,600	13	11	11	11	11	14	15	20	28	34	43	49	63	85	85
1,700	13	11	11	11	11	14	17	19	27	34	40	49	62	85	85
1,800	13	11	11	11	12	14	17	21	27	33	40	45	58	50	50
1,900	12	11	11	11	11	14	17	21	27	34	39	46	53	50	50
2,000	11	10	10	10	10	14	17	22	30	34	39	45	49	50	50
2,100	10	8	8	8	8	14	17	21	23	30	34	35	37	38	38

Initial Supporting table - P0299: Underboost barometric correction

Description: Ambient air pressure multiplicative correction to the base threshold for underboost monitoring. It is function of ambient air pressure (Y axis) and desired boost pressure (X axis).

Value Units: const [-8, 8]
X Unit: kPa
Y Units: kPa

y/x	70	80	90	100	110	120	130	140	150	160	170	180	200	220	240
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
86	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0299: Underboost monitor delay timer

Description: Delay timer before enabling the underboost deviation monitoring once all entry conditions are fulfilled. This map is function of engine speed.

Value Units: s
X Unit: rpm

y/x	1,200	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,100
1	2	2	2	1	1	1	1	1	1	1

Initial Supporting table - P0401: Insufficient HP EGR flow Max fuel enabling condition

Description: Maximum desired fuel below which the insufficient HP EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	579	580	1,074	1,075	1,350	1,351	1,500	1,501
50	-256	40	40	40	40	40	40	-256
55	-256	40	40	40	40	40	40	-256
60	-256	40	40	40	40	40	40	-256
65	-256	40	40	40	40	40	40	-256
70	-256	40	40	40	40	40	40	-256
75	-256	40	40	40	40	40	40	-256
80	-256	40	40	40	40	40	40	-256
85	-256	40	40	40	40	40	40	-256
90	-256	40	40	40	40	40	40	-256
100	-256	40	40	40	40	40	40	-256
110	-256	40	40	40	40	40	40	-256

Initial Supporting table - P0401: Insufficient HP EGR flow Max OAT threshold for C1

Description: Maximum desired OAT below which the insufficient HP EGR flow is enabled, for the C1 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0401: Insufficient HP EGR flow Max OAT threshold for C2

Description: Maximum desired OAT below which the insufficient HP EGR flow is enabled, for the C2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0401: Insufficient HP EGR flow Max OAT threshold for others

Description: Maximum desired OAT below which the insufficient HP EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0401: Insufficient HP EGR flow Max OAT threshold for V2

Description: Maximum desired OAT below which the insufficient HP EGR flow is enabled, for the V2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0401: Insufficient HP EGR flow Min fuel enabling condition

Description: Minimum desired fuel above which the insufficient HP EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	579	580	1,074	1,075	1,350	1,351	1,500	1,501
50	256	5	5	5	5	5	5	256
55	256	5	5	5	5	5	5	256
60	256	5	5	5	5	5	5	256
65	256	5	5	5	5	5	5	256
70	256	5	5	5	5	5	5	256
75	256	5	5	5	5	5	5	256
80	256	5	5	5	5	5	5	256
85	256	5	5	5	5	5	5	256
90	256	5	5	5	5	5	5	256
100	256	5	5	5	5	5	5	256
110	256	5	5	5	5	5	5	256

Initial Supporting table - P0401: Insufficient HP EGR flow Min OAT threshold for C1

Description: Minimum desired OAT above which the insufficient HP EGR flow is enabled, for the C1 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12

Initial Supporting table - P0401: Insufficient HP EGR flow Min OAT threshold for C2

Description: Minimum desired OAT above which the insufficient HP EGR flow is enabled, for the C2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

Initial Supporting table - P0401: Insufficient HP EGR flow Min OAT threshold for others

Description: Minimum desired OAT above which the insufficient HP EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12

Initial Supporting table - P0401: Insufficient HP EGR flow Min OAT threshold for V2

Description: Minimum desired OAT above which the insufficient HP EGR flow is enabled, for the V2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

Initial Supporting table - P0401: Insufficient HP EGRflow monitor enabling

Description: Calibration map to choose if the insufficient HP EGR flow monitor is enabled or not for each combustion mode.

Value Units: boolean
X Unit: enum

P0401: Insufficient HP EGR flow monitor enabling - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag
1	1	1	1	1	0	0

P0401: Insufficient HP EGR flow monitor enabling - Part 2

y/x	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmIlp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0	0	0

P0401: Insufficient HP EGR flow monitor enabling - Part 3

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0	0	0		

Initial Supporting table - P0401: Minimum desired HP EGR flow

Description: Minimum desired HP EGR flow above which the insufficient HP EGR flow monitor is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mg
X Unit: rpm
Y Units: kPa

y/x	579	580	1,074	1,075	1,350	1,351	1,500	1,501
50	400	400	652	752	752	752	752	752
55	400	400	652	752	752	752	752	752
60	400	400	452	452	452	752	752	752
65	400	400	452	452	452	752	752	752
70	180	180	232	232	232	232	232	232
75	180	180	232	232	232	232	232	232
80	400	400	752	752	752	752	752	752
85	400	400	752	752	752	752	752	752
90	52	52	500	500	500	500	500	500
100	52	52	500	500	500	500	500	500
110	52	52	500	500	500	500	500	500

Initial Supporting table - P0402: Excessive HP EGR flow Max fuel enabling condition

Description: Maximum desired fuel below which the excessive HP EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	579	580	1,074	1,075	1,350	1,351	1,500	1,501
50	-256	-256	-256	65	65	-256	-256	-256
55	-256	-256	-256	65	65	-256	-256	-256
60	-256	-256	-256	65	65	-256	-256	-256
65	-256	-256	-256	65	65	-256	-256	-256
70	-256	-256	-256	65	65	-256	-256	-256
75	-256	-256	-256	65	65	-256	-256	-256
80	-256	-256	-256	65	65	-256	-256	-256
85	-256	-256	-256	65	65	-256	-256	-256
90	-256	-256	-256	65	65	-256	-256	-256
100	-256	-256	-256	65	65	-256	-256	-256
110	-256	-256	-256	65	65	-256	-256	-256

Initial Supporting table - P0402: Excessive HP EGR flow Max OAT threshold for C1

Description: Maximum desired OAT below which the excessive HP EGR flow is enabled, for the C1 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0402: Excessive HP EGR flow Max OAT threshold for C2

Description: Maximum desired OAT below which the excessive HP EGR flow is enabled, for the C2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0402: Excessive HP EGR flow Max OAT threshold for others

Description: Maximum desired OAT below which the excessive HP EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0402: Excessive HP EGR flow Max OAT threshold for V2

Description: Maximum desired OAT below which the excessive HP EGR flow is enabled, for the V2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	90	90	90	90	90	90	90	90	90	90	90

Initial Supporting table - P0402: Excessive HP EGR flow Min fuel enabling condition

Description: Minimum desired fuel above which the excessive HP EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	579	580	1,074	1,075	1,350	1,351	1,500	1,501
50	256	255	255	42	42	80	80	256
55	256	255	255	42	42	80	80	256
60	256	255	255	42	42	80	80	256
65	256	255	255	42	42	80	80	256
70	256	255	255	42	42	80	80	256
75	256	255	255	42	42	80	80	256
80	256	255	255	42	42	80	80	256
85	256	255	255	42	42	80	80	256
90	256	255	255	42	42	80	80	256
100	256	255	255	42	42	80	80	256
110	256	255	255	42	42	80	80	256

Initial Supporting table - P0402: Excessive HP EGR flow Min OAT threshold for C1

Description: Minimum desired OAT above which the excessive HP EGR flow is enabled, for the C1 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

Initial Supporting table - P0402: Excessive HP EGR flow Min OAT threshold for C2

Description: Minimum desired OAT above which the excessive HP EGR flow is enabled, for the C2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

Initial Supporting table - P0402: Excessive HP EGR flow Min OAT threshold for others

Description: Minimum desired OAT above which the excessive HP EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

Initial Supporting table - P0402: Excessive HP EGR flow Min OAT threshold for V2

Description: Minimum desired OAT above which the excessive HP EGR flow is enabled, for the V2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	50	55	60	65	70	75	80	85	90	100	110
1	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23

Initial Supporting table - P0402: Excessive HP EGR flow monitor enabling

Description: Calibration map to choose if the excessive HP EGR flow monitor is enabled or not for each combustion mode.

Value Units: boolean
X Unit: enum

P0402: Excessive HP EGR flow monitor enabling - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag
1	1	0	0	0	0	0

P0402: Excessive HP EGR flow monitor enabling - Part 2

y/x	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmIlp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0	0	0

P0402: Excessive HP EGR flow monitor enabling - Part 3

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0	0	0		

Initial Supporting table - P0402: Maximum desired HP EGR flow

Description: Maximum desired HP EGR flow below which the excessive HP EGR flow monitor is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mg
X Unit: rpm
Y Units: kPa

y/x	579	580	1,074	1,075	1,350	1,351	1,500	1,501
50	160	160	160	160	160	160	160	160
55	160	160	160	160	160	160	160	160
60	160	160	160	160	160	160	160	160
65	160	160	160	160	160	160	160	160
70	152	152	152	152	152	152	152	152
75	152	152	152	152	152	152	152	152
80	12	12	12	12	12	12	12	12
85	12	12	12	12	12	12	12	12
90	400	400	400	400	400	1,000	1,000	1,000
100	400	400	400	400	400	1,000	1,000	1,000
110	400	400	400	400	400	1,000	1,000	1,000

Initial Supporting table - P0606 PFM Sequence Fail f(Loop Time)

Description: Fail threshold for PFM per operating loop.

Value Units: Fail threshold for PFM (count)
X Unit: Operating Loop (enum)

P0606 PFM Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msFlow	CePISR_e_3p125msFlow	CePISR_e_5msFlow	CePISR_e_6p25msFlow
1	8	8	8	8

P0606 PFM Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_1OmsFlow	CePISR_e_12p5msFlow	CePISR_e_20msFlow	CePISR_e_25msFlow
1	8	8	8	8

P0606 PFM Sequence Fail f(Loop Time) - Part 3

y/x	CePISR_e_40msFlow	CePISR_e_50msFlow	CePISR_e_80msFlow	CePISR_e_1OOmsFlow
1	4	4	2	2

P0606 PFM Sequence Fail f(Loop Time) - Part 4

y/x	CePISR_e_250msFlow			
1	2			

Initial Supporting table - P0606 PFM Sequence Sample f(Loop Time)

Description: Sample threshold for PFM per operating loop.

Value Units: Sample threshold for PFM (count)
X Unit: Operating Loop (enum)

P0606 PFM Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msFlow	CePISR_e_3p125msFlow	CePISR_e_5msFlow	CePISR_e_6p25msFlow
1	10	10	10	10

P0606 PFM Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_1OmsFlow	CePISR_e_12p5msFlow	CePISR_e_20msFlow	CePISR_e_25msFlow
1	10	10	10	10

P0606 PFM Sequence Sample f(Loop Time) - Part 3

y/x	CePISR_e_40msFlow	CePISR_e_50msFlow	CePISR_e_80msFlow	CePISR_e_1OOmsFlow
1	5	5	3	3

P0606 PFM Sequence Sample f(Loop Time) - Part 4

y/x	CePISR_e_250msFlow			
1	3			

Initial Supporting table - P0606 PFM Enable f(Loop Time)

Description: PFM Enable

Value Units: PFM enable flag (boolean)
X Unit: Operating Loop Time Sequence (enum)

P0606 PFM_Enable f(Loop Time) - Part 1

y/x	CePISR_e_2p5msFlow	CePISR_e_3p125msFlow	CePISR_e_5msFlow	CePISR_e_6p25msFlow
1	0	0	0	1

P0606 PFM_Enable f(Loop Time) - Part 2

y/x	CePISR_e_1OmsFlow	CePISR_e_12p5msFlow	CePISR_e_20msFlow	CePISR_e_25msFlow
1	0	1	0	0

P0606 PFM_Enable f(Loop Time) - Part 3

y/x	CePISR_e_40msFlow	CePISR_e_50msFlow	CePISR_e_80msFlow	CePISR_e_1OOmsFlow
1	0	1	0	1

P0606 PFM_Enable f(Loop Time) - Part 4

y/x	CePISR_e_250msFlow			
1	0			

Initial Supporting table - P060C CB safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on CB Energizing Time compensation (for each torque forming pulse) as a function of Fuel Rail Pressure.

y/x	13	25	38	51	64	77	90	103	116	129	142	155	168	181	194	207	220
1	563	759	559	461	379	329	294	269	258	240	218	205	192	188	181	174	167

Initial Supporting table - P060C_DecOffset_f(Vehicle Speed)

Description: The axle torque offset from road load that represents 0.02 G of deceleration.

Value Units: Nm
X Unit: Vehicle Speed (kph)

y/x	45	50	55	60	70	80	90	100	110	115	130	135	145	160	175	185	200
1	213	213	213	213	213	270	280	290	300	310	380	400	400	400	400	400	400

Initial Supporting table - P060C_Delta MAP Threshold f(Desired Engine Torque)

Description: Engine Sync based and Time based delta pressure threshold above which Torque Security error is reported.

Value Units: Torque Security Threshold for Engine Sync and Time Based Delta Pressure (kPa)
X Unit: Desired Engine Torque (Nm)

y/x	0	50	100	150	200	300
1	255	255	255	255	255	255

Initial Supporting table - P060C_EIA safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on EIA Energizing Time compensation (for each torque forming pulse) as function of Fuel Rail Pressure.

y/x	13	25	38	51	64	77	90	103	116	129	142	155	168	181	194	207	220
1	563	759	559	461	379	329	294	269	258	240	218	205	192	188	181	174	167

Initial Supporting table - P060C_EIA VSI safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on EIA Energizing Time compensation specific for VSI

P060C_EIA VSI safety deadband threshold f(Fuel Rail Pressure) - Part 1

y/x	13	25	38	51	64	77
1	563	759	559	461	379	329

P060C_EIA VSI safety deadband threshold f(Fuel Rail Pressure) - Part 2

y/x	90	103	116	129	142	155
1	294	269	258	240	218	205

P060C_EIA VSI safety deadband threshold f(Fuel Rail Pressure) - Part 3

y/x	168	181	194	207	220	
1	192	188	181	174	167	

Initial Supporting table - P060C IBT safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on IBT Energizing Time compensation as function of Fuel Rail Pressure.

P060CJBT safety deadband threshold f(Fuel Rail Pressure) - Part 1

y/x	20	30	40	50	60	70
1	563	759	559	461	379	329

P060CJBT safety deadband threshold f(Fuel Rail Pressure) - Part 2

y/x	80	90	100	110	120	130
1	294	269	258	240	218	205

P060CJBT safety deadband threshold f(Fuel Rail Pressure) - Part 3

y/x	140	150	160	170	180	
1	192	188	181	174	167	

Initial Supporting table - P060C_Roadl_oad f(Vehicle Speed)

Description: Actual Axle Torque threshold above which Torque Security error is reported on a Coastdown

Value Units: Nm
X Unit: Vehicle Speed (kph)

y/x	45	50	55	60	70	80	90	100	110	115	130	135	145	160	175	185	200
1	225	225	225	225	225	300	320	390	460	503	630	700	740	1,000	1,150	1,250	1,400

Initial Supporting table - P060C_Speed Control External Load f(Oil Temp, RPM)

Description: Specifies the external load table for SPDR torque security as a function of engine oil temperature and engine RPM.

y/x	-40	-20	-10	0	50	90
400	1,327	1,327	1,314	1,305	1,287	1,281
550	1,327	1,327	1,314	1,305	1,287	1,281
600	1,282	1,282	1,270	1,261	1,243	1,236
650	1,228	1,228	1,215	1,206	1,187	1,179
700	1,194	1,194	1,181	1,172	1,154	1,148
750	1,160	1,160	1,148	1,139	1,122	1,117
800	1,126	1,126	1,114	1,106	1,090	1,085
850	1,106	1,106	1,094	1,086	1,071	1,067
900	1,086	1,086	1,074	1,066	1,052	1,049
1,000	1,038	1,038	1,027	1,019	1,007	1,005
1,100	1,046	1,046	1,035	1,027	1,015	1,014
1,800	821	821	821	821	821	821
2,000	572	572	572	572	572	572
2,200	323	323	323	323	323	323
2,400	74	74	74	74	74	74
2,600	-181	-181	-181	-181	-181	-181
4,800	-199	-199	-199	-199	-199	-199

Initial Supporting table - P060C_Speed Control External Load Max f(Vehicle Speed, RPM)

Description: External load calibration table on the basis of engine speed and vehicle speed

y/x	0	5	10	15	30	50	70
500	4,096	4,096	4,096	4,096	4,096	4,096	4,096
800	4,096	4,096	4,096	200	200	200	200
1,000	4,096	4,096	4,096	200	100	50	0
1,500	4,096	4,096	4,096	200	50	-150	-150
2,000	4,096	4,096	4,096	200	50	-150	-250

Initial Supporting table - P060C_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)

Description: The offset load to add to KtSPDC_M_ExtrenalLoadMaxLmt.

y/x	0	5	10	15	30	50	70
-40	200	200	150	100	75	25	0
-20	100	100	75	50	50	20	0
-10	75	75	50	30	25	15	0
0	50	50	30	20	20	10	0
50	25	25	20	15	10	5	0
90	0	0	0	0	0	0	0

Initial Supporting table - P060C_SQA safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on SQA Energizing Time compensation (for each torque forming pulse) as function of Fuel Rail Pressure.

y/x	13	31	50	69	88	107	126	145	163	182	201	220
1	1,686	831	603	486	411	360	324	293	266	244	231	218

Initial Supporting table - P060C_VCA safety max deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on VCA energizing time correction as function of Fuel Rail Pressure.

y/x	13	25	38	51	64	77	90	103	116	129	142	155	168	181	194	207	220
1	282	380	280	230	190	164	147	134	129	120	109	103	96	94	90	87	84

Initial Supporting table - P060C_VCA safety min deadband threshold f(Fuel Rail Pressure)

Description: Minimum allowable safety deadband on VCA energizing time correction as function of Fuel Rail Pressure.

y/x	13	25	38	51	64	77	90	103	116	129	142	155	168	181	194	207	220
1	-282	-380	-280	-230	-190	-164	-147	-134	-129	-120	-109	-103	-96	-94	-90	-87	-84

Initial Supporting table - P140B, P140C: HP EGR slow response enabling

Description: Calibration map for the enabling of HP EGR slow response monitoring, function of combustion mode.

Value Units: boolean

y/x	1
1	1

Initial Supporting table - P140B: Increasing HP EGR slow response Max fuel enabling condition

Description: Maximum desired fuel below which the increasing HP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	600	1,000	1,250	1,400	1,475	1,476	2,500	3,000
60	0	70	70	70	70	0	0	0
65	0	70	70	70	70	0	0	0
70	0	70	70	70	70	0	0	0
75	0	70	70	70	70	0	0	0
80	0	70	70	70	70	0	0	0
85	0	70	70	70	70	0	0	0
90	0	70	70	70	70	0	0	0
95	0	70	70	70	70	0	0	0
100	0	70	70	70	70	0	0	0
105	0	70	70	70	70	0	0	0
110	0	70	70	70	70	0	0	0

Initial Supporting table - P140B: Increasing HP EGR slow response Min fuel enabling condition

Description: Minimum desired fuel above which the increasing HP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	600	1,000	1,250	1,400	1,475	1,476	2,500	3,000
60	200	0	0	0	0	200	200	200
65	200	0	0	0	0	200	200	200
70	200	0	0	0	0	200	200	200
75	200	0	0	0	0	200	200	200
80	200	0	0	0	0	200	200	200
85	200	0	0	0	0	200	200	200
90	200	0	0	0	0	200	200	200
95	200	0	0	0	0	200	200	200
100	200	0	0	0	0	200	200	200
105	200	0	0	0	0	200	200	200
110	200	0	0	0	0	200	200	200

Initial Supporting table - P140B: Increasing HP EGR slow response threshold

Description: Threshold for increasing HP EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	70	85	96
1	4	8	7

Initial Supporting table - P140C: Decreasing HP EGR slow response Max fuel enabling condition

Description: Maximum desired fuel below which the decreasing HP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	600	1,000	1,250	1,400	1,475	1,476	2,500	3,000
60	0	70	70	70	70	70	0	0
65	0	70	70	70	70	70	0	0
70	0	70	70	70	70	70	0	0
75	0	70	70	70	70	70	0	0
80	0	70	70	70	70	70	0	0
85	0	70	70	70	70	70	0	0
90	0	70	70	70	70	70	0	0
95	0	70	70	70	70	70	0	0
100	0	70	70	70	70	70	0	0
105	0	70	70	70	70	70	0	0
110	0	70	70	70	70	70	0	0

Initial Supporting table - P140C: Decreasing HP EGR slow response Min fuel enabling condition

Description: Minimum desired fuel above which the decreasing HP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	600	1,000	1,250	1,400	1,475	1,476	2,500	3,000
60	0	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0
85	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0
105	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0

Initial Supporting table - P140C: Decreasing HP EGR slow response threshold

Description: Threshold for decreasing HP EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	70	85	96
1	5	6	6

Initial Supporting table - UP Stream Stk Temp Vrtn

Description: Minimum temperature movement to pass the stuck diagnostic.

Value Units: Minimum temperature movement (degC)
X Unit: Upstream Temp sensor temp (degC)

UP Stream Stk Temp Vrtn - Part 1

y/x	-40	0	20	40
1	3	4	5	5

UP Stream Stk Temp Vrtn - Part 2

y/x	60	80	89	90
1	5	4	4	-1

Initial Supporting table - P0071: OAT Performance Drive Equilibrium Engine Off

Description: OAT Performance Diagnostic counter increment for determining OAT-IAT equilibrium for engine off (for hybrid applications)

Value Units: Counter Increment Value (Unitless)
X Unit: Vehicle Speed (KPH)

y/x	0.0	5.0	10.0	15.0	20.0	25.0	30.0	50.0	80.0
1.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0

Initial Supporting table - P0071: OAT Performance Drive Equilibrium Engine Running

Description: OAT Performance Diagnostic counter increment for determining OAT-IAT equilibhum for engine running

Value Units: Counter Increment Value (Unitless)
X Unit: Vehicle Speed (KPH)
Y Units: Engine Air Flow (Grams/Second)

y/x	0.0	5.0	10.0	15.0	20.0	25.0	30.0	50.0	80.0
1.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0
5.0	-5.0	-2.0	-1.0	0.0	1.0	2.0	3.0	4.0	5.0
10.0	-4.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0
20.0	-2.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0
30.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0
40.0	0.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0
50.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0
60.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0
70.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0

Initial Supporting table - Clutch Pedal Position Exit

Description: Clutch pedal petition exit threshold based on vehicle speed

Value Units: Percent
X Unit: kph

y/x	0	10	25	40	50	60	75	90	100
1	0	10	25	40	50	60	75	90	100

Initial Supporting table - Clutch Slip for Launch Exit

Description: Clutch slip exit threshold based on vehicle speed

Value Units: Percent
X Unit: kph

y/x	0	10	25	40	50	60	75	90	100
1	0	10	25	40	50	60	75	90	100

Initial Supporting table - DPSDPHDRatioThrsh

Description:

y/x	100	150	200	250	300	350	450	550	650
0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0

Initial Supporting table - DPS_DPL_Thrsh

Description:

y/x	0	50	100	150	200	250	300	350	500
0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0089 Extended Maximum rail pressure with MU

Description: Maximum rail pressure threshold (MPa) when pressure il governed by Metering Unit as function of engine speed (rpm) and extended area is enabled.

y/x	0	850	3,500	4,000	4,500	4,600	5,000	5,067	6,400
1	68	238	238	178	118	68	68	68	68

Initial Supporting table - P2293 Extended Maximum rail pressure with PR

Description: Maximum rail pressure threshold (MPa) when pressure il governed by Pressure Regulator as function of engine speed (rpm) and extended area is enabled.

y/x	0	850	3,500	4,000	4,500	4,600	5,000	5,067	6,400
1	68	238	238	178	118	68	68	68	68

Initial Supporting table - 1st_FireAftrMisfr_Acel

Description: Used for P0300 - P0308, Multiplier for establishing the expected acceleration of the cylinder after the misfire

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
4	0.96	0.96	0.92	1.09	1.06	0.87	1.08	0.99	0.88	0.91	1.20	1.30	1.24	0.57	0.92	0.73	0.68
8	0.95	0.95	0.96	1.03	1.08	1.47	1.63	1.27	1.20	1.41	1.55	1.14	1.03	0.92	0.95	0.68	0.67
12	0.65	0.65	0.75	1.00	1.42	1.59	2.13	2.45	1.51	1.60	1.18	1.32	1.29	1.19	0.92	0.90	0.80
18	0.48	0.48	0.62	0.82	1.19	1.01	1.40	1.71	1.49	1.30	1.55	1.50	1.35	1.00	0.92	0.85	0.85
22	0.45	0.45	0.59	0.77	1.12	0.97	1.15	1.30	1.68	1.28	1.86	1.55	1.48	0.94	0.93	0.79	0.95
24	0.44	0.44	0.57	0.76	1.10	0.97	1.13	1.12	1.63	1.25	1.91	1.55	1.57	1.00	0.89	0.84	0.92
30	0.42	0.42	0.55	0.72	1.05	0.97	1.07	1.09	1.58	1.06	1.78	1.55	1.20	0.91	0.86	0.88	0.88
60	0.38	0.38	0.50	0.67	0.97	0.97	0.97	0.95	1.49	0.48	0.94	0.80	1.00	0.92	0.69	0.80	0.79
98	0.37	0.37	0.48	0.65	0.94	0.97	0.94	0.91	1.45	0.48	0.67	0.54	0.80	0.84	0.63	0.80	0.76

Initial Supporting table - 1st_FireAftrMisfr_Jerk

Description: Used for P0300 - P0308, Multiplier for establishing the expected Jerk of the cylinder after the misfire

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
4	-0.98	-1.00	-1.48	-1.45	-1.56	-1.57	-1.27	-1.12	-0.74	-0.51	-0.80	-0.45	-0.34	-0.55	-0.76	-0.78	-0.64
8	-0.45	-0.49	-0.73	-0.92	-0.57	-0.97	-0.98	-0.83	-0.71	-0.38	-0.50	-0.34	-0.18	-0.55	-0.95	-0.79	-0.67
12	-0.24	-0.28	-0.37	-0.52	-0.46	-0.62	-0.72	-1.25	-0.79	-0.38	-0.80	-0.33	-0.40	-0.46	-0.58	-0.82	-0.69
18	-0.11	-0.16	-0.23	-0.36	-0.38	-0.69	-0.67	-1.26	-0.80	-0.51	-0.50	-0.16	-0.55	-0.74	-1.00	-1.12	-1.00
22	-0.06	-0.13	-0.18	-0.31	-0.36	-0.48	-0.94	-1.18	-0.67	-0.56	-0.21	-0.30	-1.00	-1.05	-1.14	-1.07	-0.87
24	-0.05	-0.11	-0.17	-0.29	-0.35	-0.65	-0.92	-1.13	-0.70	-0.62	-0.22	-0.33	-1.06	-1.22	-1.13	-1.03	-0.92
30	-0.01	-0.09	-0.13	-0.25	-0.32	-0.64	-0.91	-1.08	-0.90	-0.68	-0.44	-0.52	-1.11	-1.40	-1.19	-1.02	-0.97
60	0.06	-0.03	-0.06	-0.17	-0.28	-0.60	-0.84	-1.13	-1.13	-0.87	-0.86	-0.87	-1.17	-1.79	-1.17	-0.98	-1.04
98	0.09	-0.01	-0.03	-0.14	-0.27	-0.59	-0.81	-1.15	-1.25	-0.93	-1.02	-1.00	-1.21	-1.94	-1.20	-0.96	-1.06

Initial Supporting table - IstFireAfterMisJerkAFM

Description: Used for P0300 - P0308, Multiplier for establishing the expected jerk of the cylinder after the misfire if Active Fuel Management cylinder deact mode is active

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
8	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1
24	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1

Initial Supporting table - IstFireAftrMisAcelAFM

Description: Used for P0300 - P0308, Multiplier for establishing the expected acceleration of the cylinder after the misfire if Active Fuel Management cylinder deact mode is active

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
8	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1
24	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1

Initial Supporting table - Abnormal Cyl Mode

Description: Used for P0300-P0308. Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (Cylinder Mode Equation)

Value Units: Number of consecutive number of decelerating cylinders (integer)
X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	3	4	4	3	3	3	3	3	3

Initial Supporting table - Abnormal Rev Mode

Description: Used for P0300-P0308. Abnormal Rev Mode Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (Rev Mode Equation)

Value Units: Number of consecutive number of decelerating cylinders (integer)
X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

Initial Supporting table - Abnormal SCD Mode

Description: Used for P0300-P0308. Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (SCD Mode Equation)

Value Units: Number of consecutive number of decelerating cylinders (integer)
X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	2	2	2	2	2	2	2	2	2

Initial Supporting table ■Bank_SCD_Decel

Description: Used for P0300 - P0308, Mulitplier to SCD decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
6	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
8	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
12	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
16	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
24	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
40	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
98	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60

Initial Supporting table - Bank_SCD_Jerk

Description: Used for P0300 - P0308, Mulitplier to Medres SCD jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: mulitplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - BankCylModeDecel

Description: Used for P0300 - P0308, Mulitplier to Lores Decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
4	1.57	1.57	1.63	1.71	1.29	1.07	1.21	0.94	1.14	1.13	1.29	1.35	1.64	1.64	1.63	1.23	0.47
6	1.00	1.00	0.96	0.99	0.91	0.91	1.26	0.85	1.20	1.17	1.26	1.40	1.65	1.69	1.68	1.24	0.53
8	0.71	0.71	0.74	0.68	0.62	0.70	1.04	0.72	1.05	1.23	1.24	1.26	1.52	1.75	1.75	1.32	0.60
12	0.46	0.46	0.48	0.53	0.59	0.51	0.81	0.64	0.87	1.09	0.87	1.26	1.21	1.42	1.25	1.15	0.67
16	0.40	0.40	0.40	0.36	0.49	0.52	0.55	0.56	0.44	0.57	0.40	1.05	0.92	1.10	0.81	0.83	0.61
24	0.35	0.35	0.36	0.32	0.42	0.50	0.50	0.48	0.43	0.41	0.45	0.34	0.64	0.28	0.36	0.39	0.48
40	0.31	0.31	0.34	0.29	0.37	0.49	0.48	0.37	0.42	0.50	0.48	0.35	-0.31	-0.20	-0.01	0.09	0.33
60	0.30	0.30	0.32	0.28	0.35	0.48	0.46	0.32	0.44	0.55	0.49	0.39	-0.57	-0.43	-0.18	-0.06	0.27
98	0.29	0.29	0.32	0.27	0.33	0.48	0.46	0.34	0.45	0.58	0.49	0.41	-0.73	-0.58	-0.28	-0.18	0.22

Initial Supporting table - BankCylModeJerk

Description: Used for P0300 - P0308, Mulitplier to Lores Jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
4	2.10	1.93	2.24	2.58	2.50	2.48	1.98	1.71	1.85	1.49	1.74	1.55	1.74	1.69	1.48	1.30	1.00
6	1.79	1.59	1.38	1.79	1.36	1.63	1.79	1.88	1.92	1.59	1.95	1.63	2.00	1.73	1.67	1.33	1.05
8	1.43	1.18	1.30	1.39	1.10	1.30	1.56	1.56	1.83	1.70	1.90	1.77	2.00	1.91	1.65	1.37	1.11
12	1.28	1.11	1.14	1.15	1.14	1.05	1.08	1.92	1.77	1.70	1.64	1.53	1.53	1.21	1.21	1.10	1.13
16	1.21	1.11	1.14	1.16	1.21	1.13	1.12	1.87	1.45	1.47	1.19	1.43	1.90	1.18	1.11	0.88	1.13
24	1.23	1.23	1.21	1.15	1.29	1.19	1.17	1.48	1.30	1.30	1.45	0.94	1.60	1.49	1.15	1.06	1.25
40	1.00	1.32	1.26	1.15	1.34	1.24	1.22	1.37	1.03	1.10	1.31	0.95	0.74	1.99	1.14	1.16	1.53
60	1.00	1.36	1.28	1.14	1.37	1.27	1.24	1.36	0.94	1.01	1.05	1.03	0.72	1.72	1.14	1.23	1.65
98	1.00	1.40	1.30	1.14	1.39	1.28	1.25	1.33	0.88	0.95	0.91	1.04	0.67	1.51	1.13	1.28	1.81

Initial Supporting table - Catalyst_Damage_Misfire_Percentage

Description: Catalyst Damaging Misfire Percentage" Table whenever secondary conditions are met.

Value Units: percent misfire over 200 revolutions (%)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000
0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
10	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
20	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
30	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
40	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
50	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
60	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
70	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
80	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
90	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
100	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0

Initial Supporting table - CatCrtdMaxFuel

Description: Maximum integrated post injected fuel quantity threshold [g], as function of ambient temperature [K], needed to stop Catalyst integrators (heat and injected fuel) and calculate the Aging Index

y/x	250.00	266.00	282.00	298.00	314.00	330.00
1.00	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000

Initial Supporting table - ClyAfterAFM_Decel

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire after a deactivated cylider.   Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - ЄlyBeforeAFM_Jerk

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire before a deactivated cylider, but after an active cylinder that follows an deactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - CombustModeIdleTbl

Description: Used for P0300 - P0308, Only used on Diesel engines. Combustion modes that will force use of Idle table. A value of CeCMBR_i_CombModesMax means not selected.

Value Units: Enumerated value of different combustion modes (enumeration)
X Unit: Current Combustion Mode (enumeration)

CombustModeIdleTbl - Part 1

y/x	0	1	2	3	4	5
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

CombustModeIdleTbl - Part 2

y/x	6	7	8	9	10	11
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

CombustModeIdleTbl - Part 3

y/x	12	13	14	15	16	
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	

Initial Supporting table - ConsecCylModDecel

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
4	2.00	2.00	2.01	2.33	1.73	1.44	1.57	1.76	1.51	1.36	1.57	1.58	1.85	1.75	1.54	1.36	1.16
6	1.62	1.62	1.34	1.74	1.30	1.21	1.73	1.69	1.61	1.41	1.66	1.63	1.87	1.73	1.59	1.33	1.24
8	1.29	1.29	1.35	1.40	1.24	1.21	1.75	1.38	1.43	1.59	1.81	1.48	1.81	1.75	1.65	1.37	1.33
12	1.14	1.14	1.19	1.27	1.58	1.13	1.21	1.94	1.49	1.85	1.60	1.45	1.35	1.31	1.21	1.10	1.20
16	1.11	1.11	1.11	1.16	1.48	1.23	1.18	1.53	1.06	1.41	1.43	1.71	1.50	1.10	0.97	0.88	1.00
24	1.16	1.16	1.06	1.05	1.40	1.27	1.23	1.17	0.95	1.36	2.00	1.67	1.70	1.05	0.96	0.92	1.20
40	1.19	1.19	1.03	0.98	1.35	1.31	1.26	1.06	0.79	0.87	1.50	1.35	0.98	1.65	0.87	0.98	1.22
60	1.21	1.21	1.02	0.95	1.33	1.32	1.28	1.04	0.73	0.95	1.13	1.34	1.01	1.35	0.81	1.02	1.21
98	1.22	1.22	1.00	0.93	1.31	1.33	1.29	1.01	0.63	1.01	0.92	1.26	0.95	1.13	0.75	1.05	1.22

Initial Supporting table - ConsecCylModeJerk

Description: Used for P0300 - P0308, Mulitplier to Lores Jerk to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
4	-1	-1	-1	-1	-1	-2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
6	-1	-1	-1	-1	0	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
8	0	0	0	-1	0	0	-1	-1	-1	0	0	-1	-1	-1	-1	-1	-1
12	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1
16	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
24	0	0	0	0	0	0	0	-1	-1	-2	-1	-1	-2	-1	-1	-1	-1
40	0	0	0	0	0	0	0	-1	-1	-2	-2	-1	-1	-1	-1	-1	-1
60	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
98	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	0

Initial Supporting table - ConsecSCD_Decel

Description: Used for P0300 - P0308, Mulitplier to medres decel to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table ■ConsecSCD_Jerk

Description: Used for P0300 - P0308, Mulitplier to medres Jerk to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Initial Supporting table - CylAfterAFM Jerk

Description: Used for P0300 - P0308, Mulitplier to Lores Jerk to account for different pattern of misfire after a deactivated cylider. Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0

Initial Supporting table - C2ylBeforeAFM_Decel

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire before a deactivated cylider, but after an active cylinder that follows an deactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - CylModeDecel

Description: Used for P0300-P0308. Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

CylModeDecel - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	1,416	927	621	380	255	190	138	106	78	59	45	30	24
2	1,014	689	483	304	207	166	127	95	71	55	43	28	23
4	794	411	312	212	150	133	111	81	61	49	39	26	22
6	1,159	628	437	288	183	151	115	66	60	44	36	24	20
8	1,575	986	575	339	230	173	114	66	68	46	32	21	21
10	2,041	1,344	770	465	291	178	124	67	69	46	33	22	19
12	2,467	1,702	1,078	630	403	214	158	96	65	48	29	23	19
14	2,893	2,060	1,332	796	515	271	188	127	78	50	39	28	20
16	3,318	2,418	1,586	962	626	328	212	151	104	75	48	30	21
18	3,744	2,776	1,839	1,127	738	385	243	175	123	86	55	29	22
20	4,170	3,134	2,093	1,294	850	441	274	198	142	97	62	31	23
22	4,595	3,492	2,347	1,458	961	498	305	222	161	108	69	37	25
24	5,021	3,850	2,600	1,624	1,073	555	336	246	180	120	76	43	30
30	6,298	4,924	3,362	2,123	1,408	725	428	317	238	154	98	60	43
40	8,426	6,715	4,630	2,949	1,966	1,009	582	435	333	211	134	90	64
60	12,682	10,295	7,168	4,604	3,083	1,577	889	672	525	324	206	149	108
97	20,663	17,008	11,925	7,711	5,177	2,641	1,467	1,116	883	538	341	259	190

CylModeDecel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
1	19	16	14	13	12	11	9	32,768	32,768	32,768	32,768	32,768	32,768
2	18	15	13	12	12	11	8	32,768	32,768	32,768	32,768	32,768	32,768
4	17	14	12	11	11	10	8	32,768	32,768	32,768	32,768	32,768	32,768
6	16	13	11	11	10	9	7	32,768	32,768	32,768	32,768	32,768	32,768
8	16	12	10	10	9	8	7	32,768	32,768	32,768	32,768	32,768	32,768
10	17	13	12	9	9	7	6	32,768	32,768	32,768	32,768	32,768	32,768
12	17	13	12	10	9	8	6	32,768	32,768	32,768	32,768	32,768	32,768
14	18	13	14	11	9	8	7	32,768	32,768	32,768	32,768	32,768	32,768
16	19	15	16	12	11	9	8	32,768	32,768	32,768	32,768	32,768	32,768
18	20	20	18	13	11	10	9	32,768	32,768	32,768	32,768	32,768	32,768
20	21	24	20	16	13	10	10	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - CylModeDecel

22	21	27	22	17	14	11	11	32,768	32,768	32,768	32,768	32,768	32,768
24	22	29	24	19	16	13	12	32,768	32,768	32,768	32,768	32,768	32,768
30	30	38	29	24	20	16	15	32,768	32,768	32,768	32,768	32,768	32,768
40	43	42	42	33	28	23	20	32,768	32,768	32,768	32,768	32,768	32,768
60	71	68	67	50	43	36	30	32,768	32,768	32,768	32,768	32,768	32,768
97	122	117	115	81	70	60	48	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - CylModeJerk

Description: Crankshaft jerk threshold. Thresholds are a function of rpm and % engine Load.

Value Units: Change in Delta time per cylinder from last cylinder (usee)
Y Units: percent load of max indicated torque (%)

CylModeJerk - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	1,154	761	500	325	222	185	127	99	80	65	45	31	26
2	931	618	409	271	181	143	100	81	73	52	41	27	24
4	755	490	323	190	135	92	65	64	63	40	36	23	22
6	1,044	738	445	280	178	144	85	64	54	37	32	20	20
8	1,422	1,032	629	352	231	195	105	74	60	36	30	20	18
10	1,821	1,325	825	499	312	246	137	89	65	38	30	20	18
12	2,211	1,618	1,115	660	445	297	169	108	65	40	32	22	18
14	2,637	1,911	1,370	807	534	349	200	125	73	45	38	31	22
16	3,045	2,204	1,591	930	623	400	232	147	85	55	46	36	25
18	3,506	2,497	1,807	1,053	711	451	264	169	99	66	54	42	32
20	3,972	2,791	2,016	1,176	800	503	295	191	114	78	63	48	39
22	4,357	3,084	2,238	1,300	889	554	327	213	128	89	71	53	48
24	4,727	3,377	2,451	1,423	978	605	359	235	142	101	80	59	53
30	5,969	4,256	3,099	1,793	1,245	759	454	301	185	135	105	75	67
40	7,988	5,722	4,181	2,409	1,689	1,016	612	410	257	193	147	103	92
60	12,070	8,654	6,347	3,642	2,577	1,528	929	629	400	308	232	159	140
97	19,725	14,151	10,393	5,953	4,243	2,490	1,523	1,040	669	524	390	264	230

CylModeJerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
1	23	18	16	13	13	13	11	32,768	32,768	32,768	32,768	32,768	32,768
2	21	17	15	13	13	12	11	32,768	32,768	32,768	32,768	32,768	32,768
4	18	15	13	12	12	11	10	32,768	32,768	32,768	32,768	32,768	32,768
6	15	13	11	11	11	10	10	32,768	32,768	32,768	32,768	32,768	32,768
8	14	11	10	10	10	9	9	32,768	32,768	32,768	32,768	32,768	32,768
10	15	13	11	10	9	8	8	32,768	32,768	32,768	32,768	32,768	32,768
12	15	14	12	10	10	8	8	32,768	32,768	32,768	32,768	32,768	32,768
14	15	14	13	10	10	8	8	32,768	32,768	32,768	32,768	32,768	32,768
16	15	14	14	12	10	8	8	32,768	32,768	32,768	32,768	32,768	32,768
18	16	16	15	13	11	9	9	32,768	32,768	32,768	32,768	32,768	32,768
20	17	17	17	14	13	11	10	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - CylModeJerk

22	20	19	18	15	14	12	10	32,768	32,768	32,768	32,768	32,768	32,768
24	24	21	20	17	15	12	11	32,768	32,768	32,768	32,768	32,768	32,768
30	36	26	24	21	18	15	13	32,768	32,768	32,768	32,768	32,768	32,768
40	57	35	32	28	22	18	17	32,768	32,768	32,768	32,768	32,768	32,768
60	99	54	48	41	30	26	24	32,768	32,768	32,768	32,768	32,768	32,768
97	174	88	77	67	45	40	38	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - DeacCylInversionDecel

Description: Used for P0300 - P0308, Negative Torque can cause crank readings to invert (active cylinders appear weak & deactivated cylinders appear "strong" If deactivated cylinders don't decelerate at least this amount then the crank signal is inverting. Function of speed and load.

Value Units: Delta time per cylinder (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0

Initial Supporting table - DeacCylInversionJerk

Description: Used for P0300 - P0308, Negative Torque can cause crank readings to invert (active cylinders appear weak & deactivated cylinders appear "strong" If deactivated cylinders don't jerk at least this amount then the crank signal is inverting. Function of speed and load.

Value Units: Change in Delta time per cylinder from last cylinder (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0

Initial Supporting table - EngineOverSpeedLimit

Description: Engine OverSpeed Limit versus gear

Value Units: RPM
X Unit: Enumeration of transmission gear state (enumeration)

EngineOverSpeedLimit - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGr9
1	5,200	5,200	5,200	5,200	5,200	5,200	5,200

EngineOverSpeedLimit - Part 2

y/x	CeTGRR_e_TransGrI0	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	5,200	5,200	5,200	5,200	5,200	5,200	

Initial Supporting table - InfrequentRegen

Description: Used for P0300-P0308. Only used on Diesel engines. Initiates a misfire delay when the current combustion mode matchs a selection in the table. A value of CeCMBR_i_CombModesMax means not selected.

Value Units: Enumerated value of different combustion modes (enumeration)
X Unit: Current Combustion Mode (enumeration)

InfrequentRegen - Part 1

y/x	0	1	2	3	4	5
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

InfrequentRegen - Part 2

y/x	6	7	8	9	10	11
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

InfrequentRegen - Part 3

y/x	12	13	14	15	16	
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	

Initial Supporting table - Number of Normals

Description: Used for P0300-P0308. Number of Normals for the Driveline Ring Filter
After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.

Value Units: Number of Engine cycles after isolated misfire (Engine cycles)
X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	3	3	3	3	3	3	3	3	3

Initial Supporting table - P0101: Manifold pressure High limit in Overrun

Description: Intake manifold pressure high limit in overrun condition, below which the MAF sensor performance monitoring is enabled. It is function of engine speed.

Value Units: kPa
X Unit: rpm

y/x	750	1,000	1,250	1,500	1,750	2,000	2,500	3,000
1	200	200	200	200	200	200	200	200

Initial Supporting table - P0101: Manifold pressure Low limit in Overrun

Description: Intake manifold pressure low limit in overrun condition, above which the MAF sensor performance monitoring is enabled. It is function of engine speed.

Value Units: kPa
X Unit: rpm

y/x	750	1,000	1,250	1,500	1,750	2,000	2,500	3,000
1	70	70	70	70	70	70	70	70

Initial Supporting table - P0101: Pulsation Map

Description: Adjustment of the air mass flow measured by the MAF sensor for flow distribution and pulsations. It is function of engine speed (X axis) and fuel request (Y axis)

Value Units: const
X Unit: rpm
Y Units: mm^3

y/x	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600
0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
110	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
120	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
130	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
140	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0101: VGT position High limit in Overrun

Description: VGT position high limit in overrun condition, below which the MAF sensor performance monitoring is enabled. It is function of engine speed.

Value Units: %
X Unit: rpm

y/x	750	1,000	1,250	1,500	1,750	2,000	2,500	3,000
1	90	90	90	90	90	90	90	90

Initial Supporting table - P0101: VGT position Low limit in Overrun

Description: VGT position low limit in overrun condition, above which the MAF sensor performance monitoring is enabled. It is function of engine speed.

Value Units: %
X Unit: rpm

y/x	750	1,000	1,250	1,500	1,750	2,000	2,500	3,000
1	10	10	10	10	10	10	10	10

Initial Supporting table - P129F Threshold High

Description: P129F Filtered Fuel Pump Speed Error High Threshold [over-performing motor]
Instantaneously calculated filtered pump speed error measured is higher than commanded

Value Units: revs / min
X Unit: revs / min [commanded pump speed]
Y Units: kiloPascals [requested fuel pressure]

y/x	200.0	300.0	400.0	500.0	600.0
1,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
2,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
3,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
4,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
5,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
6,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
7,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0

Initial Supporting table - P129F Threshold Low

Description: P129F Filtered Fuel Pump Speed Error Low Threshold [under-performing motor]
Instantaneously calculated filtered pump speed error measured is lower than commanded

Value Units: revs / min
X Unit: revs / min [commanded pump speed]
Y Units: kiloPascals [requested fuel pressure]

y/x	200.0	300.0	400.0	500.0	600.0
1,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
2,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
3,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
4,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
5,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
6,000.0	1,750.0	1,750.0	1,750.0	1,750.0	1,750.0
7,000.0	2,750.0	2,750.0	2,750.0	2,750.0	2,750.0

Initial Supporting table - P2457: Maximum HP EGR filtered flow for HP EGR cooler efficiency monitor enabling

Description: Maximum allowed HP EGR filtered flow as a function of ambient air temperature to enable HP EGR cooler efficiency diagnostic.

Value Units: g/s
X Unit: deg C

y/x	1	2	3	4	5	6
1	80	80	80	80	80	80

Initial Supporting table - P2457: Minimum HP EGR filtered flow for HP EGR cooler efficiency monitor enabling

Description: Minimum allowed HP EGR filtered flow as a function of ambient air temperature to enable HP EGR cooler efficiency diagnostic.

Value Units: g/s
X Unit: deg C

y/x	1	2	3	4	5	6
1	0	0	0	0	0	0

Initial Supporting table - P2457: Minimum time for HP EGR cooler efficiency monitor enabling

Description: Minimum allowed time as a function of HP EGR filtered flow to run HP EGR cooler efficiency diagnostic once that all HP EGR flow enabling conditions are reached.

Value Units: s
X Unit: g/s

y/x	0	20	40	60	80	100
1	7	7	6	5	4	4

Initial Supporting table - Pair_SCD_Decel

Description: Used for P0300 - P0308, Mulitplier to SCD_Decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - Pair_SCD_Jerk

Description: Used for P0300 - P0308, Mulitplier to P0300_SCD_Jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - PairCylModeDecel

Description: Used for P0300 - P0308, Mulitplier to Cyl Mode Deceleration to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: mulitplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
4	2.20	1.85	1.80	2.27	1.29	1.05	1.13	1.00	1.05	0.96	1.14	0.98	1.27	1.14	1.08	1.32	1.26
6	1.08	0.88	1.20	1.05	0.86	0.78	1.06	0.92	1.03	0.90	1.11	0.92	1.26	1.08	1.14	1.14	1.29
8	0.98	0.95	1.08	1.05	0.75	0.80	1.05	0.89	0.98	0.81	1.12	0.79	1.13	1.08	1.15	1.16	1.33
12	0.87	0.80	0.94	0.84	1.18	0.65	0.80	1.21	1.34	1.03	1.02	0.87	0.88	1.00	0.83	0.90	1.07
16	0.83	0.73	0.89	0.83	1.15	0.67	0.63	0.93	1.09	1.11	1.12	1.02	0.92	0.93	0.78	1.04	0.83
24	0.78	0.69	0.84	0.84	1.13	0.71	0.56	0.74	0.99	1.14	1.29	1.25	1.36	0.72	0.81	0.89	0.88
40	0.75	0.66	0.81	0.84	1.12	0.73	0.51	0.62	0.91	1.16	1.20	1.11	1.28	0.94	0.77	0.88	0.80
60	0.74	0.65	0.79	0.85	1.11	0.74	0.49	0.57	0.87	1.17	1.17	1.06	1.22	0.93	0.74	0.86	0.77
98	0.72	0.64	0.78	0.85	1.11	0.75	0.47	0.53	0.85	1.13	1.15	1.02	1.18	0.91	0.70	0.85	0.76

Initial Supporting table - PairCylModeJerk

Description: Used for P0300 - P0308, Mulitplier to P0300_CylModeJerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
4	1.88	1.87	1.48	1.77	2.01	2.02	1.38	1.19	1.39	1.21	1.50	1.14	1.31	1.28	1.44	1.43	1.14
6	1.00	1.04	0.94	1.26	1.09	1.37	1.29	1.35	1.37	1.24	1.58	1.20	1.48	1.35	1.62	1.43	1.20
8	0.96	0.88	0.93	1.10	1.03	0.98	1.06	1.18	1.40	1.18	1.50	1.31	1.43	1.50	1.65	1.42	1.28
12	0.91	0.73	1.00	1.13	1.24	0.76	0.76	1.08	1.49	1.46	1.59	1.33	1.17	1.14	1.25	1.15	1.31
16	0.88	0.77	1.06	1.19	1.31	0.80	0.62	0.95	1.64	1.31	1.26	1.39	1.63	1.36	1.07	1.08	1.25
24	0.84	0.83	1.16	1.25	1.41	0.88	0.55	0.61	1.54	1.14	1.19	1.09	1.66	1.49	1.28	1.06	1.22
40	0.82	0.87	1.22	1.30	1.49	0.94	0.53	0.58	1.48	1.05	1.15	1.11	1.21	1.51	1.42	1.07	1.22
60	0.82	0.89	1.26	1.32	1.53	0.97	0.52	0.57	1.45	1.00	1.13	1.14	1.08	1.52	1.49	1.09	1.27
98	0.81	0.91	1.28	1.33	1.56	1.00	0.51	0.56	1.44	0.97	1.11	1.15	1.01	1.54	1.55	1.09	1.29

Initial Supporting table - Random_SCD_Decel

Description: Used for P0300 - P0308, Mulitplier to SCD_Decel to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - Random_SCD_Jerk

Description: Used for P0300 - P0308, Mulitplier to Random_SCD_Jerk to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomAFM_Decl

Description: Used for P0300 - P0308, Mulitplier to CylinderJDecel while in Cylnder Deactivation mode to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table -RandomAFM_Jerk

Description: Used for P0300 - P0308, Mulitplier to Cylinder_Jerk while in Cylnder Deactivation mode to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomCylModDecel

Description: Used for P0300 - P0308. Multiplier to CylMode_Decel. account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: Multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
2	1.41	1.35	1.35	1.18	1.13	1.23	1.29	1.31	1.05	1.11	1.00	1.00	1.00	1.07	1.19	1.13	1.10
4	1.41	1.44	1.41	1.32	1.20	1.23	1.29	1.36	1.01	1.10	1.00	1.00	1.00	1.04	1.21	1.18	1.16
6	1.17	1.25	1.17	1.11	1.19	1.16	1.28	1.24	1.14	1.11	1.00	1.00	1.00	1.00	1.23	1.14	1.18
10	1.21	1.16	1.21	1.26	1.30	1.10	1.26	1.02	1.33	1.20	1.19	1.08	1.00	1.12	1.08	1.22	1.31
14	1.12	1.00	1.12	1.25	1.43	1.06	1.03	1.03	1.64	1.17	1.23	1.15	1.11	1.42	1.18	1.18	1.00
24	1.06	1.00	1.06	1.10	1.18	1.05	1.05	1.03	1.13	1.19	1.46	1.42	1.64	1.02	1.15	1.13	1.16
30	1.04	1.00	1.04	1.07	1.12	1.04	1.06	1.00	1.08	1.21	1.32	1.28	1.54	1.00	1.19	1.10	1.13
60	1.02	1.00	1.02	1.01	1.02	1.02	1.07	1.02	1.00	1.25	1.11	1.09	1.33	1.10	1.06	1.07	1.06
98	1.01	1.00	1.01	1.00	1.00	1.02	1.07	1.02	1.00	1.26	1.06	1.03	1.26	1.03	1.01	1.07	1.03

Initial Supporting table - RandomCylModJerk

Description: Used for P0300 - P0308, Multiplier to CylMode_Jerk to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,200
2	1.00	1.00	1.00	1.00	1.00	1.00	1.07	1.00	1.00	1.00	1.19	1.00	1.00	1.00	1.00	1.00	1.00
4	1.00	1.00	1.24	1.11	1.09	1.12	1.09	1.00	1.00	1.00	1.13	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.05	1.09	1.05	1.19	1.08	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.05	1.03	1.00	1.19	1.19	1.00	1.13	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	1.00	1.00	1.00	1.00	1.10	1.13	1.12	1.29	1.31	1.17	1.08	1.05	1.27	1.11	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.11	1.06	1.07	1.15	1.15	1.04	1.05	1.00	1.62	1.37	1.08	1.06	1.13
30	1.00	1.00	1.00	1.00	1.11	1.04	1.05	1.11	1.11	1.03	1.06	1.00	1.36	1.37	1.13	1.10	1.14
60	1.00	1.00	1.00	1.00	1.12	1.01	1.02	1.04	1.04	1.02	1.05	1.01	1.07	1.36	1.21	1.17	1.23
98	1.00	1.00	1.00	1.00	1.12	1.01	1.01	1.01	1.01	1.01	1.05	1.03	1.01	1.37	1.24	1.20	1.29

Initial Supporting table - FandomRevModDecl

Description: Used for P0300 - P0308, Mulitplier to RevMode_Decel to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000	8,000
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RepetSnapDecayAdjst

Description: Used for P0300 - P0308, If misfire is present in consecutive engine cycles, this multiplier is applied to the misfire jerk threshold and compared to a crankshaft snap value after the misfire has taken place.. Table lookup as a function of engine rpm.

Value Units: multiplier
X Unit: RPM

y/x	600	1,000	1,200	1,400	1,600	1,800	2,200	2,600	3,200
1	1.00	1.10	1.15	1.40	1.40	1.80	2.00	1.30	1.00

Initial Supporting table - RevMode_Decel

Description: Used for P0300-P0308. Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time between revolutions (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	6,500
1	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
2	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
4	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
6	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
8	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
10	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
12	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
14	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
16	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
18	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
20	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
22	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
24	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
30	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
40	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
60	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
97	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - Ring Filter

Description: Used for P0300-P0308. Driveline Ring Filter
After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.

Value Units: Number of Engine cycles after isolated misfire (Engine cycles)
X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	4	4	4	4	4	4	4	4	4

Initial Supporting table - SCD_Decel

Description: Used for P0300-P0308 Crankshaft decel threshold. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
2	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
4	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
6	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
8	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
10	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
12	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
14	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
16	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
18	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
20	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
22	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
24	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
30	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
40	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
60	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
97	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - SCD_Jerk

Description: Used for P0300-P0308. Crankshaft jerk threshold. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Value Units: Change in Delta time per cylinder from last cylinder (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
2	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
4	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
6	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
8	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
10	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
12	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
14	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
16	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
18	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
20	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
22	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
24	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
30	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
40	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
60	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
97	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - SnapDecayAfterMisfire

Description: Used for P0300 - P0308, multiplier times the ddtjerk value used used to detect misfire at that speed and load to see if size of disturbance has died down as expected of real misfire. Table lookup as a function of engine rpm and trans gear ratio.

Value Units: multiplier
X Unit: RPM
Y Units: gear ratio

y/x	600	1,000	1,200	1,400	1,600	1,800	2,200	2,600	3,200
1	1.50	1.50	1.50	1.50	1.50	1.50	1.40	1.30	1.20
1	1.70	1.70	1.90	1.20	1.20	1.40	1.50	0.90	0.90
1	2.00	2.00	2.60	1.60	1.20	1.20	1.40	1.00	1.00
1	2.70	2.70	2.80	2.80	1.60	1.20	1.60	1.20	1.00
1	1.30	1.30	3.00	3.00	2.60	1.20	1.40	1.10	1.45
2	1.30	1.30	3.00	2.60	2.20	1.80	1.40	1.60	1.60
2	1.00	1.00	1.40	2.80	2.00	1.70	1.70	1.40	1.60
3	1.10	1.10	1.10	1.50	1.80	1.60	1.60	1.50	1.80
5	0.80	1.00	1.20	1.40	1.60	1.80	2.00	1.25	1.70

Initial Supporting table - T(□SSRoughRoadThres

Description: Used for P0300-P0308. Only used if Rough Road source = TOSS: dispersion Value on Transmission Output Speed Sensor above which rough road is indicated present

Value Units: change in rpm per sec (rpm)
X Unit: Engine Speed (RPM)
Y Units: Transmission Speed (RPM)

y/x	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000
100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
500	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
700	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
900	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Initial Supporting table - WaitToStart

Description: Used for P0300-P0308. Number of engine cycles to delay if diesel engine is cranked before wait to start lamp is extinguished. This lookup table determines the delay length by taking into account the coolant temperature.

Value Units: Number of Engine Cycles (integer)
X Unit: Engine Coolant (deg C)

y/x	-20	-10	0	10	20	30	40	50	60
1	0	0	0	0	0	0	0	0	0

Initial Supporting table - WSSRoughRoadThres

Description: Used for P0300-P0308. Only used if Wheel speed from ABS is used. If difference between wheel speed readings is larger than this limit, rough road is present

Value Units: acceleration
X Unit: Vehicle Speed (KPH)

y/x	0	12	24	36	48	60	72	85	97	109	121	133	145	157	169	181	193
1	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

Initial Supporting table - ZeroTorqueAFM

Description: Used for P0300-P0308. Zero torque engine load while in Active Fuel Management. %of Max Brake Torque along the Neutral rev line, as a function of RPM and Baro

Value Units: Percent of Maximum Brake torque (%)
X Unit: RPM
Y Units: Barometric Pressure (kPa)

ZeroTorqueAFM - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

ZeroTorqueAFM - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Initial Supporting table - ZeroTorqueEngLoad

Description: Used for P0300-P0308. %of Max Brake Torque that represents Zero Brake torque along the Neutral rev line, as a function of RPM and Baro

Value Units: Percent of Maximum Brake torque (%)
X Unit: RPM
Y Units: Barometric Pressure (kPa)

ZeroTorqueEngLoad - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
65	-1.00	-1.00	-1.75	-3.00	-3.75	-4.00	-4.00	-3.75	-3.50	-3.25	-3.50	-4.00	-2.50
75	-1.00	-1.20	-1.75	-2.75	-3.50	-3.50	-2.80	-2.40	-2.12	-2.25	-2.75	-3.00	-1.73
85	-1.00	-1.37	-1.75	-1.75	-1.75	-1.50	-1.25	-1.25	-1.25	-1.65	-2.00	-2.00	-0.87
95	-0.75	-0.75	-0.75	-0.75	-1.00	-1.00	-1.00	-1.25	-1.75	-2.45	-2.75	-3.00	-1.60
105	-0.75	-0.75	-0.75	-0.75	-1.00	-1.00	-1.00	-1.25	-1.75	-2.45	-2.75	-3.00	-1.60

ZeroTorqueEngLoad - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
65	-1.01	0.49	1.99	3.49	4.98	6.48	7.98	9.47	10.97	12.47	13.96	16.96	19.95
75	-0.46	0.80	2.07	3.33	4.60	5.87	7.14	8.40	9.67	10.93	12.20	14.73	17.27
85	0.26	1.38	2.51	3.64	4.76	5.89	7.02	8.15	9.27	10.40	11.53	13.78	16.03
95	-0.20	1.20	2.60	4.00	5.40	6.80	8.20	9.60	11.00	12.40	13.80	16.60	19.40
105	-0.20	1.20	2.60	4.00	5.40	6.80	8.20	9.60	11.00	12.40	13.80	16.60	19.40

Initial Supporting table - ColdTestEnergyThreshold

Description: Table to set the minimum Energy threshold that should be generated in V3 Cold Test for test pass.

Value Units: Exhaust energy [J]
X Unit: Exhaust temperature [°C]
Y Units: N/A

y/x	-20.0	-10.0	0.0	10.0	20.0	30.0	40.0	50.0
0	320.0	320.0	320.0	320.0	320.0	320.0	320.0	320.0
10	320.0	320.0	320.0	320.0	320.0	320.0	320.0	320.0
20	320.0	320.0	320.0	320.0	320.0	320.0	320.0	320.0
25	320.0	320.0	320.0	320.0	320.0	320.0	320.0	320.0
40	320.0	320.0	320.0	320.0	320.0	320.0	320.0	320.0
65	320.0	320.0	320.0	320.0	320.0	320.0	320.0	320.0
85	320.0	320.0	320.0	320.0	320.0	320.0	320.0	320.0
95	320.0	320.0	320.0	320.0	320.0	320.0	320.0	320.0
150	320.0	320.0	320.0	320.0	320.0	320.0	320.0	320.0
300	320.0	320.0	320.0	320.0	320.0	320.0	320.0	320.0

Initial Supporting table - ColdTestExhaustTempAxis

Description: Exhuast Gas temperature breakpoints to be used in EGT based maps for the V3 Cold Test Monitor.

Value Units: Exhaust temperature [°C]
X Unit: N/A
Y Units: N/A

y/x	1	2	3	4	5	6	7	8	9	10
1	0.0	10.0	20.0	25.0	40.0	65.0	85.0	95.0	150.0	300.0

Initial Supporting table - ColdTestMinEnergyDifference

Description: Tables to set the minimum energy difference between WPA and BPU conditions below which the V3 Cold Test Monitor measurements will be discarded.

Value Units: Exhaust energy [J]
X Unit: Exhaust temperature [°C]
Y Units: N/A

y/x	-20.0	-10.0	0.0	10.0	20.0	30.0	40.0	50.0
0	475.0	475.0	475.0	475.0	475.0	475.0	475.0	475.0
10	475.0	475.0	475.0	475.0	475.0	475.0	475.0	475.0
20	475.0	475.0	475.0	475.0	475.0	475.0	475.0	475.0
25	475.0	475.0	475.0	475.0	475.0	475.0	475.0	475.0
40	475.0	475.0	475.0	475.0	475.0	475.0	475.0	475.0
65	475.0	475.0	475.0	475.0	475.0	475.0	475.0	475.0
85	475.0	475.0	475.0	475.0	475.0	475.0	475.0	475.0
95	475.0	475.0	475.0	475.0	475.0	475.0	475.0	475.0
150	475.0	475.0	475.0	475.0	475.0	475.0	475.0	475.0
300	475.0	475.0	475.0	475.0	475.0	475.0	475.0	475.0

Initial Supporting table - ColdTestTargetEnergy

Description: Target Energy that should be generated in V3 WPA mode before ther V3 Cold Test Monitor will be considered completed.

Value Units: Exhaust energy [J]
X Unit: Exhaust temperature [°C]
Y Units: N/A

y/x	-20.0	-10.0	0.0	10.0	20.0	30.0	40.0	50.0
0	800.0	800.0	800.0	800.0	800.0	800.0	800.0	800.0
10	800.0	800.0	800.0	800.0	800.0	800.0	800.0	800.0
20	800.0	800.0	800.0	800.0	800.0	800.0	800.0	800.0
25	800.0	800.0	800.0	800.0	800.0	800.0	800.0	800.0
40	800.0	800.0	800.0	800.0	800.0	800.0	800.0	800.0
65	800.0	800.0	800.0	800.0	800.0	800.0	800.0	800.0
85	800.0	800.0	800.0	800.0	800.0	800.0	800.0	800.0
95	800.0	800.0	800.0	800.0	800.0	800.0	800.0	800.0
150	800.0	800.0	800.0	800.0	800.0	800.0	800.0	800.0
300	800.0	800.0	800.0	800.0	800.0	800.0	800.0	800.0

Initial Supporting table - Engine Coolant Weight Factor

Description: Weighting factor for cooling fan speed stability based on the Engine Coolant Temperature

Value Units: Dimensionless
X Unit: DegC
Y Units: Dimensionless

y/x	90	94	98	102	106	110	114	118	122
1	1	1	1	1	1	1	1	1	1

Initial Supporting table - Input Shaft Speed Weight Factor

Description: Weighting factor for cooling fan speed stability based on input shaft speed

Value Units: Dimensionless
X Unit: RPM
Y Units: Dimensionless

y/x	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,400	6,800
1	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0

Initial Supporting table - Input Shaft Stability Factor

Description: Weighting factor for cooling fan speed stability based on input shaft speed changes

Value Units: Dimensionless
X Unit: RPM
Y Units: Dimensionless

y/x	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200
1	0	0	1	1	1	1	1	0	0

Initial Supporting table - Intake Air Temperature [IAT] Weight Factor

Description: Weighting factor for cooling fan speed stability based on Intake Air Temperature (IAT)

Value Units: Dimensionless
X Unit: DegC
Y Units: Dimensionless

y/x	20	30	40	50	60	70	80	90	100
1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0495 Threshold [EV Fans Only]

Description: Tabulated EV Fan High Speed Thresholds

Value Units: rpm
X Unit: Fan Drive Speed (input shaft speed) rpm
Y Units: Fan Drag Speed (fan speed high limit) rpm

y/x	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,400	6,800
1	400	775	1,135	1,540	1,960	2,320	2,600	3,000	3,400	3,840	4,224	4,608	5,200	5,600	6,000	6,400	6,800

Initial Supporting table - P129F Threshold High

Description: P129F Filtered Fuel Pump Speed Error High Threshold [over-performing motor]
Instantaneously calculated filtered pump speed error measured is higher than commanded

Value Units: revs / min
X Unit: revs / min [commanded pump speed]
Y Units: kiloPascals [requested fuel pressure]

y/x	200.0	300.0	400.0	500.0	600.0
1,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
2,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
3,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
4,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
5,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
6,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
7,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0

Initial Supporting table - P129F Threshold Low

Description: P129F Filtered Fuel Pump Speed Error Low Threshold [under-performing motor]
Instantaneously calculated filtered pump speed error measured is lower than commanded

Value Units: revs / min
X Unit: revs / min [commanded pump speed]
Y Units: kiloPascals [requested fuel pressure]

y/x	200.0	300.0	400.0	500.0	600.0
1,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
2,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
3,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
4,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
5,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
6,000.0	1,750.0	1,750.0	1,750.0	1,750.0	1,750.0
7,000.0	2,750.0	2,750.0	2,750.0	2,750.0	2,750.0

Initial Supporting table - WarmTestEnergyThreshold

Description: Table to set the minimum Energy threshold that should be generated in V3 Warm Test for test pass.

Value Units: Exhaust energy [J]
X Unit: Exhaust temperature [°C]
Y Units: N/A

y/x	-20.0	-10.0	0.0	10.0	20.0	30.0	40.0	50.0
0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0
20	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0
50	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0
100	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0
150	450.0	450.0	450.0	450.0	450.0	450.0	450.0	450.0
200	520.0	520.0	520.0	520.0	520.0	520.0	520.0	520.0
250	580.0	580.0	580.0	580.0	580.0	580.0	580.0	580.0
300	580.0	580.0	580.0	580.0	580.0	580.0	580.0	580.0
300	580.0	580.0	580.0	580.0	580.0	580.0	580.0	580.0
400	580.0	580.0	580.0	580.0	580.0	580.0	580.0	580.0

Initial Supporting table - WarmTestExhaustTempAxis

Description: Exhuast Gas temperature breakpoints to be used in EGT based maps for the V3 Warm Test Monitor.

Value Units: Exhaust temperature [°C]
X Unit: N/A
Y Units: N/A

y/x	1	2	3	4	5	6	7	8	9	10
1	0.0	20.0	50.0	100.0	150.0	200.0	250.0	300.0	300.1	400.0

Initial Supporting table - WarmTestMinEnergyDiffernce

Description: Tables to set the minimum energy difference between WPA and BPU conditions below which the V3 Warm Test measurements will be discarded.

Value Units: Exhaust energy [J]
X Unit: Exhaust temperature [°C]
Y Units: N/A

y/x	-20.0	-10.0	0.0	10.0	20.0	30.0	40.0	50.0
0	475.0	475.0	475.0	475.0	475.0	475.0	475.0	475.0
20	475.0	475.0	475.0	475.0	475.0	475.0	475.0	475.0
50	475.0	475.0	475.0	475.0	475.0	475.0	475.0	475.0
100	475.0	475.0	475.0	475.0	475.0	475.0	475.0	475.0
150	475.0	475.0	475.0	475.0	475.0	475.0	475.0	475.0
200	475.0	475.0	475.0	475.0	475.0	475.0	475.0	475.0
250	475.0	475.0	475.0	475.0	475.0	475.0	475.0	475.0
300	475.0	475.0	475.0	475.0	475.0	475.0	475.0	475.0
300	475.0	475.0	475.0	475.0	475.0	475.0	475.0	475.0
400	475.0	475.0	475.0	475.0	475.0	475.0	475.0	475.0

Initial Supporting table - WarmTestTargetEnergy

Description: Target Energy that should be generated in V3 WPA mode before ther V3 Warm Test Monitor will be considered completed.

Value Units: Exhaust energy [J]
X Unit: Exhaust temperature [°C]
Y Units: N/A

y/x	-20.0	-10.0	0.0	10.0	20.0	30.0	40.0	50.0
0	900.0	900.0	900.0	900.0	900.0	900.0	900.0	900.0
20	900.0	900.0	900.0	900.0	900.0	900.0	900.0	900.0
50	900.0	900.0	900.0	900.0	900.0	900.0	900.0	900.0
100	900.0	900.0	900.0	900.0	900.0	900.0	900.0	900.0
150	900.0	900.0	900.0	900.0	900.0	900.0	900.0	900.0
200	900.0	900.0	900.0	900.0	900.0	900.0	900.0	900.0
250	900.0	900.0	900.0	900.0	900.0	900.0	900.0	900.0
300	900.0	900.0	900.0	900.0	900.0	900.0	900.0	900.0
300	4,095.9	4,095.9	4,095.9	4,095.9	4,095.9	4,095.9	4,095.9	4,095.9
400	4,095.9	4,095.9	4,095.9	4,095.9	4,095.9	4,095.9	4,095.9	4,095.9

Initial Supporting table - P057B KtBRKI K CmpltTestPointWeight

Description:

y/x	0.000	0.025	0.028	0.033	0.070	0.100	0.150	0.500	1.000
1	0	0	0	1	1	1	1	1	1

Initial Supporting table - P057B KtBRKl K FastTestPointWeight

Description:

y/x	0.000	0.025	0.028	0.033	0.045	0.100	0.200	0.500	1.000
1	0	0	0	1	1	1	1	1	1

Initial Supporting table - P10D1_CoilTempRatTempRef

Description:

y/x	-40.0000000000	-30.0000000000	-20.0000000000	-10.0000000000	0.0000000000	10.0000000000	20.0000000000	30.0000000000	40.0000000000	50.0000000000
1	55	55	55	55	55	55	55	55	55	55

Initial Supporting table - EnginePointEnable DPF TempDeviation

Description:

y/x	850	900	2,000	2,500	3,000	3,500	4,000	5,000
0	0	0	0	0	0	0	0	0
1	0	1	1	1	1	1	1	1
10	0	1	1	1	1	1	1	1
13	0	1	1	1	1	1	1	1
20	0	1	1	1	1	1	1	1
30	0	1	1	1	1	1	1	1
40	0	1	1	1	1	1	1	1
80	0	1	1	1	1	1	1	1
90	0	0	0	0	0	0	0	0

Initial Supporting table - EnginePointEnable HC TempDeviation

Description:

y/x	850	900	1,100	1,200	1,800	2,000	2,800	3,500
0	0	1	1	1	1	1	1	1
5	0	1	1	1	1	1	1	1
10	0	1	1	1	1	1	1	1
15	0	1	1	1	1	1	1	1
20	0	1	1	1	1	1	1	1
50	0	1	1	1	1	1	1	1
80	0	1	1	1	1	1	1	1
120	0	1	1	1	1	1	1	1
140	0	1	1	1	1	1	1	1

Initial Supporting table - KaFADC_n_DFSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12
1	5	5	5	5	5	5	5	5	5	5	5	5	5

Initial Supporting table - KaFADC_n_FSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	1	1	0	0	4	4	4	4	4	4

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	80	100	120
450	12	13	12	15	18	21	23	28	30	33
700	12	13	14	16	18	21	23	28	30	33
950	12	13	16	18	19	21	23	28	30	33
1,200	12	13	17	20	22	23	24	29	30	33
1,450	12	13	17	20	23	25	26	31	32	34
1,700	12	13	17	20	23	26	30	33	34	35
1,950	12	13	17	20	23	26	30	35	36	38
2,200	12	13	17	20	23	26	30	35	38	41
2,800	12	13	17	20	23	26	30	35	38	41
3,200	12	13	17	20	23	26	30	35	38	41

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	80	100	120
450	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
700	-8	-8	-10	-10	-10	-10	-10	-10	-10	-10
950	-8	-10	-11	-11	-11	-11	-11	-11	-11	-11
1,200	-9	-10	-12	-12	-12	-12	-12	-12	-12	-12
1,450	-10	-11	-12	-13	-13	-13	-13	-13	-13	-13
1,700	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
1,950	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
2,200	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
2,800	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
3,200	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14

Initial Supporting table - KtFADC_V_FSA_MaxFuelFall

Description: Upper bound of fuel quantity range to enable the F8A learning phase depending on the engine speed

Value Units: mm^3

y/x	510	511	800	1,000	1,500	1,750	2,250	2,750	3,000	3,250
1	0	30	60	70	100	120	110	110	100	70

Initial Supporting table - P1682 PT Relay Pull-in Run/Crank Voltage f(IAT)

Description: The Run/Crank voltages required to pull in the PT relay as a function of induction air temperature.

Value Units: Run/Crank Voltages required to pull in PT Relay (V)
X Unit: Induction Air Temperature (deg C)

y/x	23.0	85.0	95.0	105.0	125.0
1	7.000	8.700	9.000	9.200	10.000

Initial Supporting table - P16A7 PT Relay Pull-in Run/Crank Voltage f(IAT)

Description: The Run/Crank voltages required to pull in the PT relay as a function of induction air temperature.

Value Units: Run/Crank Voltages required to pull in PT Relay (V)
X Unit: Induction Air Temperature (deg C)

y/x	23.0	85.0	95.0	105.0	125.0
1	7.000	8.700	9.000	9.200	10.000

Initial Supporting table - P16BC PT Relay Pull-in Run/Crank Voltage f(IAT)

Description: The Run/Crank voltages required to pull in the PT relay as a function of induction air temperature.

Value Units: Run/Crank Voltages required to pull in PT Relay (V)
X Unit: Induction Air Temperature (deg C)

y/x	23.0	85.0	95.0	105.0	125.0
1	7.000	8.700	9.000	9.200	10.000

Initial Supporting table - EGT_Bank1_Sensor1_Temp MAP

Description:

y/x	-40	-12	16	40	68	96	116	120
1	160	132	104	80	52	24	4	0

Initial Supporting table - EGT_Bank1_Sensor2_Temp MAP

Description:

y/x	-40	-12	16	40	68	96	116	120
1	160	132	104	80	52	24	4	0

Initial Supporting table - EGT_Bank1_Sensor3_Temp MAP

Description:

y/x	-40	-24	-4	12	28	44	60	64
1	104	88	68	52	36	20	4	0

Initial Supporting table - EGT_Bank1_Sensor4_Temp MAP

Description:

y/x	-40	-24	-4	12	28	44	60	64
1	104	88	68	52	36	20	4	0

Initial Supporting table - EGT_Bank1_Sensor5_Temp MAP

Description:

y/x	-40	-24	-4	12	28	44	60	64
1	104	88	68	52	36	20	4	0

Initial Supporting table - EGT_ERD_B1S1_CombModeDly

Description:

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	210	900	900	900	900	300	900	900	300	900	900	900	900

Initial Supporting table - EGT_ERD_B1S1_CombModeEnbl

Description:

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - EGT_ERD_B1S2_CombModeDly

Description:

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	210	900	900	900	900	300	900	900	300	900	900	900	900

Initial Supporting table - EGT_ERD_B1S2_CombModeEnbl

Description:

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - EGT_ERD_B1S3_CombModeDly

Description:

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	120	210	900	900	900	900	300	900	900	300	900	900	900	900

Initial Supporting table - EGT_ERD_B1S3_CombModeEnbl

Description:

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - EGT_ERD_B1S4_CombModeDly

Description:

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	120	210	900	900	900	900	300	900	900	300	900	900	900	900

Initial Supporting table - EGT_ERD_B1S4_CombModeEnbl

Description:

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - EGT_ERD_B1S5_CombModeDly

Description:

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	120	210	900	900	900	900	300	900	900	300	900	900	900	900

Initial Supporting table - EGT_ERD_B1S5_CombModeEnbl

Description:

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P054E_IFM_CombModesEnbl

Description: This calibration provides the capability to select in which combustion mode the Idle Fuel Monitoring shall be enabled.
1 -> monitor enabled
0 -> monitor disabled

Value Units: Boolean
X Unit: Combustion Mode

P054E_IFM_CombModesEnbl - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	0	1	0

P054E_IFM_CombModesEnbl - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	0	0	0

P054E_IFM_CombModesEnbl - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

P054E_IFM_CombModesEnbl - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - P054E_IFM_MinFuelIdleC1_G

Description: During Normal combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	500	600	800	1,050	1,560
-20	25	25	26	29	29
-10	18	18	20	21	21
0	14	14	15	18	19
20	11	11	13	16	16
50	9	9	10	11	11
70	8	8	8	9	9

Initial Supporting table - P054E E_IFM_MinFuelIdleC1_PN

Description: During Normal combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	500	600	800	1,050	1,560
-20	23	23	24	26	26
-10	18	18	19	20	20
0	13	13	14	15	15
20	9	9	10	11	11
50	6	6	6	6	6
70	4	4	5	5	5

Initial Supporting table - P054E_IFM_MinFuelIdleHC_G

Description: During HC Unloading combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	500	600	800	1,050	1,560
-20	21	21	22	23	23
-10	18	18	21	22	22
0	14	14	17	19	19
20	12	12	15	18	18
50	9	9	9	10	10
70	8	8	9	10	10

Initial Supporting table - P054E z_IFM_MinFuelIdleHC_PN

Description: During HC Unloading combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	500	600	800	1,050	1,560
-20	14	14	15	17	17
-10	13	13	14	14	14
0	10	10	12	13	13
20	9	9	9	10	9
50	6	6	8	9	9
70	5	5	6	6	6

Initial Supporting table - P054[E_IFM_MinFuelIdleV2_G

Description: During Soft Warm Up combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	500	600	800	1,050	1,560
-20	28	28	30	32	32
-10	19	19	20	21	21
0	12	12	13	15	15
20	9	9	10	11	11
50	9	9	9	11	11
70	7	7	7	8	8

Initial Supporting table - P054E_IFM_MinFuelIdleV2_PN

Description: During Soft Warm Up combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	500	600	800	1,050	1,560
-20	13	13	14	16	16
-10	10	10	12	13	13
0	8	8	10	10	10
20	6	6	7	7	7
50	6	6	6	6	6
70	5	5	5	5	5

Initial Supporting table - P054[E_IFM_MinFuelIdleV3_G

Description: During Strong Warm Up combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	500	600	800	1,050	1,560
-20	28	28	30	32	32
-10	19	19	20	21	21
0	12	12	13	15	15
20	9	9	10	11	11
50	9	9	9	11	11
70	7	7	7	8	8

Initial Supporting table - P054E_IFM_MinFuelIdleV3_PN

Description: During Strong Warm Up combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	500	600	800	1,050	1,560
-20	13	13	14	16	16
-10	10	10	12	13	13
0	8	8	10	10	10
20	6	6	7	7	7
50	6	6	6	6	6
70	5	5	5	5	5

Initial Supporting table - P054F_IFM_CombModesEnbl

Description: This calibration provides the capability to select in which combustion mode the Idle Fuel Monitoring shall be enabled.
1 -> monitor enabled
0 -> monitor disabled

Value Units: Boolean
X Unit: Combustion Mode

P054FJFM_CombModesEnbl - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_Warmllp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	0	1	0

P054F_IFM_CombModesEnbl - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	0	0	0

P054F_IFM_CombModesEnbl - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

P054F_IFM_CombModesEnbl - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - P054F_IFM_MaxFuelIdleC1_G

Description: During Normal combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	500	600	800	1,050	1,560
-20	65	65	83	96	96
-10	56	56	74	87	87
0	34	34	39	46	46
20	29	29	35	43	43
50	26	26	30	37	37
70	23	23	28	33	33

Initial Supporting table - P054FJFM_MaxFuelIdleC1_PN

Description: During Normal combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	500	600	800	1,050	1,560
-20	65	65	83	96	96
-10	56	56	74	87	87
0	34	34	39	46	46
20	29	29	35	43	43
50	26	26	30	37	37
70	23	23	28	33	33

Initial Supporting table - P054F_IFM_MaxFuelIdleHC_G

Description: During HC Unloading combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	500	600	800	1,050	1,560
-20	56	56	78	99	99
-10	49	49	72	93	93
0	31	31	41	46	46
20	32	32	36	43	43
50	26	26	30	38	38
70	25	25	30	37	37

Initial Supporting table - P054F_IFM_MaxFuelIdleHC_PN

Description: During HC Unloading combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	500	600	800	1,050	1,560
-20	56	56	78	99	99
-10	49	49	72	93	93
0	31	31	41	46	46
20	32	32	36	43	43
50	26	26	30	38	38
70	25	25	30	37	37

Initial Supporting table - P054F_IFM_MaxFuelIdleV2_G

Description: During Soft Warm Up combustion mode, this error threshold map indicates the inaximum fuel requested [mm3] in nominal condition and with transmission in gear. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	500	600	800	1,050	1,560
-20	69	69	75	77	77
-10	62	62	72	69	69
0	49	49	57	63	63
20	42	42	51	58	58
50	42	42	44	51	51
70	40	40	43	49	49

Initial Supporting table - P054F=_IFM_MaxFuelIdleV2_PN

Description: During Soft Warm Up combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	500	600	800	1,050	1,560
-20	69	69	72	74	74
-10	58	58	60	62	62
0	52	52	56	57	57
20	44	44	46	47	47
50	37	37	39	40	40
70	35	35	36	36	36

Initial Supporting table - P054F_IFM_MaxFuelIdleV3_G

Description: During Strong Warm Up combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	500	600	800	1,050	1,560
-20	66	66	85	102	102
-10	56	56	85	102	102
0	44	44	48	57	57
20	39	39	43	52	52
50	32	32	36	41	41
70	36	36	37	41	41

Initial Supporting table - P054F_IFM_MaxFuelIdleV3_PN

Description: During Strong Warm Up combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	500	600	800	1,050	1,560
-20	66	66	85	102	102
-10	56	56	85	102	102
0	44	44	48	57	57
20	39	39	43	52	52
50	32	32	36	41	41
70	36	36	37	41	41

Initial Supporting table - P0087 Minimum rail pressure

Description: Minimum rail pressure threshold (MPa) as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	450	500	650	660	800	1,000	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,200	4,400	4,800
1	0	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15

Initial Supporting table - P0089 Maximum rail pressure with MU

Description: Maximum rail pressure threshold (MPa) when pressure is governed by Metering Unit as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	0	1,250	2,250	3,500	4,500	4,600
1	68	238	238	238	118	68

Initial Supporting table - P0181 Fuel Temperature Sensor Reference

Description: Defines which sensor is used as reference for check plausibility of fuel temperature sensor.
(CeFTSR_e_ECT_Snsr = Engine coolant temperature, CeFTSR_e_DPF_SnsrUp = Exhaust gas temperature measured upstream the DPF, CeFTSR_e_DPF_SnsrDwn = Exhaust gas temperature measured downstream the DPF.

Value Units: -

y/x	1
1	CeFTSR_e_DPF_SnsrDwn

Initial Supporting table - P228B Pressure Regulator completely closed command

Description: Command, in terms of pressure (MPa), to consider pressure regulator valve completely closed as function of rail pressure (MPa).

Value Units: MPa
X Unit: MPa

y/x	0	125	200	250
1	45	183	245	278

Initial Supporting table - P2293 Maximum rail pressure with PR

Description: Maximum rail pressure threshold (MPa) when pressure is governed by Pressure Regulator as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	0	1,250	2,250	3,500	4,500	4,600
1	68	238	238	238	118	68

Initial Supporting table - P3187_Threshold

Description: P3187 Filtered Fuel Pressure Error Threshold [under-performing pump]

Value Units: kilo Pascals
X Unit: kPa [commanded fuel pressure]
Y Units: grams / sec [fuel flow]

y/x	200.00	250.00	300.00	350.00	400.00	450.00	500.00	550.00	600.00
0.00	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
1.50	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
3.00	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
4.50	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
6.00	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
7.50	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
9.00	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
10.50	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
12.00	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
13.50	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
15.00	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
16.50	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
18.00	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
19.50	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
21.00	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
22.50	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
24.00	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
25.50	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
27.00	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
28.50	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
30.00	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
31.50	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
33.00	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
34.50	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
36.00	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
37.50	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
39.00	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
40.50	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
42.00	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
43.50	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
45.00	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00

Initial Supporting table ■P3187_Threshold

46.50	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
48.00	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00

Initial Supporting table - P3188_Threshold

Description: P3188 Filtered Fuel Pressure Error Threshold [over-performing pump]

Value Units: kilo pascals [kPa]
X Unit: kPa [commanded fuel pressure]
Y Units: grams/sec [fuel flow]

y/x	200.00	250.00	300.00	350.00	400.00	450.00	500.00	550.00	600.00
0.00	-260.00	-210.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
1.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
3.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
4.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
6.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
7.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
9.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
10.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
12.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
13.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
15.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
16.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
18.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
19.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
21.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
22.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
24.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
25.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
27.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
28.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
30.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
31.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
33.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
34.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
36.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
37.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
39.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
40.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
42.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
43.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
45.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00

Initial Supporting table ■P3188_Threshold

46.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
48.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00

Initial Supporting table - Rail Pressure Sensor Configuration

Description: Defines which kind of Rail Pressure Sensor configuration is used:
CeFHPG_e_RPS_SingleTrack = RPS with a single rail pressure information
CeFHPG_e_RPS_DoubleTrack = RPS with a redundant rail pressure information

Value Units: -

y/x	1
1	CeFHPG_e_RPS_DoubleTrack

Initial Supporting table - KaFADC_n_DFSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12
1	5	5	5	5	5	5	5	5	5	5	5	5	5

Initial Supporting table - KaFADC_n_FSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	1	1	0	0	4	4	4	4	4	4

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	80	100	120
450	12	13	12	15	18	21	23	28	30	33
700	12	13	14	16	18	21	23	28	30	33
950	12	13	16	18	19	21	23	28	30	33
1,200	12	13	17	20	22	23	24	29	30	33
1,450	12	13	17	20	23	25	26	31	32	34
1,700	12	13	17	20	23	26	30	33	34	35
1,950	12	13	17	20	23	26	30	35	36	38
2,200	12	13	17	20	23	26	30	35	38	41
2,800	12	13	17	20	23	26	30	35	38	41
3,200	12	13	17	20	23	26	30	35	38	41

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	80	100	120
450	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
700	-8	-8	-10	-10	-10	-10	-10	-10	-10	-10
950	-8	-10	-11	-11	-11	-11	-11	-11	-11	-11
1,200	-9	-10	-12	-12	-12	-12	-12	-12	-12	-12
1,450	-10	-11	-12	-13	-13	-13	-13	-13	-13	-13
1,700	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
1,950	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
2,200	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
2,800	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
3,200	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14

Initial Supporting table - KtFADC_V_FSA_MaxFuelFall

Description: Upper bound of fuel quantity range to enable the F8A learning phase depending on the engine speed

Value Units: mm^3

y/x	510	511	800	1,000	1,500	1,750	2,250	2,750	3,000	3,250
1	0	30	60	70	100	120	110	110	100	70

Initial Supporting table - KaFADR_e_FSA_CombModeEnblGrp

Description: Enable FSA learning based on the combustion modes and select related maps based on calibrated groups

Value Units: -
X Unit: -

KaFADR_e_FSA_CombModeEnblGrp - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_CombModeEnblGrp - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_CombModeEnblGrp - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_CombModeEnblGrp - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_CombModeEnblGrp - Part 5

y/x				
1				

Initial Supporting table - KaFADR_e_FSA_CombModeRelGrp

Description: Enable FSA correction release based on the combustion modesand select related maps based on calibrated groups

Value Units: -
X Unit: -

KaFADR_e_FSA_CombModeRelGrp - Part 1				
y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_Grp1

KaFADR_e_FSA_CombModeRelGrp - Part 2				
y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_CombModeRelGrp - Part 3				
y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_CombModeRelGrp - Part 4				
y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_CombModeRelGrp - Part 5				
y/x				
1				

Initial Supporting table - KaFADR_e_FSA_ECM_CombModeGrp

Description: Enable P026C and P026D in specific combustion modes and select related threshold maps based on calibrated group

Value Units: -
X Unit: -

KaFADR_e_FSA_ECM_CombModeGrp - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_ECM_CombModeGrp - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_ECM_CombModeGrp - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_ECM_CombModeGrp - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_ECM_CombModeGrp - Part 5

y/x				
1				

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	5	10	20	30	40	50	60	80	100	120
450	12	13	12	15	18	21	23	28	30	33
700	12	13	14	16	18	21	23	28	30	33
950	12	13	16	18	19	21	23	28	30	33
1,200	12	13	17	20	22	23	24	29	30	33
1,450	12	13	17	20	23	25	26	31	32	34
1,700	12	13	17	20	23	26	30	33	34	35
1,950	12	13	17	20	23	26	30	35	36	38
2,200	12	13	17	20	23	26	30	35	38	41
2,800	12	13	17	20	23	26	30	35	38	41
3,200	12	13	17	20	23	26	30	35	38	41

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	5	10	20	30	40	50	60	80	100	120
450	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
700	-8	-8	-10	-10	-10	-10	-10	-10	-10	-10
950	-8	-10	-11	-11	-11	-11	-11	-11	-11	-11
1,200	-9	-10	-12	-12	-12	-12	-12	-12	-12	-12
1,450	-10	-11	-12	-13	-13	-13	-13	-13	-13	-13
1,700	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
1,950	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
2,200	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
2,800	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
3,200	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14

Initial Supporting table - KtFADD_K_FSA_ECM_PresAmbWghtHi

Description: Curve of the weighting factor dependent on ambient pressure for P026D

Value Units: -
X Unit: kPa

y/x	72	85	100
1	1	1	1

Initial Supporting table - KtFADD_K_FSA_ECM_PresAmbWghtLo

Description: Curve of the weighting factor dependent on ambient pressure for P026C

Value Units: -
X Unit: kPa

y/x	72	85	100
1	1	1	1

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrshGrp1

Description: Map to define P026D threshold for combustion mode Group 1

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	18	20	23	25	28	30	33	35	38	40
1,100	7	8	8	9	9	10	11	11	12	12
1,200	7	8	8	9	9	10	11	12	12	12
1,300	7	8	8	9	9	10	11	12	12	12
1,400	7	8	8	9	10	10	11	12	12	12
1,500	7	8	8	9	10	10	11	12	12	12
1,600	8	8	8	9	10	11	11	12	12	12
1,700	8	8	8	9	10	11	11	12	12	12
1,800	8	8	9	10	10	11	11	12	12	12

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrshGrp2

Description: Map to define P026D threshold for combustion mode Group 2

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	18	20	23	25	28	30	33	35	38	40
1,100	11	13	10	9	9	9	9	9	9	9
1,200	9	13	13	9	10	9	10	10	10	10
1,300	13	11	14	14	10	10	13	13	13	13
1,400	9	10	12	12	12	13	14	14	14	14
1,500	10	11	12	12	14	14	14	14	14	14
1,600	12	11	12	12	14	14	14	14	14	14
1,700	17	10	13	14	14	14	18	18	18	18
1,800	16	16	17	14	16	18	18	18	18	18

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrshGrp3

Description: Map to define P026D threshold for combustion mode Group 3

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	18	20	23	25	28	30	33	35	38	40
1,100	11	13	10	9	9	9	9	9	9	9
1,200	9	13	13	9	10	9	10	10	10	10
1,300	13	11	14	14	10	10	13	13	13	13
1,400	9	10	12	12	12	13	14	14	14	14
1,500	10	11	12	12	14	14	14	14	14	14
1,600	12	11	12	12	14	14	14	14	14	14
1,700	17	10	13	14	14	14	18	18	18	18
1,800	16	16	17	14	16	18	18	18	18	18

Initial Supporting table - KtFADD_V_FSA_ECM_LoThrshGrp1

Description: Map to define P026C threshold for combustion mode Group 1

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	18	20	23	25	28	30	33	35	38	40
1,100	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
1,200	-8	-8	-10	-10	-10	-10	-10	-10	-10	-10
1,300	-8	-10	-11	-11	-11	-11	-11	-11	-11	-11
1,400	-9	-10	-12	-12	-12	-12	-12	-12	-12	-12
1,500	-10	-11	-12	-13	-13	-13	-13	-13	-13	-13
1,600	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
1,700	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14
1,800	-10	-12	-12	-13	-14	-14	-14	-14	-14	-14

Initial Supporting table - KtFADD_V_FSA_ECM_LoThrshGrp2

Description: Map to define P026C threshold for combustion mode Group 2

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	18	20	23	25	28	30	33	35	38	40
1,100	-4	-4	-4	-3	-1	-2	-1	-1	-1	-1
1,200	-5	-5	-3	-1	-1	-1	-1	-1	-1	-1
1,300	-2	-3	-2	-2	-1	-1	-1	-1	-1	-1
1,400	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,500	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,600	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,700	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,800	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1

Initial Supporting table - KtFADD_V_FSA_ECM_LoThrshGrp3

Description: Map to define P026C threshold for combustion mode Group 3

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	18	20	23	25	28	30	33	35	38	40
1,100	-4	-4	-4	-3	-1	-2	-1	-1	-1	-1
1,200	-5	-5	-3	-1	-1	-1	-1	-1	-1	-1
1,300	-2	-3	-2	-2	-1	-1	-1	-1	-1	-1
1,400	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,500	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,600	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,700	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
1,800	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1

Initial Supporting table - RufCyl Decel

Description: Used for P0300-P0308. Crankshaft decel threshold during Idle or GPF regen. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usee)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufCyl_Decel - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	1,416	927	621	380	255	190	138	106	78	59	45	30	24
2	1,014	689	483	304	207	166	127	95	71	55	43	28	23
4	794	411	312	212	150	133	111	81	61	49	39	26	22
6	1,159	628	437	288	205	151	115	66	60	44	36	24	20
8	1,575	986	575	375	230	173	114	66	68	46	32	21	21
10	2,041	1,344	824	465	291	178	124	67	69	46	33	22	19
12	2,467	1,702	1,078	630	403	214	158	96	65	48	29	23	19
14	2,893	2,060	1,332	796	515	271	188	127	78	50	39	28	20
16	3,318	2,418	1,586	962	626	328	212	151	104	75	48	30	21
18	3,744	2,776	1,839	1,127	738	385	243	175	123	86	55	29	22
20	4,170	3,134	2,093	1,294	850	441	274	198	142	97	62	31	23
22	4,595	3,492	2,347	1,458	961	498	305	222	161	108	69	37	25
24	5,021	3,850	2,600	1,624	1,073	555	336	246	180	120	76	43	30
30	6,298	4,924	3,362	2,123	1,408	725	428	317	238	154	98	60	43
40	8,426	6,715	4,630	2,949	1,966	1,009	582	435	333	211	134	90	64
60	12,682	10,295	7,168	4,604	3,083	1,577	889	672	525	324	206	149	108
97	20,663	17,008	11,925	7,711	5,177	2,641	1,467	1,116	883	538	341	259	190

RufCyl_Decel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
1	19	16	14	13	12	11	9	32,768	32,768	32,768	32,768	32,768	32,768
2	18	15	13	12	12	11	8	32,768	32,768	32,768	32,768	32,768	32,768
4	17	14	12	11	11	10	8	32,768	32,768	32,768	32,768	32,768	32,768
6	16	13	11	11	10	9	7	32,768	32,768	32,768	32,768	32,768	32,768
8	16	12	10	10	9	8	7	32,768	32,768	32,768	32,768	32,768	32,768
10	17	13	12	9	9	7	6	32,768	32,768	32,768	32,768	32,768	32,768
12	17	13	12	10	9	8	6	32,768	32,768	32,768	32,768	32,768	32,768
14	18	13	14	11	9	8	7	32,768	32,768	32,768	32,768	32,768	32,768
16	19	15	16	12	11	9	8	32,768	32,768	32,768	32,768	32,768	32,768
18	20	20	18	13	11	10	9	32,768	32,768	32,768	32,768	32,768	32,768
20	21	24	20	16	13	10	10	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - RufCyl Decel

22	21	27	22	17	14	11	11	32,768	32,768	32,768	32,768	32,768	32,768
24	22	29	24	19	16	13	12	32,768	32,768	32,768	32,768	32,768	32,768
30	30	38	29	24	20	16	15	32,768	32,768	32,768	32,768	32,768	32,768
40	43	42	42	33	28	23	20	32,768	32,768	32,768	32,768	32,768	32,768
60	71	68	67	50	43	36	30	32,768	32,768	32,768	32,768	32,768	32,768
97	122	117	115	81	70	60	48	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - RufCyl Jerk

Description: Crankshaft jerk threshold during Idle or GPF regen. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usee)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufCyl_Jerk - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	1,154	761	500	325	222	185	127	99	80	65	45	31	26
2	931	618	409	271	181	143	100	81	73	52	41	27	24
4	755	490	323	190	135	92	65	64	63	40	36	23	22
6	1,044	738	445	314	178	144	85	64	54	37	32	20	20
8	1,422	1,032	629	437	267	195	105	74	60	36	30	20	18
10	1,821	1,325	825	560	356	246	137	89	65	38	30	20	18
12	2,211	1,618	1,115	683	445	297	169	108	65	40	32	22	18
14	2,637	1,911	1,370	807	534	349	200	125	73	45	38	31	22
16	3,045	2,204	1,591	930	623	400	232	147	85	55	46	36	25
18	3,506	2,497	1,807	1,053	711	451	264	169	99	66	54	42	32
20	3,972	2,791	2,016	1,176	800	503	295	191	114	78	63	48	39
22	4,357	3,084	2,238	1,300	889	554	327	213	128	89	71	53	48
24	4,727	3,377	2,451	1,423	978	605	359	235	142	101	80	59	53
30	5,969	4,256	3,099	1,793	1,245	759	454	301	185	135	105	75	67
40	7,988	5,722	4,181	2,409	1,689	1,016	612	410	257	193	147	103	92
60	12,070	8,654	6,347	3,642	2,577	1,528	929	629	400	308	232	159	140
97	19,725	14,151	10,393	5,953	4,243	2,490	1,523	1,040	669	524	390	264	230

RufCyl_Jerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
1	23	18	16	13	13	13	11	32,768	32,768	32,768	32,768	32,768	32,768
2	21	17	15	13	13	12	11	32,768	32,768	32,768	32,768	32,768	32,768
4	18	15	13	12	12	11	10	32,768	32,768	32,768	32,768	32,768	32,768
6	15	13	11	11	11	10	10	32,768	32,768	32,768	32,768	32,768	32,768
8	14	11	10	10	10	9	9	32,768	32,768	32,768	32,768	32,768	32,768
10	15	13	11	10	9	8	8	32,768	32,768	32,768	32,768	32,768	32,768
12	15	14	12	10	10	8	8	32,768	32,768	32,768	32,768	32,768	32,768
14	15	14	13	10	10	8	8	32,768	32,768	32,768	32,768	32,768	32,768
16	15	14	14	12	10	8	8	32,768	32,768	32,768	32,768	32,768	32,768
18	16	16	15	13	11	9	9	32,768	32,768	32,768	32,768	32,768	32,768
20	17	17	17	14	13	11	10	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - RufCyl Jerk

22	20	19	18	15	14	12	10	32,768	32,768	32,768	32,768	32,768	32,768
24	24	21	20	17	15	12	11	32,768	32,768	32,768	32,768	32,768	32,768
30	36	26	24	21	18	15	13	32,768	32,768	32,768	32,768	32,768	32,768
40	57	35	32	28	22	18	17	32,768	32,768	32,768	32,768	32,768	32,768
60	99	54	48	41	30	26	24	32,768	32,768	32,768	32,768	32,768	32,768
97	174	88	77	67	45	40	38	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - RufSCD Decel

Description: Used for P0300-P0308.   Crankshaft decel threshold while in SCD mode during Idle or GPF regen.   SCD mode uses smaller windows near TDC.   Thresholds are a function of rpm and % engine Load. Note: Misfire's Load term is %, but not PID$04.   PID $04 is not robust to temperature and alititude shifts, (especially decel and jerk thresholds since they track actual air trapped in cylinder)

Value Units: Delta time per cylinder (usee)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufSCD_Decel - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

RufSCD_Decel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
1	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCD Decel

18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCD Jerk

Description: Used for P0300-P0308. Crankshaft jerk threshold while in SCD mode during Idle or GPF regen. 8CD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usee)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufSCD_Jerk - Part 1

y/x	450	520	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
1	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

RufSCD_Jerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,600	5,000
1	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCD Jerk

20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - P04FB : Pressure Sensor Equilibrium Time

Description: Pressure sensor equilibrium time funtion of Outside Ambient Temperature

Value Units: Time (seconds)
X Unit: Outside Ambient Temperature (degrees C)

y/x	-40	-30	-20	-10	0	10	20
1	10	10	10	10	10	10	10

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Longitudinal Acceleration Sensor Performance	C0552	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 Ilium.
					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 Ilium.
					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 Ilium.
					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 Ilium.
					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 4 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 LI0073 fault active LI0073 test fail this key on DTCs not fault active	= FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th > 0.5300 g < 3.8500 g < 0.70 % < 50.0 Nm < -0.1700 g > 2.0 KPH < 120.0 KPH < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	region 4 fail time > 2.0 seconds out of region 4 sample time > 2.5 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Longitudinal Acceleration Sensor Circuit Low	C0553	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 Q 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 Ilium.
Longitudinal Acceleration Sensor Circuit High	C0554	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 Q 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 Ilium.
Lateral Acceleration Sensor Circuit Low	C0697	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 Q 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 Ilium.
Lateral Acceleration Sensor Circuit High	C0698	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 Q 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 Ilium.
Lateral Acceleration Sensor Performance	C0699	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 Ilium.
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.	
				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 Ilium.
Controller 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 Ilium.
Controller 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 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 Ilium.
Internal Controller Processor Integrity Fault	P0606	Indicates that the controller 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	500 milliseconds	Type A, 1 Trips
			MAIN processor receives seed in wrong order			always running	18 / 17 counts intermittent. 50 ms/count in the controller main processor	
			2 fails in a row in the MAIN processor's ALU check			Test is Enabled: 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 200 milliseconds continuous; 50 ms/count in the controller main processor	
			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.	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 access flash with corrupted memory	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Counter >=					
			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 PFM_Enable f (Loop Time)** (If 0, this test is disabled)	Fail Table, f(Loop Time). See supporting tables: **P0606 PFM Sequence Fail f (Loop Time)** / Sample Table, f (Loop Time)See supporting tables: **P0606 PFM Sequence Sample f(Loop Time)** counts 50 ms/count in the controller main orocessor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Controller 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.			Test is enabled: 1. (If 0, this test is disabled)	5 counts background task/ count in the controller 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)		Test is enabled: 1. (If 0, this test is disabled)	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)		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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Redundant Memory Performance , P060C = previous model years P16F3	P060C	The diagnostic monitor is a rationalization of command values: command clutch pressures, command gear, and commanded direction. The monitor is broken up into three fault detection routines, command pressure (tie up) fault detection, command gear/shift fault detection, and commanded direction. 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	For each combination of clutches which can lead to an output lock: Commanded Clutch PCS Pressure OR For each combination of clutches which can lead to a mult-clutch tie-up: Commanded Clutch PCS Pressure	> **Cmnd Tie Up Monitor Output Lock Thresh** * **Clutch PCS Pressure Gain** + **Clutch PCS Pressure Offset** transfer case range is 4WD Low: > **Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo** * **Clutch PCS Pressure Gain** + **Clutch PCS Pressure Offset** Else > **Cmnd Tie Up Monitor Multi-Clutch Thresh** * **Clutch PCS Pressure Gain** +			when fail timer reaches 100, set DTC	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		rational, one or more of 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 transfer case range	if above criteria met, increment fail timer by 3.125 6.25 ms update rate	**Clutch PCS Pressure Offset**	commanded tie up monitor enable calibration vehicle speed OR commanded tie up fault pending OR (vehicle speed AND monitor enabled in previous loop) High Side Driver 1 On High Side Driver 2 On Service Fast Learn OR (Service Fast Learn AND Vehicle Speed for vehicle speed time) Number of fill factor conditions below which need to be met Clutch 1 volume fill factor Clutch 2 volume fill factor Clutch 3 volume fill factor Clutch 4 volume fill factor Clutch 5 volume fill factor Clutch 6 volume fill factor SOWC volume fill factor (GF9 only)	= 1 (1 to enable, 0 to disable) > 5.0 KPH = TRUE > 5.0 KPH = TRUE = TRUE = TRUE = FALSE = TRUE > 8.0 KPH > 2.50 seconds = 4 Filled Clutches > 1.00 > 1.00 > 1.00 > 1.00 > 1.00 > 1.00 > 1.00 Transfer case range is 4WD Lo:		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		The command direction fault detection is designed to verify the clutches commanded on will result in the commanded direction (e.g. reverse clutches are being commaned on when the commanded range is reverse). This is used to prevent an incorrect direction safety hazard.			output shaft deceleration DTCs Not Fault Active DTCs Not Test Failed This Key On	< -403.3 RPM/sec Else < -149.4 RPM/sec P077C, P077D P0723, P0722		
			Commanded Gear AND at least one of the following: Previous Loop Commanded Gear and current loop commanded OR current commanded gear and previous loop commanded gear OR incorrect downshift fail timer if above conditions are met, increment incorrect downshift fail timer 6.25 ms update rate Alternatively, if commanded gear increment invalid commanded gear fail	< **Shift Monitor Lowest Allowed Gear** > Current Loop Commanded Gear (i.e a downshift) = a forward, locked gear = a forward, locked gear # a forward, locked gear >0.0 = NULL			when incorrect downshift fail timer reaches 4.63 sec, set DTC	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			timer 6.25 ms update rate		command shift monitor enable calibration Service Fast Learn OR (Service Fast Learn AND Vehicle Speed for vehicle speed time) High Side Driver 1 On High Side Driver 2 On DTCs Not Fault Active DTCs Not Test Failed This Key On	= 1 (1 to enable, 0 to disable) = FALSE = TRUE > 8.0 KPH > 2.50 seconds = TRUE = TRUE P077C, P077D, P0721 P0723, P0722, P172A, P172B		
			Criteria based on driver requested range: Drive: An invalid combination of drive clutches commanded on* driver requested range Incorrect drive enable calibration Incrorrect drive disable calibration Reverse: An invalid combination of reverse clutches commanded on*	= **Illegal Drive Clutch Combinations** = Drive = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable) = **Illegal Reverse Clutch Combinations**			Fault pending fail timer > **Clutch Connectivity Wrong Direction FP** Fail time based on driver requested range: **Incorrect Drive Fail Time** **Incorrect Reverse Fail Time** **Incorrect Neutral Fail Time** **Incorrect Park Fail Time**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			driver requested range	= Reverse			6.25 ms update rate	
			Incorrect reverse enable calibration	= 1 (1 to enable, 0 to disable)	Current driver requested range	= previous driver requested range	> **Incorrect Direction Range Change Delay Time**	
			Incrorrect reverse disable calibration	= 0 (0 to enable, 1 to enable)				
			Neutral:		(vehicle speed AND	> -6.00 KPH		
			An invalid combinatio of neutral clutches commanded on*	= **Illegal Park-Neutral Clutch Combinations**	vehicle speed OR Fail Timer)	> 6.00 KPH >0.0		
			driver requested range	= Neutral	clutch connectivity monitor enable OR	= 1 (1 to enable, 0 to disable		
			Incorrect neural enable calibration	= 1 (1 to enable, 0 to disable)	clutch connectivity monitor disable	= 0 (0 to enable, 1 to disable)		
			Incrorrect neutral disable calibration	= 0 (0 to enable, 1 to disable)	Service Fast Learn OR	= FALSE		
			Park:		(Service Fast Learn AND	= TRUE		
			An invalid combination of reverse clutches commanded on*	= **Illegal Park-Neutral Clutch Combinations**	Vehicle Speed for vehicle speed time)	> 8.0 KPH > 2.50		
					High Side Driver 1 On High Side Driver 2 On	= TRUE = TRUE		
			driver requested range	= Park	DTCs Not Fault Active	P077C, P077D, P0721		
			Incorrect park enable calibration	= 1 (1 to enable, 0 to disable)	DTCs Not Test Failed This Key On	P0723, P0722, P172A, P172B		
			Incrorrect park disable calibration	= 0 (0 to enable, 1 to disable)	* Note, clutch is considered "on" when the following conditions are met:			
					Clutch commanded	>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					pressure	**Clutch Connectivity C1 On Threshold** OR > **Clutch Connectivity C2 On Threshold** OR > **Clutch Connectivity C3 On Threshold** OR > **Clutch Connectivity C4 On Threshold** OR > **Clutch Connectivity C5 On Threshold** OR > **Clutch Connectivity C6 On Threshold** OR > **Clutch Connectivity C7 On Threshold**		
					Current clutch pressure command * 0.25 + 1st derivative of pressure command * 0.25 + 2nd derivative of pressure command * -0.25 + 3rd derivative of pressure command * -0.25	= 0.0 OR > -1.00 kPa		
			ratio monitor fault pending	= TRUE	If all conditions below are		increment fail timer by	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Output speed direction	= FORWARD	met, increment ratio		**Ratio Monitor**	
			OR		monitor fault pending		**Fail Increment**	
			Output speed direction	= REVERSE	timer:		**Rate (Percent**	
							per Loop)	
			Plus following criteria		vehicle speed	> 0.50 AND < 6.00 KPH	when timer	
			based on driver requested		OR		reaches 100, set	
			range:		vehicle speed	<-0.50 AND >-6.00 KPH	fault pending	
					(note: fault pending will			
			Drive:		remain latched if vehicle		Fail time based	
					speed max thresholds are		on driver	
			driver requested range	= Drive	exceeded)		requested range	
							(once fault	
			Incorrect drive enable	= 1 (1 to enable, 0 to	Monitor Armed	= TRUE	pending has	
			calibration	disable)			matured):	
					Measured output speed			
			Incrorrect drive disable	= 0 (0 to enable, 1 to	direction	= REVERSE or	**Incorrect Drive**	
			calibration	disable)		FORWARD	**Fail Time**	
					Input speed default			
			Reverse:		direction	= REVERSE or	**Incorrect**	
						FORWARD	**Reverse Fail**	
			driver requested range	= Reverse			**Time**	
					Current driver requested	= previous driver		
			Incorrect reverse enable	= 1 (1 to enable, 0 to	range	requested range	**Incorrect**	
			calibration	disable)	for range time	>	**Neutral Fail**	
						Incorrect Direction	**Time**	
			Incrorrect reverse disable	= 0 (0 to enable, 1 to		**Range Change Delay**		
			calibration	enable)		**Time**	**Incorrect Park**	
							Fail Time	
			Neutral:		based on PRNDL		6.25 ms update	
					position:		rate	
			driver requested range	= Neutral				
					driver requested range	= Reverse		
			Incorrect neural enable	= 1 (1 to enable, 0 to	AND			
			calibration	disable)	transmission measured	> 0.40		
					speed ratio			
			Incrorrect neutral disable	= 0 (0 to enable, 1 to	AND			
			calibration	disable)	Loop-to-loop change in	> -8.00		
					measured ratio			
			Park:		AND			
					(Direction By Ratio	= FORWARD		
			driver requested range	= Park	OR			
					Direction Bv Clutch Slio)	= a FORWARD Gear		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

			Incorrect park enable calibration
			
			Incrorrect park disable calibration
				= 1 (1 to enable, Oto disable)
				
				= 0 (0 to enable, 1 to disable)
					driver requested range
					AND
					transmission measured speed ratio
					AND
					Loop-to-loop change in measured speed ratio
					AND
					(Direction By Ratio
					OR
					Direction By Clutch Slip)
					*****************************
					Monitor Armed Enables:
					
					if Range Shift enable cal:
					THEN
					Range Shift State
					OR
					if Attained Gear enable cal:
					THEN
					Attained Gear
					
					ALSO
					Engine Speed
					Ratio Monitor enable cal
					OR
					Ratio Monitor disable cal
					*****************************
					Direction By Ratio:
					
					(vehicle speed
					OR
					vehicle speed)
					
					WHEN:
					Measured output speed direction
					AND
						= Drive
						
						< -0.40
						
						< 8.00
						
						= REVERSE
						
						= REVERSE
						*****************************
						
						= 0 (1 to enable, 0 to disable)
						= Range Shift Complete
						
						= 0 (1 to enable, 0 to disable)
						
						# Neutral AND # Park
						
						> 400 RPM
						= 1 (1 to enable, 0 to disable)
						= 0 (0 to enable, 1 to disable)
						*****************************
						
						> 0.50 KPH
						
						< -0.50 KPH
						
						= reverse		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Absolute measured gear ratio THEN Direction by Ratio ELSE WHEN Measured output speed direction AND Absolute measured gear ratio THEN Direction by Ratio **************************** Direction by Clutch Slip: C1 clutch slip valid C2 clutch slip valid C5 clutch slip valid C3C4 dual clutch slip valid C3C6 dual clutch slip valid C4C6 dual clutch slip valid Direction by Clutch Slip Enable cal (vehicle speed OR vehicle speed) for each clutch: current clutch slip clutch held combination matches a valid aear in:	> 4.48 AND < 4.59 = REVERSE = forward > 4.49 AND < 0.66 = FORWARD **************************** = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = 1 (1 to enable, 0 to disable) > 0.50 KPH < -0.50 KPH **Ratio Monitor Slip < Threshold** (if slip condition met, clutch held = 1, else held = 0) **Ratio Monitor Clutch States**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					*****************************	*****************************		
					General enables:			
					Transmission Type	= RWD 10 Spd Automatic		
					Service Fast Learn OR (Service Fast Learn AND Vehicle Speed for vehicle speed time)	= FALSE = TRUE > 8.0 KPH > 2.50 seconds		
					High Side Driver 1 On High Side Driver 2 On	= TRUE = TRUE		
					DTCs Not Fault Pending	P0716, P0717, P07BF, P07C0, P0721, P0722, P0723, P077C, P077D, P172A, P172B, P1783, P17CE		
					DTCs Not Fault Active	P0716, P0717, P07BF, P07C0, P077C, P077D, P0721, P17CE, P1783		
					DTCs Not Test Failed This Key On	P0721, P0722, P0723, P172A, P172B		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 Ilium.
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 0 impedance between signal and controller ground OR > 200 K 0 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 > 30 counts within sample count of 50 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 Ilium.
Transmission Range (TR) Switch Circuit Low Voltage	P0707	Diagnoses the internal range sensor circuit A and wiring for a ground short circuit fault using controller specific PWM duty cycle measurement thresholds.	when PWM sensor type and PWM voltage direct conditional internal range sensor A PWM duty cycle when PWM sensor type and PWM voltage inverse conditional internal range sensor A PWM duty cycle Increment fail and sample time, update rate 25 milliseconds Controller specific PWM duty cycle thresholds are set to meet the following controller specification for a short to ground.	< 7.779 % duty cycle > 7.779 % duty cycle < 0.5 Q impedance between signal and controller ground	diagnostic monitor enable battery voltage when sensor type is PWM duty cycle direct or inverse conditional for fail threshold is used conditional type check calibration	= 1 Boolean > 9.00 volts = CeTRGD_e_VoltDirctProP	fail time > 0.500 seconds out of sample time > 1.500 seconds battery voltage time > 1.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range (TR) Switch Circuit High Voltage	P0708	Diagnoses the internal range sensor circuit A and wiring for a short to voltage circuit fault using controller specific PWM duty cycle measurement thresholds.	when PWM sensor type and PWM voltage direct conditional internal range sensor A PWM duty cycle when PWM sensor type and PWM voltage inverse conditional internal range sensor A PWM duty cycle Increment fail and sample time, update rate 25 milliseconds Controller specific PWM duty cycle thresholds are set to meet the following controller specification for a short to power.	 > 92.221 % duty cycle < 92.221 % duty cycle < 0.5 Q impedance between signal and controller power	diagnostic monitor enable battery voltage when sensor type is PWM duty cycle direct or inverse conditional for fail threshold is used conditional type check calibration ECM Message Available Communication Check Enable for ECM message Vehicle is in a mode that enables accessory power	= 1 Boolean > 9.00 volts = CeTRGD_e_VoltDirctProP = TRUE = 1.00 Boolean = TRUE	fail time > 0.900 seconds out of sample time > 1.100 seconds battery voltage time > 1.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	< -6.7 °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	> -273.0 °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 Ilium.
						EngineTorqueEstInaccurate AcceleratorPedalFailure Crank8ensor_FA ECT_Sensor_FA VehicleSpeedSensor_FA		
					TFT Warmup Pass P0711 test fail this key on	= FALSE = FALSE		
			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	= 1 Boolean		
					battery voltage	> 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	= 1 Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					propulsion system active	= TRUE		
			raw transmission fluid temperature - previous raw transmission fluid temperature, update rate 100 milliseconds, update fail time	< 0.0000 °C			fail time > 600.0 seconds	
					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	
					stuck in range test enable	= 1 Boolean		
					propulsion system active	= TRUE		
					raw transmission fluid temperature	> -273.0 °C		
					raw transmission fluid temperature	< 150.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	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 sample 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 Ilium.
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	>284,177.0 Q			fail time > 5.00 seconds out of fail 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	> 9.00 volts	run crank voltage in range time > 0.100 seconds	
					run crank voltage in range time			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 run crank voltage 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 enable high side driver 2 enable service fast learn active run crank voltage last valid raw transmission input speed OR valid raw transmission input speed (before drop event) last valid raw transmission input speed updates every 25 milliseconds when stablity time complete as long as (delta raw transmission input speed AND raw transmission input speed) raw transmission output speed accelerator pedal position engine torque engine torque transmission hydraulic pressure available: engine speed	= FALSE > 9.00 volts = 1 Boolean = FALSE = FALSE = FALSE = TRUE = TRUE = FALSE > 5.00 volts > 240.0 RPM > 240.0 RPM < 320.0 RPM > 200.0 RPM > 377.0 RPM > 5.0 % < 8,191.9 Nm > 30.0 Nm > 500.0 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 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 Ilium.
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate	**engine speed time for transmission hydraulic pressure available**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 < 250.0 RPM	service mode $04 active diagnostic monitor enable run crank voltage service fast learn active run crank voltage P0722 fault active P0723 fault active P077C fault active P077D fault active brake pedal position sesnor must be OBDII to use brake pedal conditional brake pedal position sesnor type 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 (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) P0717 fault active P0717 test fail this key on	= FALSE = 1 Boolean > 5.00 volts = FALSE > 9.00 volts = FALSE = FALSE = FALSE = FALSE = CeBRKR_e_OBD < 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 Ilium.
					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) TISS/TOSS has single power supply calibration TISS/TOSS single power supply test enabled transmission hydraulic pressure available: engine speed DTCs not fault active	= FALSE = FALSE = 0 Boolean = 1 Boolean > 500.0 RPM EngineTorqueEstInaccurate	engine speed time > **engine speed time for transmission hydraulic pressure available**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 6.26 millisecond update rate	# FORWARD # REVERSE > 225.0 RPM	service mode $04 active diagnostic monitor enable TOSS count sample period P0721 fault active P0721 test fail this key on TOSS transitional period detected = FALSE when: on period on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward TOSS transitional period detected = TRUE when: on period on period when direction unknown senor type is directional senor type calibration	= FALSE = 1 Boolean # 0 counts = 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 = CeTOSR_e_Directional	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 Ilium.
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 when: attained gear attained gear AND attained gear use high gear fail time threshold 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 occurs: (garage shift OR PRNDL OR PRNDL OR range inhibit state) {}{when not neutral range occurs: attained gear attained gear (attained gear engine torque hysteresis high engine torque hysteresis low accelerator pedal position hysteresis high accelerator pedal position hysteresis low) when not neutral range occurs: (attained gear engine torque hysteresis high engine torque hysteresis low accelerator pedal position hysteresis high accelerator pedal position hysteresis low)}	= FALSE = 1 Boolean # COMPLETE = PARK = NEUTRAL # no inhibit active > CeCGSR_e_CR_First < CeCGSR_e_CR_Tenth > CeCGSR_e_CR_Fourth > 30.0 Nm > 20.0 Nm > 3.0 % > 1.5 % < CeCGSR_e_CR_Fourth > 50.0 Nm > 30.0 Nm > 3.5 % > 2.0 %	fail time >4.00 seconds high gear OR fail time > 3.00 seconds low gear Engine Torque criteria met > 0.15 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR			
					{}{Wheel Speed Rationality Enable	= 1.00 Boolean		
					AND Transfer Case Range Valid	=TRUE		
					AND Vehicle Speed Fault	= FALSE	Wheel Speed Rationality met = 0 s counts down from 0.25 s	
					AND Tease state	!= Neutral		
					AND Wheel Speed Sensor Present	= TRUE		
					AND Output Speed calculate from wheel speed}	>= 100.00 rpm		
					TISS/TOSS has single power supply calibration	= 0 Boolean		
					AND TISS	< 8,191.9 RPM		
					AND TISS)	> 250.0 RPM		
					OR TISS/TOSS has single power supply calibration	= 0 Boolean		
					AND TISS	< 8,191.9 RPM		
					AND TISS)	> 3,500.0 RPM		
					P0716 test fail this key on	= FALSE		
					P0717 test fail this key on	= FALSE		
					P07BF test fail this key on	= FALSE		
					P07C0 test fail this key on	= FALSE		
					PTO check: PTO enable calibration is FALSE	# 0 Boolean		
					OR			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(PTO enable calibration is TRUE AND PTO active) run crank voltage service fast learn active run crank voltage transmission fluid temperature P0723 test fail this key on P077C test fail this key on P077D test fail this key on P0722 fault active P0722 test fail this key on transmission hydraulic pressure available: engine speed DTCs not fault active	= 0 Boolean = TRUE > 5.00 volts = FALSE > 9.00 volts > -40.00 °C = FALSE = FALSE = FALSE = FALSE = FALSE > 500.0 RPM AcceleratorPedalFailure EngineTorqueEstInaccurate	 run crank voltage time > 25 milliseconds engine speed time > **engine speed time for transmission hydraulic pressure available**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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.	delta raw transmission output speed = raw transmission output speed previous loop - raw transmission output speed, 25 millisecond update rate Failing criteria depends on below decision tree for failure threshold If 4WD low engaged and wheel speed usage is not enabled Else If Wheel speed usage enabled for failing TOS drop diagnostic Else (Not 4WD and not Wheel Speed usage) If 4WD low is engaged and Wheel speed usage enabled	 > 1,755.0 RPM **P0723 Wheel Speed Calc** function of output speed > 650.0 RPM > Above threshold * 2.70	service mode $04 active diagnostic monitor enable transmission engaged state 4WD low state 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 P077C test fail this key on P077D test fail this key on when PRNDL is moved to	= FALSE = 1 Boolean # not engaged = 4WD low state previous loop, 25 millisecond update rate # 0 Boolean = 0 Boolean = TRUE > 5.00 volts = FALSE > 9.00 volts = FALSE = FALSE	fail time > 1.500 seconds updated fail event count, fail event count > 5 counts, 25 millisecond update rate transmission engaged state time > **P0723 (MY21) transmission engaged state time threshold** 4WD low change time > 3.0 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 Ilium.
					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_Transitionall 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:			
					((raw transmission input speed - raw transmission input speed previous, 25 millisecond update AND	< 4,095.9 RPM	raw transmission input speed stability time > 2.00 seconds	
					raw transmission input speed) OR	> 200.0 RPM		
					Wheel speed usage enabled for failing TOS drop diagnostic) OR	= TRUE		
					(TISS/TOSS has single cower suoolv calibration	= 0 Boolean	no time required	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND raw transmission input speed)	= 0.0 RPM		
					select delta RPM fail theshold: (4WD low state AND4WD low valid) select P0723 4WD TOSS delta fail threshold otherwise use P0723 TOSS delta fail threshold	 = TRUE = TRUE		
					last valid raw transmission output speed OR valid raw transmission output speed (before drop event)	> 36.0 RPM > 36.0 RPM	raw transmission output speed time > 2.00 seconds	
					Wheel speed usage enabled for failing TOS drop diagnostic AND TOS - Calculated TOS from Wheel Speed	= TRUE > 300.00 rpm		
					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)	 < 140.0 RPM > 36.0 RPM	stability time > 0.100 seconds	
					transmission hydraulic pressure available: enqine speed	> 500.0 RPM	engine speed time >	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate	**engine speed time for transmission hydraulic pressure available**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Torque Converter Clutch (TCC) System Performance - GR10 specific	P0741	The GR10 diagnostic monitor detects the transmission torque converter control valve failed hydraulically on. If the control valve is stuck, the torque converter will drain down, resulting in an excessive K factor above expected value	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	diagnostic monitor enable (TCC stuck off enable OR TCC stuck on enable) hydraulic pressure available: engine speed battery voltage run crank voltage engine speed status PRNDL PRNDL Commanded Gear Commanded Gear transmission fluid temperature transmission fluid temperature engine speed	= 1 Boolean = 1 Boolean = 1 Boolean > 500.0 RPM > 9.00 volts > 9.00 volts # INVALID # PARK # NEUTRAL # PARK # NEUTRAL > -6.66 °C < 130.0 °C > 750.0 RPM	fail count > 4 counts in 75 count sample 25 millisecond update rate engine speed time > **engine speed time for transmission hydraulic pressure available** see supporting table 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 Ilium.
					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) P0741 test fail this key on range shift state attained gear slip engine torque accelerator pedal position accelerator pedal position engine acceleration transmission torque converter speed ratio (transmission turbine shaft speed / engine speed) DTCs not fault active DTCs not fault pending	= FALSE = FALSE = range shift complete (steady state gear) < 75.0 RPM > 25.00 Nm > 1.00 % < 100.0 % > -200.0 RPM/sec < 0.900 AcceleratorPedalFailure EngineTorqueEstInaccurate CrankSensor_FA P281B, P281D, P281E, P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D P0722, P0723, P0716, P0717, P07BF, P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 > 2 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	= 1 Boolean		
					(use run crank voltage calibration is TRUE AND	= 1 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 Ilium.
		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 pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) ***************************** 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	= FALSE Boolean = TRUE > 10.00 kPa = TRUE = TRUE ***************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 36.0 RPM > 0.50 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		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.			engine speed OR transmission input shaft speed)	> 1,250.0 RPM > 350.0 RPM		
					C1 clutch slip speed valid	= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)		
					C1 clutch pressured map	= mapped to line pressure, C1 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	> 0.500 seconds	
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176CP176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P126C P176DP17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3P17C5 P0721 AcceleratorPedalFailure Crank8ensor_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 P172AP172B		
					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 P2715P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 Ilium.
		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			******************************	******************************	**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	
		the solenoid is electrically functional. All clutch pressure control solenoid stuck			system-level enables: use battery voltage calibration is FALSE	= 1 Boolean		
		on diagnostic monitors are emission MIL DTCs. System voltage			OR (use battery voltage calibration is TRUE	= 1 Boolean		
		must be normal, all clutch pressure control solenoid driver circuits must be functional, no			AND battery voltage)	> 9.00 volts	battery voltage time > 0.100 seconds	
		clutch pressure control solenoid electrical or			use run crank voltage calibration is FALSE	= 1 Boolean		
		performance faults can be present, and no speed sensor electrical			OR (use run crank voltage calibration is TRUE	= 1 Boolean		
		or performance faults can be present, or the clutch pressure control solenoid stuck on test			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 Ilium.
		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 OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable) ****************************	> 10 kPa = TRUE = TRUE *****************************		
					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 AND off going clutch pressure ramp control ramp time out enable)	= TRUE = 1 (1 to enable, 0 to disable)	exhaust delay by shift tvoe:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C1 off going clutch command pressure)	< 350.0 kPa	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**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	> 8,191.8 Nm = 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: **C2 Torque-Based Pressure Clip** OR **C3 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip** OR	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**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					C1 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation ******************************* 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	**C6 Torque-Based Pressure Clip** clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts** = TRUE ******************************* # 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 aear	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 Ilium.
					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 P17D3P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176CP176D P176B P17D6		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176DP17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3P17C5 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 P172AP172B		
					******************************	******************************		
					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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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 state = range shift			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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 control solenoid stuck on			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCstoset 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 Ilium.
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 > 2 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	= 1 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 1 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 Ilium.
		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 pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) ***************************** 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	= FALSE Boolean = TRUE > 10.00 kPa = TRUE = TRUE ***************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 36.0 RPM > 0.50 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		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.			engine speed OR transmission input shaft speed) C2 clutch slip speed valid C2 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	> 1,250.0 RPM > 350.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip speed calculation) = mapped to line pressure, C2 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 P17D3P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176CP176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C	> 0.500 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P126C P176DP17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3P17C5 P0721 AcceleratorPedalFailure Crank8ensor_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 P172AP172B		
					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 P2715P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 Ilium.
		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 = 1 Boolean = 1 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 millisecond 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 Ilium.
		is disabled. This diagnostic monitor is relative to the GR10 C2 CB12891OR 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	> 10 kPa		
					OR			
					Park/Neutral Stuck on FP	= TRUE		
					OR			
					Neutral Staging Line Pressure Disable)	= TRUE		
					****************************	*****************************		
					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)	exhaust delay by shift tvoe:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C2 off going clutch command pressure)	< 350 kPa	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**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	> 8,192 Nm = 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 **C3 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip** OR **C6 Torque-Based Pressure Clio**	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 Ilium.
						clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **ClutchClipPressCDShifts EMPTY** 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 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	= FALSE		
					shift type enable cal for garage shift AND	= 1 (0 will enable, 1 will enable)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Attained Gear AND (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	= NEUTRAL OR commanded gear = 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 P17D3P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P077C P176CP176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176DP17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3P17C5 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 P172AP172B		
					******************************	******************************		
					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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					shift due to two conditions: 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					transmission shift completes, range shift 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset 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 Ilium.
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 Q 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 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 Ilium.
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 Q 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 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 Ilium.
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 > 2 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	= 1 Boolean		
					(use run crank voltage calibration is TRUE AND	= 1 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 Ilium.
		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 pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) ***************************** 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	= FALSE Boolean = TRUE > 10.00 kPa = TRUE = TRUE ***************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 36.0 RPM > 0.50 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		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.			engine speed OR transmission input shaft speed) C3 clutch slip speed valid 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	> 1,250.0 RPM > 350.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip 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 P17D3P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176CP176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C	> 0.500 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P126C P176DP17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3P17C5 P0721 AcceleratorPedalFailure Crank8ensor_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 P172AP172B		
					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 P2715P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 < 50.00 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 Ilium.
		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 = 1 Boolean = 1 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 Ilium.
		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 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 OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable) ***************************** range shift state diagnostic clutch test transmission output shaft speed ((C3 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)	= TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE > 10 kPa =TRUE =TRUE ****************************** # range shift complete = OFF GOING CLUTCH TEST > 36.0 RPM = TRUE = 1 f 1 to enable. 0 to	exhaust delay by shift tvoe:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C3 off going clutch command pressure)	disable) < 350 kPa	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**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	> 8,192 Nm = 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 **C4 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip** OR	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 Ilium.
						C6 Torque-Based Pressure Clip clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **ClutchClipPressCDShift s EMPTY** 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 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 tvoe enable cal for	= FALSE = 1 (0 will enable. 1 will		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					garage shift AND Attained Gear AND (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	enable) = NEUTRAL OR commanded gear = 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 P17D3P17C5 P0721 P172AP172B P0716		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P0717 P07C0 P07BF P0723 P0722 P077D P077C P176CP176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176DP17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3P17C5 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 P172AP172B		
					******************************	******************************		
					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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					HOLD during an automatic transmission shift due to two conditions: 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.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR The automatic transmission shift completes, range shift 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset 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 Ilium.
Input/Turbine Speed SensorA 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 Q 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 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 Ilium.
Input/Turbine Speed SensorA 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 Q 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 Ilium.
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 D10OR 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 Ilium.
					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 D10OR 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 Ilium.
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 D10OR 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 Ilium.
					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 D10OR 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 Ilium.
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 Ilium.
Pressure Control (PC) Solenoid A Control Circuit Open	P0960	Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, 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 0 impedance between signal and controller ground	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) 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 = ACCESSORY = 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 Ilium.
Pressure Control (PC) Solenoid A Control Circuit Low	P0962	Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, 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 0 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 OR Power Mode)) 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 = ACCESSORY = 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 Ilium.
Pressure Control (PC) Solenoid A Control Circuit High	P0963	Controller specific circuit diagnoses 9 speed CB123456, 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 0 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 OR Power Mode) 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 = ACCESSORY = 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 Ilium.
Pressure Control (PC) Solenoid B Control Circuit Open	P0964	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB12891OR, 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 0 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 OR Power Mode) 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 = ACCESSORY = 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 Ilium.
Pressure Control (PC) Solenoid B Control Circuit Low	P0966	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB12891OR, 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 0 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 OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 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 Ilium.
Pressure Control (PC) Solenoid B Control Circuit High	P0967	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB12891OR, 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 0 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 OR Power Mode) 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 = ACCESSORY = 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 Ilium.
Pressure Control (PC) Solenoid C Control Circuit Open	P0968	Controller specific circuit diagnoses 9 speed CB38, 10 speed C23457910, 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 0 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 OR Power Mode 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 = ACCESSORY = 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 Ilium.
Pressure Control (PC) Solenoid C Control Circuit Low	P0970	Controller specific circuit diagnoses 9 speed CB38.10 speed C23457910, 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 0 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 OR Power Mode) 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 = ACCESSORY = 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 Ilium.
Pressure Control (PC) Solenoid C Control Circuit High	P0971	Controller specific circuit diagnoses 9 speed CB38, 10 speed C23457910, 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 0 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 OR Power Mode) 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 = ACCESSORY = 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 Ilium.
Wheel Speed Sensor Sequence Number Incorrect	P15FD	This DTC monitors wheel speed signals for an incorrect sequence	Communication of the wheel speed sequence numbers from the ABS / Brake Control Module is incorrect. A complete set of sequence numbers has not been received for and this state is continuous for out of a total sample time of	 > 10.00 seconds >2.00 seconds > 12.00 seconds	Sequence Number Error DTC is enabled Power Mode Run/Crank Ignition Voltage Driven and non-driven wheel rotational status is currently being received and not failsoft.	Enabled = Run or Crank >=11.00 Volts	Diagnostic executes in 25ms loop.	Type C, NoSVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 Ilium.
					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 Ilium.
					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 Ilium.
					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 Ilium.
					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 Ilium.
					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	> 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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	unintended decel test system fault unintended decel test system fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND unintended deceleration latent fault fail count)) UPDATE unintended decel test system fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 100 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE continue execute only IF: calibrated for a back up signal to longitudinal acceleration and total brake axle torque using and wheel speed or TOSS OR U0121 (loss comm ABS/EBCM) occurs OR brake pedal position fault THEN SET unintended decel test system fault occur = TRUE	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = CeTSDD_e_WhlSpdBackUp	unintended decel test system fault time > 10.0 seconds UPDATE unintended deceleration latent fault fail count SET unintended decel test system fault = TRUE unintended deceleration latent fault fail count > 100 counts 25 millisecond update rate	Type A, 1 Trips
			ECM range sensor fault ECM range sensor fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active	= FALSE = TRUE = TRUE = FALSE = TRUE	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE	ECM range sensor fault time > 10.0 seconds UPDATE ECM range sensor latent fault fail count SET ECM range sensor fault = TRUE	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		counts the run/crank ignition cycles before the latent fault DTC is set fault active.	AND ECM range sensor latent fault fail count)) UPDATE ECM range sensor fault time *default gear option active occurs when emission MIL active due to transmission default gear	= 100 counts	met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF ECM P2802 fault active OR ECM P2803 fault active SET ECM range sensor fault occur = TRUE	 = TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE	 ECM range sensor latent fault fail count > 100 counts 25 millisecond update rate	
			TCM range sensor fault TCM range sensor fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND TCM range sensor latent fault fail count)) UPDATE TCM range sensor fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 100 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF TCM P0707 fault active OR TCM P0708 fault active SET TCM range sensor fault occur = TRUE	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE	TCM range sensor fault time > 10.0 seconds UPDATE TCM range sensor latent fault fail count SET TCM range sensor fault = TRUE TCM range sensor latent fault fail count > 100 counts 25 millisecond update rate	
			TOSS fault TOSS fault occur RunCrankVoltageMet (*default gear option	= FALSE = TRUE = TRUE = FALSE	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage	= 1 Boolean > 5.00 volts	TOSS fault time > 10.0 seconds UPDATE TOSS latent fault fail count	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			active OR (*default gear option active AND TOSS sensor latent fault fail count)) UPDATE TOSS fault time *default gear option active occurs when emission MIL active due to transmission default gear	 = TRUE = 100 counts	for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF P077C or P077D fault active OR P0722 or P0723 test fail this key on SET TOSS fault occur = TRUE	> 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE	SET TOSS fault = TRUE TOSS latent fault fail count > 100 counts 25 millisecond update rate	
			tie-up fault tie-up fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND tie-up latent fault fail count)) UPDATE tie-up fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 100 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF P077C or P077D fault active OR P0722 or P0723 test fail this key on	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE	tie-up fault time > 10.0 seconds UPDATE tie-up latent fault fail count SET tie-up fault = TRUE tie-up latent fault fail count > 100 counts 25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					SET tie-up fault occur = TRUE			
			trans range fault trans range fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND tie-up latent fault fail count)) UPDATE trans range fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 200 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF [(P0717or P07C0 or P07BF fault active or P077D or P077C fault active or P723 test fail this key on or P0723 or P077D or P077C or P0722 fault pending or P0716or P07C0 or P07BF or P0717fault pending or P172B or P172Aor P0721 fault pending or P1783 or P17CE fault active or	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE	trans range fault time > 10.0 seconds UPDATE trans range latent fault fail count SET trans range fault = TRUE trans range latent fault fail count > 200 counts 25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					P1783 or P17CE fault pending or P172AorP172B test fail this key on or P0721 fault active) AND (safety diasble cal not FALSE OR safety enable cal TRUE)] OR [(P176C orP160E or P0963 or P078F or P0707 fault pending or P18AA fault active) AND (safety diasble cal not FALSE OR safety enable cal TRUE)] SET trans range fault occur = TRUE	= TRUE = TRUE = TRUE = 0 Boolean = 1 Boolean = TRUE = TRUE = 0 Boolean = 1 Boolean		
			tie-up test disable fault tie-up test disable fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND tie-up test latent fault fail count)) UPDATE tie-up test latent fault time *default gear option active	= FALSE = TRUE = TRUE = FALSE = TRUE = 100 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds	tie-up test latent fault time > 10.0 seconds UPDATE tie-up test latent fault fail count SET tie-up test disable fault = TRUE tie-up test latent fault fail count > 100 counts 25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			occurs when emission MIL active due to transmission default gear		IF EngineTorqueEstInaccurate AcceleratorPedalFailure OR CrankSensor_FA OR P2534 fault active OR (P0707 test fail this key on OR P0707 fault active OR P0708 test fail this key on OR P0708 fault active OR P2805 fault active OR P27EE fault active OR P27EB fault active OR P27ED fault active OR P17F7 fault active OR P17F5 fault active OR P17F6 fault active OR P17FC fault active OR P17FA fault active OR P17FB fault active) OR (P0716 fault pending, fault active, test fail this key on OR P0717 fault pending, fault active, test fail this key on OR P0721 fault pending, fault active, test fail this key on OR P0722 fault pending, fault active, test fail this key on OR P0723 fault pending, fault active, test fail this key on OR P077B fault oendina. fault	= TRUE = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					active, test fail this key on OR	= TRUE		
					P077C fault pending, fault active, test fail this key on OR	= TRUE		
					P077D fault pending, fault active, test fail this key on OR	= TRUE = TRUE		
					P07BF fault pending, fault active, test fail this key on OR	= TRUE		
					P07C0 fault pending, fault active, test fail this key on OR	= TRUE		
					P172A fault pending, fault active, test fail this key on OR	= TRUE		
					P172B fault pending, fault active, test fail this key on OR	= TRUE		
					P176B fault pending, fault active, test fail this key on OR	= TRUE		
					P176C fault pending, fault active, test fail this key on OR	= TRUE		
					P176D fault pending, fault active, test fail this key on OR	= TRUE		
					P1783 fault pending, fault active, test fail this key on OR	= TRUE		
					P178F fault pending, fault active, test fail this key on OR	= TRUE		
					P17C4 fault pending, fault active, test fail this key on OR	= TRUE		
					P17C5 fault pending, fault active, test fail this key on OR	= TRUE		
					P17C6 fault pending, fault	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					active, test fail this key on OR P17C7 fault pending, fault active, test fail this key on OR P17CC fault pending, fault active, test fail this key on OR P17CD fault pending, fault active, test fail this key on OR P17CE fault pending, fault active, test fail this key on OR P17D3 fault pending, fault active, test fail this key on OR P17D6 fault pending, fault active, test fail this key on) SET tie-up test disable fault occur = TRUE	 = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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.	deltal = ABS (transmission input speed - (transmission output speed * gear ratio commanded)) update faiil time 25 millisecond update rate	> 50.0 RPM	diagnostic monitor enable speed sesnor 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	= 1 Boolean = CeTNSR_e_NSPD_DualSpdSnsr **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 Ilium.
					speed / ratio calibration) with transmission input speed input speed sensor ready based on commaned gear and transmission intermediate speed sensor (state output must be FALSE to enable fail evaluation) with with attained gear ****************************** transmission input speed transmission output speed neutral idle mode range shift state P0716 fault active P0717 fault active P07BF fault active P07C0 fault active P0722 fault active P0723 fault active P077C fault active P077D fault active P176C fault active P176D fault active battery voltage	see supporting tables **P176B minimum transmission input speed to enable fail** **> evaluation** see supporting tables **P176B holding clutch** **= states** see supporting tables = REVERSE OR = 1st thru 10th ****************************** > 240.0 RPM > 36.0 RPM = nuetral idle mode ON = range shift complete = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE > 9.00 volts = FALSE	**P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation** see supporting tables	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					service fast learn active run crank voltage transmission hydraulic pressure available: engine speed	> 9.00 volts > 500.0 RPM	battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds engine speed time > **engine speed time for transmission hydraulic pressure available** see supporting tables	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	< 0.25 volts (< 0.5 Q 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 = 1.00 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = FALSE = FALSE	fail time > 0.05 seconds, update fail count, fail count > 40.00 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 Ilium.
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	> 4.75 volts (< 0.5 Q 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 = 1.00 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = FALSE = FALSE	fail time > 0.05 seconds, update fail count, fail count > 40.00 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 Ilium.
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	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM > **engine speed time for transmission hydraulic pressure available** seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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	> 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 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)	**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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enable time			
			intermediate speed sensor 1 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 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 Lz11y 111Lr speed UIIILz	**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 Ilium.
					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 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	**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 Ilium.
					range shift state (auto trans shift complete) enable time	> 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND TIS direction AND attained gear	**intermediate speed sensor 1 or 2** **# predicted direction** **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 OR intermediate speed sensor 2 direction raw) ■AWS----------------------------	**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	**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 Ilium.
			raw TIS direction AND attained gear AND attained gear	# FORWARD > 1st gear < 10th gear	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	**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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional > 500.0 RPM > **engine speed time for transmission hydraulic pressure available** seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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	> 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 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)	**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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enable time			
			intermediate speed sensor 1 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) 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 Lz11y 111Lr speed UIIILz	**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 Ilium.
					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 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	**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 Ilium.
					range shift state (auto trans shift complete) enable time	> 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR TIS direction) AND attained gear	**intermediate speed sensor 1 or 2** # **predicted direction** **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 OR intermediate speed sensor 2 direction raw OR TIS direction) AND	**intermediate speed sensor 1 or 2** # **predicted direction** **intermediate speed sensor 1 or 2** # **predicted direction** # FORWARD	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 > 500.0 RPM >	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			attained gear AND attained gear	> 1st gear < 10th gear	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	**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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 calibration (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 6.26 millisecond update	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional > 500.0 RPM > **engine speed time for transmission hydraulic pressure available** seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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	> 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 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** 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 Ilium.
					enable time	> 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) 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 UIIUinCr jpCrCrd U111U	**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 Ilium.
					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 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	**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	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					P0721 Fault Active range shift state (auto trans shift complete) enable time	= 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	**intermediate speed sensor 1 or 2** # **predicted direction** **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 OR intermediate speed	**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	**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 Ilium.
			sensor 2 direction raw OR TIS direction) AND attained gear AND attained gear	# FORWARD > 1st gear < 10th gear	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	> 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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 sesnor raw voltage, update fail time, 12.5 millisecond update rate	< 0.250 volts (< 0.5 Q 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 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 Ilium.
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 Q 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 Ilium.
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 when transitional period = FALSE 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: 6.26 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 calibration (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 Ilium.
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 calibration (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 Ilium.
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.	deltal = 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	> 50.0 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** see supporting tables = **P17D6 ratio calibration when REVERSE** see supporting tables ***************************** > **P17D6 minimum estimated transmission intermediate speed to enable fail evaluation** see supporting tables	fail time > **P17D6 intermediate speed sensor fail time threshold** see supporting tables fail time threshold met increments fail count, fail count > **P17D6 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 Ilium.
					transmission input speed	> **P17D6 minimum transmission input speed to enable fail evaluation** see supporting tables	**P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation** see supporting tables	
					input speed sensor ready based on commaned gear and transmission intermediate speed sensor (state output must be FALSE to enable fail evaluation)	= **P17D6 holding clutch states** see supporting tables		
					with			
					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		
					run crank voltage	> 9.00 volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					transmission hydraulic pressure available: engine speed	> 500.0 RPM	battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds engine speed time > **engine speed time for transmission hydraulic pressure available** see supporting tables	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Run / Crank = FALSE	Ignition switch Run/Start position circuit low diag enable and Run / Crank active ECM	= 1.00 = TRUE	99 failures out of 240 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 Ilium.
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	Run / Crank = TRUE	Ignition switch Run/Start position circuit low diag enable and Run / Crank active ECM	= 1.00 = FALSE	320 failures out of 400 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 Ilium.
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 0 impedance between signal and controller ground OR > 200 K 0 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 > 30 counts within sample count of 50 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 Ilium.
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	****************************** 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	****************************** = 1 Boolean = 1 Boolean > 9.00 volts = 1 Boolean = 1 Boolean > 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean	fail time > 1.00 seconds, update fail count, fail count > 2 counts 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 Ilium.
		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 pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) ***************************** 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	= FALSE Boolean = TRUE > 10.00 kPa = TRUE = TRUE ***************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 36.0 RPM > 0.50 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		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.			engine speed OR transmission input shaft speed)	> 1,250.0 RPM > 350.0 RPM		
					C4 clutch slip speed valid	= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)		
					C4 clutch pressured map	= mapped to line pressure, C4 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	> 0.500 seconds	
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176CP176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P126C P176DP17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3P17C5 P0721 AcceleratorPedalFailure Crank8ensor_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 P172AP172B		
					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 P2715P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 < 50.00 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 Ilium.
		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					**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	
		hydraulically on, while the solenoid is electrically functional.			**************************** system-level enables:	****************************		
		All clutch pressure control solenoid stuck			use battery voltage calibration is FALSE	= 1 Boolean		
		on diagnostic monitors			OR			
		are emission MIL DTCs. System voltage			(use battery voltage calibration is TRUE	= 1 Boolean		
		must be normal, all			AND			
		clutch pressure control solenoid driver circuits must be functional, no			battery voltage)	> 9.00 volts	battery voltage time > 0.100 seconds	
		clutch pressure control solenoid electrical or			use run crank voltage calibration is FALSE	= 1 Boolean		
		performance faults can			OR			
		be present, and no speed sensor electrical			(use run crank voltage calibration is TRUE	= 1 Boolean		
		or performance faults			AND			
		can be present, or the clutch pressure control solenoid stuck on test			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 Ilium.
		is disabled. This diagnostic monitor is relative to GR10 C4 C2346781OR 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 OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable)	> 10 kPa =TRUE =TRUE		
					****************************	*****************************		
					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 AND off going clutch pressure ramp control ramp time out enable)	= TRUE = 1 (1 to enable, 0 to disable)	exhaust delay by shift tvoe:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C4 off going clutch command pressure)	< 350 kPa	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**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	> 8,192 Nm = 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**	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 Ilium.
						OR **C6 Torque-Based Pressure Clip** clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **ClutchClipPressCDShift s EMPTY** 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	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					shift type enable cal for garage shift AND Attained Gear AND (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 will enable, 1 will enable) = NEUTRAL OR commanded gear = 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 P17D3P17C5 P0721		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176CP176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176DP17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3P17C5 P0721 AcceleratorPedalFailure Crank8ensor_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 P172AP172B		
					******************************	******************************		
					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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					execute. OR The automatic transmission shift completes, range shift 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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 DTCstoset 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 Ilium.
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 0 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 OR Power Mode) 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 = ACCESSORY = 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 Ilium.
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 0 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	> 5.00 volts	> 25 milliseconds	
					accessory voltage active OR	= TRUE	> 12.5 milliseconds	
					Power Mode)	= ACCESSORY		
					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 Ilium.
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 0 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 OR Power Mode) 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 = ACCESSORY = 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 Ilium.
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	****************************** 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	****************************** = 1 Boolean = 1 Boolean > 9.00 volts = 1 Boolean = 1 Boolean > 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean	fail time > 1.00 seconds, update fail count, fail count > 2 counts 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 Ilium.
		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 pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) **************************** 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	= FALSE Boolean = TRUE > 10.00 kPa = TRUE = TRUE **************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 36.0 RPM > 0.50 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		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.			OR			
					engine speed	> 1,250.0 RPM		
					OR			
					transmission input shaft speed)	> 350.0 RPM		
					C5 clutch slip speed valid	= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)		
					0 5 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)	= a FORWARD gear		
					OR			
					(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	> 0.500 seconds	
					******************************	*****************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176CP176D 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 Ilium.
						P07BF P077D P077C P126C P176DP17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3P17C5 P0721 AcceleratorPedalFailure Crank8ensor_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 P172AP172B		
					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 P2715P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 < 50.00 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 Ilium.
		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 millisecond 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	= 1 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 1 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 Ilium.
		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 OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable)	> 10 kPa =TRUE =TRUE		
					******************************	******************************		
					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)	= TRUE = 1 (1 to enable, 0 to disable)	exhaust delay by shift tvoe:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C5 off going clutch command pressure)	< 350 kPa	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**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	> 8,192 Nm = 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 **C4 Torque-Based Pressure Clip** OR	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 Ilium.
						C6 Torque-Based Pressure Clip clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **ClutchClipPressCDShift s EMPTY** 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 (Intrusive shift active AND shift type enable cal for aaraae shift	# Garage shift **Clutch Stuck On Shift = Type Enable** (0 table value will disable, 1 will enable) = FALSE = 1 (0 will enable. 1 will		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND Attained Gear AND (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	enable) = NEUTRAL OR commanded gear = 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 P17D3P17C5 P0721 P172AP172B P0716		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not fault active	P0717 P07C0 P07BF P0723 P0722 P077D P077C P176CP176D P176B P17D6		
					DTCs not test fail this key on	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176DP17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3P17C5 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 P172AP172B		
					******************************	******************************		
					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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					automatic transmission shift due to two conditions: 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					The automatic transmission shift completes, range shift 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset 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 Ilium.
Pressure Control (PC) Solenoid E Control Circuit Open	P2727	Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, 8 speed C45678R clutch solenoid, or CVT TCC Control 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 0 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 OR Power Mode) 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 = ACCESSORY = 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 Ilium.
Pressure Control (PC) Solenoid E Control Circuit Low	P2729	Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, 8 speed C45678R clutch, or CVT TCC Control 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 0 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 OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 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 Ilium.
Pressure Control (PC) Solenoid E Control Circuit High	P2730	Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, 8 speed C45678R, or CVT TCC Control 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 0 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 OR Power Mode) 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 = ACCESSORY = 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 Ilium.
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 > 2 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	= 1 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 1 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 Ilium.
		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 pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) ***************************** 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	= FALSE Boolean = TRUE > 10.00 kPa = TRUE = TRUE ***************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 36.0 RPM > 0.50 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		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 C4567891OR clutch pressure control solenoid.			engine speed OR transmission input shaft speed) C6 clutch slip speed valid 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	> 1,250.0 RPM > 350.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip 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 P17D3P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176CP176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C	> 0.500 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P126C P176DP17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3P17C5 P0721 AcceleratorPedalFailure Crank8ensor_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 P172AP172B		
					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 P2715P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 Ilium.
		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 millisecond update	
					******************************	******************************		
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND		battery voltage	
					battery voltage)	> 9.00 volts	time > 0.100 seconds	
					use run crank voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 1 Boolean		
					AND		run crank voltage	
					run crank voltage)	> 9.00 volts	time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		is disabled. This diagnostic monitor is relative to the GR10 C6 C4567891OR 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 OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable)	> 10 kPa =TRUE =TRUE		
					****************************	*****************************		
					range shift state	# range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 36.0 RPM		
					((C6 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)	= TRUE = 1 (1 to enable, 0 to disable)	exhaust delay by shift tvoe:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C6 off going clutch command pressure)	< 350 kPa	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**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	> 8,192 Nm = 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 **C4 Torque-Based Pressure Clip** OR	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 Ilium.
					C6 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation ****************************** 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	**C5 Torque-Based Pressure Clip** clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **ClutchClipPressCDShifts EMPTY** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts** = TRUE ****************************** # Garage shift **Clutch Stuck On Shift = Type Enable** (0 table value will disable, 1 will enable) = FALSE = 1 (0 will enable, 1 will enable)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Attained Gear AND (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))	= NEUTRAL OR commanded gear = 1 (0 to disable, 1 to enable) = 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 P17D3P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not fault active	P0723 P0722 P077D P077C P176CP176D P176B P17D6		
					DTCs not test fail this key on	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176DP17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3P17C5 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 P172AP172B		
					*****************************	*****************************		
					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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					shift due to two conditions: 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					transmission shift completes, range shift 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset 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 Ilium.
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 0 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 OR Power Mode) 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 = ACCESSORY = 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 Ilium.
Pressure Control (PC) Solenoid F Control Circuit Low	P2738	Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1), 10 speed C4567891OR 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 0 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 OR Power Mode) 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 = ACCESSORY = 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 Ilium.
Pressure Control (PC) Solenoid F Control Circuit High	P2739	Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1), 10 speed C4567891OR 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 0 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 OR Power Mode) 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 = ACCESSORY = 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 Ilium.
Pressure Control (PC) Solenoid A Calibration Incorrect	P27A7	The diagnostic monitor verifies that the pressure control solenoid A (GF9 line or GR10C1 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 Ilium.
			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 Ilium.
Pressure Control (PC) Solenoid B Calibration Incorrect	P27A8	The diagnostic monitor verifies that the pressure control solenoid B (GF9TCC 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 Ilium.
			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 Ilium.
Pressure Control (PC) Solenoid C Calibration Incorrect	P27A9	The diagnostic monitor verifies that the pressure control solenoid C (GF9 C1 CB123456 clutch or GR10C3 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 Ilium.
			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 Ilium.
Pressure Control (PC) Solenoid D Calibration Incorrect	P27AA	The diagnostic monitor verifies that the pressure control solenoid D (GF9 C2 CB29 clutch or GR10 C5C1356789 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 Ilium.
			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 Ilium.
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 C2346781OR clutch or CVTTCC) 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 Ilium.
			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 Ilium.
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 C4567891OR 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 Ilium.
			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 Ilium.
Pressure Control (PC) Solenoid G Calibration Incorrect	P27AD	The diagnostic monitor verifies that the pressure control solenoid G (GF9 C5 C57R clutch or GRIO line or CVT mode valve AETRS 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 Ilium.
			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 Ilium.
Pressure Control (PC) Solenoid H Calibration Incorrect	P27AE	The diagnostic monitor verifies that the pressure control solenoid H (GF9 C6 C6789 clutch or GRIO 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 Ilium.
			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 Ilium.
Transmission Range Sensor A/B Correlation	P2805	Internal range sensor A is wired independently to the TCM while internal range sensor B is wired independently to the ECM. The monitor diagnoses the internal range sensor A PWM duty cycle by comparing the raw sensor A value against the raw sensor B adjusted value, to verify signals are consistent, or determine the TCM internal range sensor A does not correlate to the ECM internal range sensor B. The ECM transmits internal range sensor B raw PWM to the TCM over the serial data bus.	ABS((TCM internal range sesnorA+ ECM internal range sesnor B raw adjusted for high or low time) - 100%)) Increment fail and sample time, update rate 25 milliseconds	> 4.849 % duty cycle	diagnostic monitor enable P0707 fault active P0708 fault active U0100 fault active ECM internal range sesnor B available from ECM ECM internal range sesnor B fault active battery voltage ABS(TCM internal range sesnor A current loop value - TCM internal range sesnor A previous loop value), update TCM internal range sesnor A stablity time, update rate 25 milliseconds ABS(ECM internal range sesnor B current loop value - ECM internal range sesnor B previous loop value), update ECM internal range sesnor B stablity time, update rate 25 milliseconds TCM internal range sesnor A stability time met OR ECM internal range sesnor B stability time met ECM internal range sesnor B raw adjusted for	= 1 Boolean = FALSE = FALSE = FALSE = TRUE = FALSE > 9.00 volts < 1.001 % duty cycle < 1.001 % duty cycle = ABS(ECM internal range sesnor B raw -	PWM fail time > 1.000 seconds out of sample time > 1.500 seconds battery voltage time > 1.000 seconds TCM internal range sesnor A stability time > 1.000 seconds ECM internal range sesnor B stability time > 1.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					high or low time Vehicle is in a mode that enables accessory power	0.000 %) = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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, 8 speed TCC Control, or CVT Mode Valve A 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 0 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 OR Power Mode) 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 = ACCESSORY = 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 > 0.60 seconds out of sample time > 0.65 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid G Control Circuit Low	P2814	Controller specific circuit diagnoses 9 speed Line Pressure Circuit, 10 speed Line Pressure Circuit, 8 speed TCC Control, or CVT Mode Valve A 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 0 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 OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 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 Ilium.
Pressure Control (PC) Solenoid G Control Circuit High	P2815	Controller specific circuit diagnoses 9 speed Line Pressure Circuit, 10 speed Line Pressure Circuit, 8 speed TCC Control, or CVT Mode Valve A 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 0 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 OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 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 Ilium.
Pressure Control Solenoid H Performance /Stuck Off - GR10 Specific	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 command 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) > **P2817TCC stuck off fail TCC slip speed** = LOCK > 130.0 RPM	diagnostic monitor enable	= 1 Boolean	fail time > 4.000 seconds increment fail count fail count > 3 counts 25 millisecond update rate	Type A, 1 Trips
					TCC command capacity	> 0.00 %	TCC command capacity time > 0.00 seconds	
					TCC command pressure	> 500.0 kPa	TCC command pressure time > 2.00 seconds	
					(TCC control mode previous TCC control mode previous TCC control mode previous) AND	#TCC control mode current # ON mode (controlled slip mode) # LOCK		
					(TCC control mode current OR TCC control mode current)	= ON mode (controlled slip mode) = LOCK		
					(TCC stuck off enable OR	= 1 Boolean		
					TCC stuck on enable) hydraulic pressure available:	= 1 Boolean		
					engine speed	> 500.0 RPM	engine speed time > **engine speed time for transmission hydraulic pressure available**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					service fast learn active battery voltage run crank voltage (PTO active OR PTO disable calibration) accelerator pedal position accelerator pedal position range shift state transmission fluid temperature transmission fluid temperature engine torque engine torque P2817 test fail this key on (TCC control mode OR TCC control mode) attained gear attainded gear slip DTCs not fault active DTCs not fault oendina	= FALSE > 9.00 volts > 9.00 volts = FALSE = 0 Boolean > 8.0 % < 99.0 % = range shift complete > -6.66 °C < 130.0 °C > 50.0 Nm < 8,191.8 Nm = FALSE = ON mode (controlled slip mode) = LOCK > CeCGSR_e_CR_Second > 75.00 RPM AcceleratorPedalFailure EngineTorqueEstlnaccurate P281B, P281D, P281E, P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D P0722, P0723, P0716, P0717, P07BF, P07C0	see supporting table 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 Ilium.
Pressure Control Solenoid H Stuck On - GR10 specific	P2818	The diagnostic monitor detects the transmission torque converter control valve solenoid failed hydraulically on. This is evaluated by monitoring slip across the torque converter in two cases: 1) during low speed shifts into drive and reverse while monitoring engine speed and 2) outside of garage shifts by monitoring engine speed decel and torque for potential engine stall	ABS(TCC slip speed) (set point engine speed - actual engine speed) (maximum engine speed during garage shift - current engine speed) engine torque update TCC stuck on fail time garage shift	< 40.0 RPM > 50.0 RPM > 50.0 RPM > 200.0 Nm	MIN(commanded or attained gear turbine speed) active clutch control freewheel-to-lock shift lock-to-freewheel shift (commanded gear AND output speed) OR (commanded gear AND output speed) primary oncoming clutch command primary oncoming control state (TCC stuck off enable OR TCC stuck on enable)	< desired engine speed - 50.0 RPM = garage shift = FALSE = FALSE = REVERSE < 15.0 RPM > FIRST GEAR > -15.0 RPM > Return spring - **P2818 GR10 Oncoming Clutch Capacity Offset** # clutch fill = 1 Boolean = 1 Boolean	TCC stuck on fail time garage shift **P2818TCC stuck on fail time garage** **> shift -GR10** update fail count when: fail count > 3 counts set DTC fault active 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 Ilium.
					battery voltage	> 9.00 volts		
					run crank voltage	> 9.00 volts		
					diagnostic monitor enable	= 0 Boolean	battery voltage time > 0.100 seconds	
					PRNDL	# PARK	run crank voltage time > 0.100 seconds	
					commanded gear	# PARK		
					PRNDL	# NEUTRAL		
					commanded gear	# NEUTRAL		
					TCC command mode	= OFF		
					(PTO active	= FALSE		
					OR			
					PTO disable calibration)	= 0 (0 to enable, 1 to disable)		
					transmission fluid temperature	> -6.66 °C		
					transmission fluid temperature	< 130.00 °C		
					engine torque	> -25.0 Nm		
					engine torque	< 800.0 Nm		
					turbine speed	> cmnd gear turbine speed - 25.0 RPM		
					P2818 test fail this key on	= FALSE		
					engine speed	> 200.0 RPM		
					engine speed	< 1,000.0 RPM		
					accelerator pedal position	< 5.0 %		
					4WD low state	= FALSE		
					(driver shift mode active	= FALSE		
					OR			
					driver shift mode calibration)	= 0 (0 to enable, 1 to disable)		
					clucth control solenoid			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					stuck ON AND stuck OFF intrusive shift active TCC solenoid pulse request vehicle speed (not garage shift) minimum turbine speed DTCs not fault pending DTCs not fault active	= FALSE = FALSE < 4.0 KPH < set point engine speed - 50.0 RPM P281B, P281D, P281E, P0722, P0723, P0716, P0717, P07BF, P07C0, P0746, P0747, P0776, P0777, P0796, P0797, P2714, P2715, P2723, P2724, P2732, P2733, P2820, P2821 AcceleratorPedalFailure EngineTorqueEstInaccurate P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D		
			active clutch control ABS(TCC slip speed) engine torque [(set point engine speed - actual engine speed) OR rate of change of engine speed] update TCC stuck on stall	# garage shift < 30.0 RPM > 90.0 Nm > 200.0 RPM < -2,000 RPM/second			TCC stuck on stall pending time > **P2818TCC stuck on fail time stall pending - GR10** when: fail count > 4 counts set DTC fault active 25 millisecond	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			pending time				update rate	
					MIN(commanded or attained gear turbine speed)	< desired engine speed - 50.0 RPM		
					active clutch control	# garage shift		
					freewheel-to-lock shift	= FALSE		
					lock-to-freewheel shift	= FALSE		
					(commanded gear AND output speed) OR (commanded gear AND output speed)	= REVERSE < -999,999.0 RPM > FIRST GEAR > 0.0 RPM		
					primary oncoming clutch command	> Return spring - **P2818 GR10 Oncoming Clutch Capacity Offset**		
					(TCC stuck off enable OR TCC stuck on enable)	= 1 Boolean = 1 Boolean		
					battery voltage	> 9.00 volts		
					run crank voltage	> 9.00 volts	battery voltage time > 0.100 seconds	
					diagnostic monitor enable	= 0 Boolean	run crank voltage time > 0.100 seconds	
					PRNDL	# PARK		
					commanded gear	# PARK		
					PRNDL	# NEUTRAL		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					commanded gear	# NEUTRAL		
					TCC command mode	= OFF		
					(PTO active OR PTO disable calibration)	= FALSE = 0 (0 to enable, 1 to disable)		
					transmission fluid temperature	> -6.66 °C		
					transmission fluid temperature	< 130.00 °C		
					engine torque	> -25.0 Nm		
					engine torque	< 800.0 Nm		
					turbine speed	> cmnd gear turbine speed - 25.0 RPM		
					P2818 test fail this key on	= FALSE		
					engine speed	> 200.0 RPM		
					engine speed	< 1,000.0 RPM		
					accelerator pedal position	< 5.0 %		
					4WD low state	= FALSE		
					(driver shift mode active OR driver shift mode calibration)	= FALSE = 0 (0 to enable, 1 to disable)		
					clucth control solenoid stuck ON AND stuck OFF intrusive shift active	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					TCC solenoid pulse request vehicle speed minimum turbine speed DTCs not fault pending DTCs not fault active	= FALSE < 15.0 KPH < set point engine speed - 50.0 RPM P281B, P281D, P281E, P0722, P0723, P0716, P0717, P07BF, P07C0, P0746, P0747, P0776, P0777, P0796, P0797, P2714, P2715, P2723, P2724, P2732, P2733, P2820, P2821 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 Ilium.
Pressure Control Solenoid H Control Circuit Open	P281B	Controller specific circuit diagnoses 9 speed TCC Control Circuit, 10 speed TCC Control Circuit, 8 speed T93 Default Valve Control Circuit, or CVT Mode Valve B 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 0 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 OR Power Mode) 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 = ACCESSORY = 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 Ilium.
Pressure Control Solenoid H Control Circuit Low	P281D	Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit, 10 speed TCC Control Circuit, 8 speed Default Valve Control Circuit, or CVT Mode Valve B 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 0 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 OR Power Mode) 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 = ACCESSORY = 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 Ilium.
Pressure Control Solenoid H Control Circuit High	P281E	Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit, 10 speed TCC Control Circuit, 8 speed Default Valve Control Circuit, or CVT Mode Valve B 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 0 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 OR Power Mode) 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 = ACCESSORY = 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 > 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 Ilium.
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 05 clutch slip speed 06 clutch slip speed) update fail time 6.25 milliscond update	> 3.000 < 2.960 > 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	****************************** = 1 Boolean = 1 Boolean > 9.00 volts = 1 Boolean = 1 Boolean > 9.00 volts = TRUE Boolean = TRUE Boolean	if engine torque <20.0 Nm fail time < 0.50 sec else 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 Ilium.
		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 detected by monitoring transmission input speed deceleration magnitude and timing during a stationary shift into drive from park, neutral, or reverse. If the driver attempts unsucessfully to accelerate and then again shifts into drive, this 2nd shift triggers a neutral test which monitors input speed to confirm that the default disable solenoid is stuck off			service fast learn active service solenoid cleaning procedure active 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 ***************************** conditions needed through duration of test: attained gear transmission output speed driver direction request	= FALSE Boolean = FALSE Boolean = TRUE > 10.00 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) ***************************** = NEUTRAL > 36.00 RPM = FORWARD		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176CP176D P176B P17D6		
					DTCs not test fail this key on	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176DP17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3P17C5 P0721 AcceleratorPedalFailure Crank8ensor_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 P172AP172B		
			(gear ratio AND gear ratio) OR (gear ratio AND	> 3.000 < 2.960 > 0.980			if engine torque <20.0 Nm fail time <0.50 sec else	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			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	< 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	****************************** = 1 Boolean = 1 Boolean > 9.00 volts = 1 Boolean = 1 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					hydraulic pressure available	= TRUE		
					(hydraulic line pressure OR	> 10.00 kPa		
					Clutch Stuck on in Park/ Neutral Fault Pending OR	= TRUE		
					Neutral Staging Line Pressure Disable)	=TRUE		
					*****************************	*****************************		
					conditions to trigger start of test:			
					clutch control solenoid test state	= Neutral Test State		
					Default disable stuck off enable cal for startle events	= 0 (1 to enable, 0 to disable)		
					Startle Mitigation Active	= TRUE		
					*****************************	*****************************		
					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)		
					attained gear	= NEUTRAL		
					driver direction request	= FORWARD		
					*****************************	*****************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3P17C5 P0721		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176CP176D P176B P17D6		
					DTCs not test fail this key on	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176DP17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3P17C5 P0721 AcceleratorPedalFailure Crank8ensor_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 P172AP172B		
			Input speed decel test: transmission input speed deceleration	> **P2820 GR10 hydraulic default input speed deceleration threshold**			decel time: > 0.05 sec decel observed within **P2820 GR10 hydraulic default at launch test window**	
			neutral test to set DTC on next shift into drive:					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			transmission input speed	<100 RPM			neutral test fail time > 0.10 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		
					use run crank voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 1 Boolean		
					AND			
					run crank voltage)	> 9.00 volts		
					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	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					available			
					(hydraulic pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable)	> 10.00 kPa = TRUE = TRUE		
					*****************************	*****************************		
					conditions needed to trigger decel test:			
					Driver direction change request	= TRUE		
					Driver requested direction	= FORWARD		
					default disable stuck off at launch enable cal	= 1 (1 to enable, 0 to disable)		
					ETRS system type	= CeTRGR_e_NoETRS (CeTRGR_e_NoETRS to enable)		
					deceleration test on previous shift into drive failed	= TRUE		
					P2820 Test Passed this Key on OR (Multiple pass cal AND Trans output speed since last pass)	= FALSE = 1 (1 to enable, 0 to disable) > 36.0 RPM		
					Accelerator pedal position transmission input speed transmission output speed	< 2.5 % < 900 RPM < 100 RPM	>0.10 sec	
					*****************************	*****************************		
					conditions needed throuah duration of decel			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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)		
					transmission input speed	< 900 RPM		
					transmission output speed	< 100 RPM		
					******************************	******************************		
					conditions needed to trigger neutral test:		All conditions met for > 1.00 sec, increment count, count > 1 , set FP	
					decel test failed	= TRUE		
					transmission output speed	< 100 RPM		
					attained gear direction	= FORWARD		
					brake pedal position	< 5.00%		
					park brake status	# APPLIED		
					park brake status	# APPLY IN PROGRESS		
					accelerator pedal position	> 10.0 %		
					Driver direction change request	= TRUE		
					driver requested direction	= FORWARD		
					transmission input speed	> 100 RPM		
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176CP176D P176B P17D6		
					DTCs not test fail this key	P2534 P0707 P0708		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					on	P0716 P0717 P07C0 P07BF P077D P077C P126C P176DP17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3P17C5 P0721 AcceleratorPedalFailure Crank8ensor_FA		
					DTCs not fault active	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732, P2818, 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 Ilium.
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 0 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 OR Power Mode) 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 = ACCESSORY = 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 Ilium.
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 0 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 OR Power Mode) 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 = ACCESSORY = 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 Ilium.
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 0 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 OR Power Mode) 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 = ACCESSORY = 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 Ilium.
Control Module Serial Peripheral Interface Bus 1	P30D6	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 / 1 6 counts intermittent 12.5 ms /count in the controller main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 controller main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
P3186 (Internal Control Module Security Peripheral Performance)	P3186	This DTC indicates the security peripheral has experienced an internal fault indicating that MAC verification results are unreliable.	MAC verification has falsely passed a configurable number of times.	2.00	Calibration enable	= 1.00 Boolean		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures	>=5.00 counts in a sliding window of 50 samples	General Enable Criteria: Starter motor engaged for Or Run/Crank ignition voltage All below criteria have been met for CAN channel is requesting full communications Normal CAN transmission on Bus is enabled Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled	 > 15,000.00 milliseconds >11.00 Volts >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts >=11.00 Volts Disabled	Samples every 100.00 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	 >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Power Steering Control Module Emissions Neutral Diagnostic	U0131	This DTC monitors for a loss of communication with the Power Steering Control Module.	Message is not received from controller for Message $023:	>10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	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 Ilium.
					If calibratable low voltage disable mode is not Never Disabled IfOBDII: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts > 15,000.00 milliseconds > 11.00 Volts >=8.00 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 $010: Message $205: Message $284: Message $404: Message $409: Message $40C: Message $413: Message $460: Message $461:	>10,000.00 milliseconds >10,000.00 milliseconds >9,325.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled IfOBDII: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts > 15,000.00 milliseconds > 11.00 Volts >=8.00 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Restraints Control Module Emissions Neutral Diagnostic	U0151	This DTC monitors for a loss of communication with the Restraints Control Module.	Message is not received from controller for Message $024: Message $0D1: Message $0D2: Message $441:	>10,000.00 milliseconds >10,000.00 milliseconds >9,825.00 milliseconds >10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	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 Ilium.
					If calibratable low voltage disable mode is not Never Disabled IfOBDII: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts > 15,000.00 milliseconds > 11.00 Volts >=8.00 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From ECM/ PCM	U0401	This DTC monitors for an error in communication with the ECM/PCM.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (C8UM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type A, 1 Trips
			SD19P_ARC:	8.00 fail counts out of 10.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
			SrlDat19_Prtctd:	2.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending			
			SD18P_ARC:	8.00 fail counts out of 10.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
			SrlDat18_Prtctd:	2.00 fail counts out of 18.00 sample counts	Controller type: OBD Controller			
			SD20P_ARC:	8.00 fail counts out of 10.00 sample counts				
			SrlDat20_Prtctd:	2.00 fail counts out of 18.00 sample counts				
			SD71_ARC:	8.00 fail counts out of 10.00 sample counts				
			SD71_CS:	2.00 fail counts out of 18.00 sample counts				
			VSADP_ARC:	8.00 fail counts out of				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				10.00 sample counts				
			VehSpdAvgDrvn_Prtctd:	2.00 fail counts out of 18.00 sample counts				
			SD26P_ARC:	8.00 fail counts out of 10.00 sample counts				
			SrlDat26_Prtctd:	2.00 fail counts out of 18.00 sample counts				
			SD22P_ARC:	8.00 fail counts out of 10.00 sample counts				
			SrlDat22_Prtctd:	2.00 fail counts out of 18.00 sample counts				
			EVMESS2_ARC:	8.00 fail counts out of 10.00 sample counts				
			WDP_ARC:	8.00 fail counts out of 10.00 sample counts				
			WhlDist.Prtctd:	2.00 fail counts out of 18.00 sample counts				
			CHCG_ARC:	8.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Brake System Control Module	U0418	This DTC monitors for an error in communication with the Brake System Control Module.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type B, 2 Trips
			SD16P_ARC:	8.00 fail counts out of 10.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
			SrlDat16_Prtctd:	2.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending			
			RATVCP.ARC:	8.00 fail counts out of 10.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
			RrAxTrqValCmd_Prtctd:	2.00 fail counts out of 18.00 sample counts	Controller type: OBD Controller			
			BSIS2P_ARC:	8.00 fail counts out of 10.00 sample counts				
			BrkSysInfoSts2_Prtctd:	2.00 fail counts out of 18.00 sample counts				
			SWIP_ARC:	8.00 fail counts out of 10.00 sample counts				
			StrgWhlInfo_Prtctd:	2.00 fail counts out of 18.00 sample counts				
			SD15P_ARC:	8.00 fail counts out of				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				10.00 sample counts				
			SrlDat15_Prtctd:	2.00 fail counts out of 18.00 sample counts				
			SD17P_ARC:	8.00 fail counts out of 10.00 sample counts				
			SrlDat17_Prtctd:	2.00 fail counts out of 18.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Power Steering Control Module Emissions Neutral Diagnostic	U0420	This DTC monitors for an error in communication with the Power Steering Control Module.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for: SWIP_ARC: StrgWhlInfo_Prtctd:	 8.00 fail counts out of 10.00 sample counts 2.00 fail counts out of 18.00 sample counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	 >= 5,000.00 milliseconds >= 11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Emissions Neutral Diagnostics - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Body Control Module	U0422	This DTC monitors for an error in communication with the Body Control Module.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (C8UM) of the following signals received over serial data is incorrect for: SPMP_ARC: SysPwrMode_Prtctd: PltfTrnsTUDSwStARC:	 8.00 fail counts out of 10.00 sample counts 2.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 10.00 sample counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	 >= 5,000.00 milliseconds >= 11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Gateway A	U0447	This DTC monitors for an error in communication with the Gateway A.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (C8UM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type A, 1 Trips
			BSPMP_ARC:	8.00 fail counts out of 10.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
			BkupSysPwrMode_Prtctd:	2.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending			
					If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
					Controller type: OBD Controller			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Restraints Control Module Emissions Neutral Diagnostic	U0452	This DTC monitors for an error in communication with the Restraints Control Module.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (C8UM) of the following signals received over serial data is incorrect for: SD47P_ARC: SrlDat47_Prtctd:	8.00 fail counts out of 10.00 sample counts 2.00 fail counts out of 18.00 sample counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	>= 5,000.00 milliseconds >= 11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Emissions Neutral Diagnostics - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Gateway A on CAN 2	U1608	This DTC monitors for a loss of communication with the Gateway A on CAN 2.	Message is not received from controller for Message $209: Message $20D: Message $427: Message $561: Message $562:	>10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled IfOBDII: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts > 15,000.00 milliseconds > 11.00 Volts >=8.00 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Brake System Control Module 1 on CAN Bus 2	U1610	This DTC monitors for a loss of communication with the Brake System Control Module 1 on CAN Bus 2.	Message is not received from controller for Message $012: Message $014: Message $015: Message $017: Message $018: Message $01A: Message $025: Message $081: Message $082: Message $210: Message $211: Message $219: Message $415:	>10,000.00 milliseconds > 9,925.00 milliseconds > 9,925.00 milliseconds > 9,925.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Message $42A: Message $4B2: Message $4B4: Message $4B5:	>10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds	If calibratable low voltage disable mode is not Never Disabled IfOBDII: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts > 15,000.00 milliseconds > 11.00 Volts >=8.00 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Engine Control Module on CAN Bus 2	U1611	This DTC monitors for a loss of communication with the Engine Control Module on CAN Bus 2.	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
			Message $011:	>10,000.00 milliseconds	All below criteria have been met for	>= 5,000.00 milliseconds		
			Message $016:	> 9,918.75 milliseconds	If message is on Bus A: U0073 not active			
			Message $01C:	> 9,918.75 milliseconds	If message is on Bus B: U0074 not active			
			Message $01D:	>418.75 milliseconds	If message is on Bus S: U0076 not active			
			Message $02A:	>10,000.00 milliseconds	CAN channel is requesting full communications			
			Message $045:	>10,000.00 milliseconds	Normal CAN transmission on Bus is enabled			
			Message $084:		If bus type is Sensor Bus, sensor bus relay is on			
			Message $086:	>10,000.00 milliseconds	Accessory mode to off mode not pending			
			Message $087:	>387.50 milliseconds	Battery voltage	>11.00 Volts		
			Message $08C:	>10,000.00 milliseconds	Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
			Message $097:	>10,000.00 milliseconds	Controller type: OBD Controller			
			Message $213:					
			Message $214:	>10,000.00 milliseconds	If power mode = Run/ Crank:			
					Power Mode is run			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Message $21D: Message $227: Message $229: Message $22A: Message $254: Message $41D: Message $41F: Message $429: Message $499: Message $4BB: Message $4BC: Message $4BD: Message $4C1:	>10,000.00 milliseconds > 9,325.00 milliseconds >10,000.00 milliseconds > 9,325.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds	If calibratable low voltage disable mode is not Never Disabled IfOBDII: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts > 15,000.00 milliseconds > 11.00 Volts >=8.00 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				>10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

Key Table Not Provisioned / Authoritative Counter At Maximum	U1960	This DTC indicates that the ECU security peripheral key slots are not provisioned OR ECU message authenticatioon Authoritative Counters are at MAX value	During controller initialization:
			
			IF (Any Security Peripheral Key Slot reports as Empty)
			-OR-
			(Any Authoritative Counter is at MAX value)
			
			During controller operation:
			
			IF (A Security Peripheral Key Slot reports as Empty)
			-OR-
			(An Authoritative Counter is at MAX value)
					Calibration enable	= 1.00 Boolean		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
U1961 (Security Peripheral Performance)	U1961	This DTC indicates that the ECU security peripheral has reported that it has failed.	The ECU security peripheral reports that the security peripheral hardware has failed.		Calibration enable	= 1.00 Boolean		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
U1962 (Unable to Authenticate Serial Data Message)	U1962	This DTC indicates that serial data message authentication on any key slot has failed a configurable number of times this key cycle.	Message authentication on a single key slot has failed a configurable number of times.	KeSSAR_Cnt_SecKey SlotFailLimit	Calibration enable	= 1.00 Boolean		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Input Power Circuit A - Ignition Input On/Start Circuit Correlation	U3023	Detect a Power A vs RuncCrank correlation error	Power A - RunCrank - Voltage	> 3.00	PowerA- RunCrank Correlation monitoring enable = TRUE Battey Present RunCrank Active Starter Motor NOT Engaged	Diagnostcis 1.00 Battey Present = TRUE RunCrank Active = TRUE Starter Motor Engaged = FALSE	40.00 failures out of 50.00	Type A, 1 Trips

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	0.300	0.300	0.300	0.150	0.150

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description:

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_Directionllnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_Directionllnknown	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_Directionllnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_Directionllnknown	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_Directionllnknown	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_Directionllnknown	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 - 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	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

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 - 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	CeTNSR_e_InternalSpdSnsr1	CeTNSR_e_InternalSpdSnsr2	CeTNSR_e_InternalSpdSnsr3
1	350	225	10

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	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

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 - 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	1,500.0	1,200.0	600.0	60.0

Initial Supporting table - Clutch Connectivity C1 On Threshold

Description: Pressure command above which C1 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C2 On Threshold

Description: Pressure command above which C2 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C3 On Threshold

Description: Pressure command above which C3 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C4 On Threshold

Description: Pressure command above which C4 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C5 On Threshold

Description: Pressure command above which C5 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C6 On Threshold

Description: Pressure command above which C6 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C7 On Threshold

Description: Pressure command above which SOWC will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	300	300	300	300	300

Initial Supporting table - Clutch Connectivity Wrong Direction FP

Description: Fault pending time for cluch connectivity detecting wrong direction

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	1	1	1	1	1

Initial Supporting table - Clutch PCS Pressure Gain

Description: Gain value to convert clutch pressure command to regulator valve command

Value Units: Gain (unitless)
X Unit: 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	1	1	1	1	1	1

Initial Supporting table - Clutch PCS Pressure Offset

Description: Offset value to convert clutch pressure command to regulator valve command

Value Units: offset (kPa)
X Unit: 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	0	0	0	0	0	0

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

Description: Maximum pressure command allowed for each combination of clutches which can lead to a multi-clutch tie up

Value Units: Pressure (kPa)
X Unit: Commanded Gear
Y Units: Clutch

Cmnd Tie Up Monitor Multi-Clutch Thresh - 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
CeTRMR_e_C1_Clutch	272	272	4,096	272	272	285	272
CeTRMR_e_C2_Clutch	261	261	261	4,096	261	261	273
CeTRMR_e_C3_Clutch	96	96	96	96	4,096	96	175
CeTRMR_e_C4_Clutch	471	471	471	471	471	4,096	471
CeTRMR_e_C5_Clutch	119	119	119	119	568	119	4,096
CeTRMR_e_C6_Clutch	207	207	207	207	207	213	207
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - 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
CeTRMR_e_C1_Clutch	272	4,096	4,096	4,096	4,096	4,096	272
CeTRMR_e_C2_Clutch	261	4,096	4,096	261	261	273	4,096
CeTRMR_e_C3_Clutch	96	4,096	96	4,096	96	175	4,096
CeTRMR_e_C4_Clutch	1,476	4,096	471	1,476	4,096	471	471
CeTRMR_e_C5_Clutch	119	4,096	119	568	119	4,096	568
CeTRMR_e_C6_Clutch	4,096	4,096	207	213	213	207	207
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 3

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
CeTRMR_e_C1_Clutch	285	272	272	296	272	272	285
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	261	273	261	273
CeTRMR_e_C3_Clutch	96	1,716	96	4,096	4,096	4,096	175
CeTRMR_e_C4_Clutch	4,096	471	1,955	4,096	471	1,476	4,096
CeTRMR_e_C5_Clutch	119	4,096	119	568	4,096	1,164	4,096
CeTRMR_e_C6_Clutch	213	207	4,096	213	207	4,096	321
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - 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
CeTRMR_e_C1_Clutch	285	272	272	4,096	272	272	285
CeTRMR_e_C2_Clutch	261	261	261	261	4,096	261	261
CeTRMR_e_C3_Clutch	96	96	96	96	96	4,096	96
CeTRMR_e_C4_Clutch	4,096	471	471	471	471	471	4,096
CeTRMR_e_C5_Clutch	119	119	119	119	119	568	119
CeTRMR_e_C6_Clutch	4,096	207	207	207	207	207	213
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - 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
CeTRMR_e_C1_Clutch	272	272	4,096	4,096	272	285	272
CeTRMR_e_C2_Clutch	273	261	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	175	96	4,096	96	4,096	96	1,716

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

CeTRMR_e_C4_Clutch	471	1,476	4,096	471	471	4,096	471
CeTRMR_e_C5_Clutch	4,096	119	4,096	119	568	119	4,096
CeTRMR_e_C6_Clutch	207	4,096	4,096	207	207	213	207
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - 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
CeTRMR_e_C1_Clutch	272	296	272	272	285	285	272
CeTRMR_e_C2_Clutch	4,096	261	273	261	273	261	261
CeTRMR_e_C3_Clutch	96	4,096	4,096	4,096	175	96	96
CeTRMR_e_C4_Clutch	1,955	4,096	471	1,476	4,096	4,096	471
CeTRMR_e_C5_Clutch	119	568	4,096	1,164	4,096	119	119
CeTRMR_e_C6_Clutch	4,096	213	207	4,096	321	4,096	207
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - 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
CeTRMR_e_C1_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	4,096	4,096	273	261
CeTRMR_e_C3_Clutch	96	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	471	471	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutch	119	4,096	4,096	568	568	4,096	1,164
CeTRMR_e_C6_Clutch	4,096	207	207	213	213	321	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 8

y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	
CeTRMR_e_C1_Clutch	4,096	4,096	451	285	272	296	
CeTRMR_e_C2_Clutch	299	276	747	4,096	4,096	4,096	
CeTRMR_e_C3_Clutch	4,096	175	4,096	1,716	4,096	4,096	
CeTRMR_e_C4_Clutch	1,476	4,096	4,096	4,096	1,955	4,096	
CeTRMR_e_C5_Clutch	4,096	4,096	4,096	4,096	4,096	1,965	
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

Description: Maximum pressure command allowed for each combination of clutches which can lead to a multi-clutch tie up when transfer case is in 4WD low range

Value Units: Pressure (kPa)
X Unit: Commanded Gear
Y Units: Clutch

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - 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
CeTRMR_e_C1_Clutch	101	101	4,096	101	101	106	101
CeTRMR_e_C2_Clutch	97	97	97	4,096	97	97	101
CeTRMR_e_C3_Clutch	35	35	35	35	4,096	35	65
CeTRMR_e_C4_Clutch	175	175	175	175	175	4,096	175
CeTRMR_e_C5_Clutch	44	44	44	44	210	44	4,096
CeTRMR_e_C6_Clutch	77	77	77	77	77	79	77
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - 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
CeTRMR_e_C1_Clutch	101	4,096	4,096	4,096	4,096	4,096	101
CeTRMR_e_C2_Clutch	97	4,096	4,096	97	97	101	4,096
CeTRMR_e_C3_Clutch	35	4,096	35	4,096	35	65	4,096
CeTRMR_e_C4_Clutch	547	4,096	175	547	4,096	175	175
CeTRMR_e_C5_Clutch	44	4,096	44	210	44	4,096	210
CeTRMR_e_C6_Clutch	4,096	4,096	77	79	79	77	77
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 3

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
CeTRMR_e_C1_Clutch	106	101	101	110	101	101	106
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	97	101	97	101
CeTRMR_e_C3_Clutch	35	636	35	4,096	4,096	4,096	65
CeTRMR_e_C4_Clutch	4,096	175	724	4,096	175	547	4,096
CeTRMR_e_C5_Clutch	44	4,096	44	210	4,096	431	4,096
CeTRMR_e_C6_Clutch	79	77	4,096	79	77	4,096	119
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - 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
CeTRMR_e_C1_Clutch	106	101	101	4,096	101	101	106
CeTRMR_e_C2_Clutch	97	97	97	97	4,096	97	97
CeTRMR_e_C3_Clutch	35	35	35	35	35	4,096	35
CeTRMR_e_C4_Clutch	4,096	175	175	175	175	175	4,096
CeTRMR_e_C5_Clutch	44	44	44	44	44	210	44
CeTRMR_e_C6_Clutch	4,096	77	77	77	77	77	79
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - 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
CeTRMR_e_C1_Clutch	101	101	4,096	4,096	101	106	101
CeTRMR_e_C2_Clutch	101	97	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	65	35	4,096	35	4,096	35	636

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

CeTRMR_e_C4_Clutch	175	547	4,096	175	175	4,096	175
CeTRMR_e_C5_Clutch	4,096	44	4,096	44	210	44	4,096
CeTRMR_e_C6_Clutch	77	4,096	4,096	77	77	79	77
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - 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
CeTRMR_e_C1_Clutch	101	110	101	101	106	106	101
CeTRMR_e_C2_Clutch	4,096	97	101	97	101	97	97
CeTRMR_e_C3_Clutch	35	4,096	4,096	4,096	65	35	35
CeTRMR_e_C4_Clutch	724	4,096	175	547	4,096	4,096	175
CeTRMR_e_C5_Clutch	44	210	4,096	431	4,096	44	44
CeTRMR_e_C6_Clutch	4,096	79	77	4,096	119	4,096	77
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - 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
CeTRMR_e_C1_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	4,096	4,096	101	97
CeTRMR_e_C3_Clutch	35	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	175	175	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutch	44	4,096	4,096	210	210	4,096	431
CeTRMR_e_C6_Clutch	4,096	77	77	79	79	119	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 8							
y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	
CeTRMR_e_C1_Clutch	4,096	4,096	167	106	101	110	
CeTRMR_e_C2_Clutch	111	102	277	4,096	4,096	4,096	
CeTRMR_e_C3_Clutch	4,096	65	4,096	636	4,096	4,096	
CeTRMR_e_C4_Clutch	547	4,096	4,096	4,096	724	4,096	
CeTRMR_e_C5_Clutch	4,096	4,096	4,096	4,096	4,096	728	
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	

Initial Supporting table - Cmnd Tie Up Monitor Output Lock Thresh

Description: Maximum pressure command allowed for each invalid combination of clutches which can lead to an output tie-up

Value Units: Pressure (kPa)
X Unit: Possible Output Tie-up Combination (unitless)
Y Units: Clutch

y/x	CeTCLR_e_TUM_OutLockl	CeTCLR_e_TUM_OutLock2	CeTCLR_e_TUM_OutLock3	CeTCLR_e_TUM_OutLock4	CeTCLR_e_TUM_OutLock5	CeTCLR_e_TUM_OutLock6	CeTCLR_e_TUM_OutLock7
CeTRMR_e_C1_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C2_Cluteh	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C3_Cluteh	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C4_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C5_Cluteh	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C6_Cluteh	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C7_Cluteh	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096

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	0.300	0.300	0.300	0.150	0.150

Initial Supporting table - Illegal Drive Clutch Combinations

Description: All combinations of clutch commands which can lead to reverse when the driver is requesting drive (1 indicates clutch on, 0 incdicates clutch off)

Value Units: Boolean (1 for on, 0 for off)
X Unit: Illegal Clutch Combination
Y Units: Clutch

y/x	CeTRMR_e_IllegalDrv_Rev1	CeTRMR_e_IllegalDrv_Rev2
CeTRMR_e_C1_Clutch	1	1
CeTRMR_e_C2_Clutch	1	1
CeTRMR_e_C3_Clutch	0	0
CeTRMR_e_C4_Clutch	1	1
CeTRMR_e_C5_Clutch	0	0
CeTRMR_e_C6_Clutch	1	1
CeTRMR_e_C7_Clutch	0	0

Initial Supporting table - Illegal Park-Neutral Clutch Combinations

Description: All combinations of clutch commands which can lead to drive or reverse when the driver is requesting park or neutral (1 indicates clutch on, 0 incdicates clutch off)

Value Units: Boolean (1 for on, 0 for off)
X Unit: Illegal Clutch Combination
Y Units: Clutch

Illegal Park-Neutral Clutch Combinations - Part 1

y/x	CeTRMR_e_IllegalPN_Rev	CeTRMR_e_IllegalPN_1A	CeTRMR_e_IllegalPN_1Ac	CeTRMR_e_IllegalPN_1Ad	CeTRMR_e_IllegalPN_1Af
CeTRMR_e_C1_Clutch	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	0	0	0	0
CeTRMR_e_C3_Clutch	0	0	1	0	0
CeTRMR_e_C4_Clutch	1	0	0	1	0
CeTRMR_e_C5_Clutch	0	1	1	1	1
CeTRMR_e_C6_Clutch	1	0	0	0	1
CeTRMR_e_C7_Clutch	0	0	0	0	0

Illegal Park-Neutral Clutch Combinations - Part 2

y/x	CeTRMR_e_IllegalPN_1M	CeTRMR_e_IllegalPN_1Me	CeTRMR_e_IllegalPN_1Md	CeTRMR_e_IllegalPN_1Mf	CeTRMR_e_IllegalPN_2A
CeTRMR_e_C1_Clutch	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	1	1	1	0
CeTRMR_e_C3_Clutch	0	1	0	0	1
CeTRMR_e_C4_Clutch	0	0	1	0	1
CeTRMR_e_C5_Clutch	1	1	1	1	0
CeTRMR_e_C6_Clutch	0	0	0	1	0
CeTRMR_e_C7_Clutch	0	0	0	0	0

Illegal Park-Neutral Clutch Combinations - Part 3

y/x	CeTRMR_e_IllegalPN_2M	CeTRMR_e_IllegalPN_3	CeTRMR_e_IllegalPN_4	CeTRMR_e_IllegalPN_5	CeTRMR_e_IllegalPN_6
CeTRMR_e_C1_Clutch	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	0	0	0	0
CeTRMR_e_C3_Clutch	1	1	1	1	0
CeTRMR_e_C4_Clutch	1	1	1	0	1
CeTRMR_e_C5_Clutch	0	1	0	1	1
CeTRMR_e_C6_Clutch	0	0	1	1	1
CeTRMR_e_C7_Clutch	0	0	0	0	0

Illegal Park-Neutral Clutch Combinations - Part 4

y/x	CeTRMR_e_IllegalPN_7	CeTRMR_e_IllegalPN_8	CeTRMR_e_IllegalPN_9	CeTRMR_e_IllegalPN_10	
CeTRMR_e_C1_Clutch	0	0	0	0	
CeTRMR_e_C2_Clutch	0	1	1	1	

Initial Supporting table - Illegal Park-Neutral Clutch Combinations

CeTRMR_e_C3_Clutch	1	0	1	1	
CeTRMR_e_C4_Clutch	1	1	0	1	
CeTRMR_e_C5_Clutch	1	1	1	0	
CeTRMR_e_C6_Clutch	1	1	1	1	
CeTRMR_e_C7_Clutch	0	0	0	0	

Initial Supporting table - Illegal Reverse Clutch Combinations

Description: All combinations of clutch commands which can lead to drive when the driver is requesting reverse (1 indicates clutch on, 0 incdicates clutch off)

Value Units: Boolean (1 for on, 0 for off)
X Unit: Illegal Clutch Combination
Y Units: Clutch

Illegal Reverse Clutch Combinations - Part 1

y/x	CeTRMR_e_IllegalRev_1A	CeTRMR e HlegalRev 1Ac	CeTRMR e HlegalRev 1Ad	CeTRMR_e_IllegalRev_1Af	CeTRMR_e_IllegalRev_1M	CeTRMR_e_IllegalRev_1Me
CeTRMR_e_C1_Clutch	1	1	1	1	1	1
CeTRMR_e_C2_Clutch	0	0	0	0	1	1
CeTRMR_e_C3_Clutch	0	1	0	0	0	1
CeTRMR_e_C4_Clutch	0	0	1	0	0	0
CeTRMR_e_C5_Clutch	1	1	1	1	1	1
CeTRMR_e_C6_Clutch	0	0	0	1	0	0
CeTRMR_e_C7_Clutch	0	0	0	0	0	0

Illegal Reverse Clutch Combinations - Part 2

y/x	CeTRMR_e_IllegalRev_1Md	CeTRMR_e_IllegalRev_1Mf	CeTRMR_e_IllegalRev_2A	CeTRMR_e_IllegalRev_2M	CeTRMR_e_IllegalRev_3	CeTRMR_e_IllegalRev_4
CeTRMR_e_C1_Clutch	1	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	1	0	1	0	0
CeTRMR_e_C3_Clutch	0	0	1	1	1	1
CeTRMR_e_C4_Clutch	1	0	1	1	1	1
CeTRMR_e_C5_Clutch	1	1	0	0	1	0
CeTRMR_e_C6_Clutch	0	1	0	0	0	1
CeTRMR_e_C7_Clutch	0	0	0	0	0	0

Illegal Reverse Clutch Combinations - Part 3

y/x	CeTRMR_e_IllegalRev_5	CeTRMR_e_IllegalRev_6	CeTRMR_e_IllegalRev_7	CeTRMR_e_IllegalRev_8	CeTRMR_e_IllegalRev_9	CeTRMR e HlegalRev 10
CeTRMR_e_C1_Clutch	1	1	0	0	0	0
CeTRMR_e_C2_Clutch	0	0	0	1	1	1
CeTRMR_e_C3_Clutch	1	0	1	0	1	1
CeTRMR_e_C4_Clutch	0	1	1	1	0	1
CeTRMR_e_C5_Clutch	1	1	1	1	1	0
CeTRMR_e_C6_Clutch	1	1	1	1	1	1
CeTRMR_e_C7_Clutch	0	0	0	0	0	0

Initial Supporting table - Incorrect Direction Range Change Delay Time

Description: Time delay after PRNDL change before incorrect direction monitor will be enabled

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	1	1	1	1	1

Initial Supporting table - Incorrect Drive Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded drive condition

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Incorrect Neutral Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded neutral condition

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Incorrect Park Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded park condition

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Incorrect Reverse Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded reverse condition

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

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_Directionllnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_Directionllnknown	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_Directionllnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_Directionllnknown	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_Directionllnknown	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_Directionllnknown	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 - 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	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

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 - 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	CeTNSR_e_InternalSpdSnsr1	CeTNSR_e_InternalSpdSnsr2	CeTNSR_e_InternalSpdSnsr3
1	350	225	10

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	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

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 - Ratio Monitor Clutch States

Description: Array of valid combinations of clutch held/off which constitues a valid gear (1 = clutch held, 0 = clutch off)

Value Units: Clutch Held Boolean
X Unit: Gear
Y Units: Clutch

Ratio Monitor Clutch States - Part 1

y/x	CeTRMR_e_GRX_GearR	CeTRMR_e_GRX_Gear1A	CeTRMR_e_GRX_Gear1Ac	CeTRMR_e_GRX_Gear1Ad	CeTRMR_e_GRX_Gear1Af
CeTSER_e_C1_Clutch	1	1	1	1	1
CeTSER_e_C2_Clutch	1	0	0	0	0
CeTSER_e_C3_Clutch	0	0	1	0	0
CeTSER_e_C4_Clutch	1	0	0	1	0
CeTSER_e_C5_Clutch	0	1	1	1	1
CeTSER_e_C6_Clutch	1	0	0	0	1

Ratio Monitor Clutch States - Part 2

y/x	CeTRMR_e_GRX_Gear1M	CeTRMR_e_GRX_Gear1Me	CeTRMR_e_GRX_Gear1Md	CeTRMR_e_GRX_Gear1Mf	CeTRMR_e_GRX_Gear2A
CeTSER_e_C1_Clutch	1	1	1	1	1
CeTSER_e_C2_Clutch	1	1	1	1	0
CeTSER_e_C3_Clutch	0	1	0	0	1
CeTSER_e_C4_Clutch	0	0	1	0	1
CeTSER_e_C5_Clutch	1	1	1	1	0
CeTSER_e_C6_Clutch	0	0	0	1	0

Ratio Monitor Clutch States - Part 3

y/x	CeTRMR_e_GRX_Gear2M	CeTRMR_e_GRX_Gear3	CeTRMR_e_GRX_Gear4	CeTRMR_e_GRX_Gear5	CeTRMR_e_GRX_Gear6
CeTSER_e_C1_Clutch	1	1	1	1	1
CeTSER_e_C2_Clutch	1	0	0	0	0
CeTSER_e_C3_Clutch	1	1	1	1	0
CeTSER_e_C4_Clutch	1	1	1	0	1
CeTSER_e_C5_Clutch	0	1	0	1	1
CeTSER_e_C6_Clutch	0	0	1	1	1

Ratio Monitor Clutch States - Part 4

y/x	CeTRMR_e_GRX_Gear7	CeTRMR_e_GRX_Gear8	CeTRMR_e_GRX_Gear9	CeTRMR_e_GRX_Gear10	
CeTSER_e_C1_Clutch	0	0	0	0	
CeTSER_e_C2_Clutch	0	1	1	1	
CeTSER_e_C3_Clutch	1	0	1	1	
CeTSER_e_C4_Clutch	1	1	0	1	
CeTSER_e_C5_Clutch	1	1	1	0	

Initial Supporting table - Ratio Monitor Clutch States

CeTSER_e_C6_Clutch	1	h	h	h	l

Initial Supporting table - Ratio Monitor Fail Increment Rate (Percent per Loop)

Description: Ratio Monitor Fail Increment Rate

Value Units: Percent Increment Per Loop
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Ratio Monitor Slip Threshold

Description: Threshold slip value below which the clutch is considered holding

Value Units: clutch slip (RPM)
X Unit: Clutch

y/x	CeTRMR_e_ClchSlipC1	CeTRMR_e_ClchSlipC2	CeTRMR_e_ClchSlipC5	CeTRMR_e_ClchSlipC3C4	CeTRMR_e_ClchSlipC3C6	CeTRMR_e_ClchSlipC4C6
1	30	30	30	25	25	25

Initial Supporting table - Shift Monitor Lowest Allowed Gear

Description: Y axis shows lowest allowed gear for the current vehicle speed and transfer case range

Value Units: Vehicle Speed (kph)
X Unit: Transfer Case Range
Y Units: Lowest Allowed Gear

y/x	CeTCLR_e_4WD_Hi	CeTCLR_e_4WD_Lo
CeTGRR_e_Gear1	54	20
CeTGRR_e_Gear2	86	32
CeTGRR_e_Gear3	119	44
CeTGRR_e_Gear4	143	53
CeTGRR_e_Gear5	166	61
CeTGRR_e_Gear6	195	72
CeTGRR_e_Gear7	246	91
CeTGRR_e_Gear8	289	107
CeTGRR_e_Gear9	358	133
CeTGRR_e_Gear10	390	144

Initial Supporting table - speed sensor directional rationality enable calibration

Description: speed sensor directional rationality enable calibration

Value Units: Boolean
X Unit: scheduled gear
Y Units: unitless

y/x	CeCGSR_FwdCmded	CeCGSR_NeutCmded	CeCGSR_RvrsCmded	CeCGSR_ParkCmded
1	1	1	0	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	1,500.0	1,200.0	600.0	60.0

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	1.500	1.000	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 when C1 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C
Y Units: C1 clutch

y/x	-40.0	-20.0	0.0	30.0	110.0
1.0	-0.2500	-0.2500	-0.2500	-0.2500	-0.2500

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 when C2 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C
Y Units: C2 clutch

y/x	-40.0	-20.0	0.0	30.0	110.0
1	-0.2500	-0.2500	-0.2500	-0.2500	-0.2500

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 when C3 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C
Y Units: C3 clutch

y/x	-40.0	-20.0	0.0	30.0	110.0
1	-0.2500	-0.2500	-0.2500	-0.2500	-0.2500

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 when C4 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C
Y Units: C4 clutch

y/x	-40.0	-20.0	0.0	30.0	110.0
1	-0.2500	-0.2500	-0.2500	-0.2500	-0.2500

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 when C5 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C
Y Units: C5 clutch

y/x	-40.0	-20.0	0.0	30.0	110.0
1	-0.2500	-0.2500	-0.2500	-0.2500	-0.2500

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 when C6 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C
Y Units: C6 clutch

y/x	-40.0	-20.0	0.0	30.0	110.0
1	-0.2500	-0.2500	-0.2500	-0.2500	-0.2500

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	400	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 Connectivity C1 On Threshold

Description: Pressure command above which C1 will be considered commanded on

Value Units: kPa
X Unit: transmission fluid temperature °C
Y Units: C1 clutch

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C2 On Threshold

Description: Pressure command above which C2 will be considered commanded on

Value Units: kPa
X Unit: transmission fluid temperature °C
Y Units: C2 clutch

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C3 On Threshold

Description: Pressure command above which C3 will be considered commanded on

Value Units: kPa
X Unit: transmission fluid temperature °C
Y Units: C3 clutch

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C4 On Threshold

Description: Pressure command above which C4 will be considered commanded on

Value Units: kPa
X Unit: transmission fluid temperature °C
Y Units: C4 clutch

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C5 On Threshold

Description: Pressure command above which C5 will be considered commanded on

Value Units: kPa
X Unit: transmission fluid temperature °C
Y Units: C5 clutch

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C6 On Threshold

Description: Pressure command above which C6 will be considered commanded on

Value Units: kPa
X Unit: transmission fluid temperature °C
Y Units: C6 clutch

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C7 On Threshold

Description: Pressure command above which C7 will be considered commanded on

Value Units: kPa
X Unit: transmission fluid temperature °C
Y Units: C7 clutch

y/x	-40	-20	0	20	120
1	300	300	300	300	300

Initial Supporting table - Clutch Connectivity Wrong Direction FP

Description: Fault pending time for cluch connectivity detecting wrong direction

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	1	1	1	1	1

Initial Supporting table - Clutch PCS Pressure Gain

Description: Gain value to convert clutch pressure command to regulator valve command

Value Units: Gain (unitless)
X Unit: 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	1	1	1	1	1	1

Initial Supporting table - Clutch PCS Pressure Offset

Description: Offset value to convert clutch pressure command to regulator valve command

Value Units: offset (kPa)
X Unit: 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	0	0	0	0	0	0

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

XUnit: 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 - Cmnd Tie Up Monitor Multi-Clutch Thresh

Description: Maximum pressure command allowed for each combination of clutches which can lead to a multi-clutch tie up

Value Units: Pressure (kPa)
X Unit: Commanded Gear
Y Units: Clutch

Cmnd Tie Up Monitor Multi-Clutch Thresh - 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
CeTRMR_e_C1_Clutch	272	272	4,096	272	272	285	272
CeTRMR_e_C2_Clutch	261	261	261	4,096	261	261	273
CeTRMR_e_C3_Clutch	96	96	96	96	4,096	96	175
CeTRMR_e_C4_Clutch	471	471	471	471	471	4,096	471
CeTRMR_e_C5_Clutch	119	119	119	119	568	119	4,096
CeTRMR_e_C6_Clutch	207	207	207	207	207	213	207
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - 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
CeTRMR_e_C1_Clutch	272	4,096	4,096	4,096	4,096	4,096	272
CeTRMR_e_C2_Clutch	261	4,096	4,096	261	261	273	4,096
CeTRMR_e_C3_Clutch	96	4,096	96	4,096	96	175	4,096
CeTRMR_e_C4_Clutch	1,476	4,096	471	1,476	4,096	471	471
CeTRMR_e_C5_Clutch	119	4,096	119	568	119	4,096	568
CeTRMR_e_C6_Clutch	4,096	4,096	207	213	213	207	207
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 3

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
CeTRMR_e_C1_Clutch	285	272	272	296	272	272	285
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	261	273	261	273
CeTRMR_e_C3_Clutch	96	1,716	96	4,096	4,096	4,096	175
CeTRMR_e_C4_Clutch	4,096	471	1,955	4,096	471	1,476	4,096
CeTRMR_e_C5_Clutch	119	4,096	119	568	4,096	1,164	4,096
CeTRMR_e_C6_Clutch	213	207	4,096	213	207	4,096	321
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - 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
CeTRMR_e_C1_Clutch	285	272	272	4,096	272	272	285
CeTRMR_e_C2_Clutch	261	261	261	261	4,096	261	261
CeTRMR_e_C3_Clutch	96	96	96	96	96	4,096	96
CeTRMR_e_C4_Clutch	4,096	471	471	471	471	471	4,096
CeTRMR_e_C5_Clutch	119	119	119	119	119	568	119
CeTRMR_e_C6_Clutch	4,096	207	207	207	207	207	213
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - 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
CeTRMR_e_C1_Clutch	272	272	4,096	4,096	272	285	272
CeTRMR_e_C2_Clutch	273	261	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	175	96	4,096	96	4,096	96	1,716

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

CeTRMR_e_C4_Clutch	471	1,476	4,096	471	471	4,096	471
CeTRMR_e_C5_Clutch	4,096	119	4,096	119	568	119	4,096
CeTRMR_e_C6_Clutch	207	4,096	4,096	207	207	213	207
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - 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
CeTRMR_e_C1_Clutch	272	296	272	272	285	285	272
CeTRMR_e_C2_Clutch	4,096	261	273	261	273	261	261
CeTRMR_e_C3_Clutch	96	4,096	4,096	4,096	175	96	96
CeTRMR_e_C4_Clutch	1,955	4,096	471	1,476	4,096	4,096	471
CeTRMR_e_C5_Clutch	119	568	4,096	1,164	4,096	119	119
CeTRMR_e_C6_Clutch	4,096	213	207	4,096	321	4,096	207
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - 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
CeTRMR_e_C1_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	4,096	4,096	273	261
CeTRMR_e_C3_Clutch	96	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	471	471	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutch	119	4,096	4,096	568	568	4,096	1,164
CeTRMR_e_C6_Clutch	4,096	207	207	213	213	321	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 8

y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	
CeTRMR_e_C1_Clutch	4,096	4,096	451	285	272	296	
CeTRMR_e_C2_Clutch	299	276	747	4,096	4,096	4,096	
CeTRMR_e_C3_Clutch	4,096	175	4,096	1,716	4,096	4,096	
CeTRMR_e_C4_Clutch	1,476	4,096	4,096	4,096	1,955	4,096	
CeTRMR_e_C5_Clutch	4,096	4,096	4,096	4,096	4,096	1,965	
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

Description: Maximum pressure command allowed for each combination of clutches which can lead to a multi-clutch tie up when transfer case is in 4WD low range

Value Units: Pressure (kPa)
X Unit: Commanded Gear
Y Units: Clutch

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - 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
CeTRMR_e_C1_Clutch	101	101	4,096	101	101	106	101
CeTRMR_e_C2_Clutch	97	97	97	4,096	97	97	101
CeTRMR_e_C3_Clutch	35	35	35	35	4,096	35	65
CeTRMR_e_C4_Clutch	175	175	175	175	175	4,096	175
CeTRMR_e_C5_Clutch	44	44	44	44	210	44	4,096
CeTRMR_e_C6_Clutch	77	77	77	77	77	79	77
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - 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
CeTRMR_e_C1_Clutch	101	4,096	4,096	4,096	4,096	4,096	101
CeTRMR_e_C2_Clutch	97	4,096	4,096	97	97	101	4,096
CeTRMR_e_C3_Clutch	35	4,096	35	4,096	35	65	4,096
CeTRMR_e_C4_Clutch	547	4,096	175	547	4,096	175	175
CeTRMR_e_C5_Clutch	44	4,096	44	210	44	4,096	210
CeTRMR_e_C6_Clutch	4,096	4,096	77	79	79	77	77
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 3

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
CeTRMR_e_C1_Clutch	106	101	101	110	101	101	106
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	97	101	97	101
CeTRMR_e_C3_Clutch	35	636	35	4,096	4,096	4,096	65
CeTRMR_e_C4_Clutch	4,096	175	724	4,096	175	547	4,096
CeTRMR_e_C5_Clutch	44	4,096	44	210	4,096	431	4,096
CeTRMR_e_C6_Clutch	79	77	4,096	79	77	4,096	119
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - 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
CeTRMR_e_C1_Clutch	106	101	101	4,096	101	101	106
CeTRMR_e_C2_Clutch	97	97	97	97	4,096	97	97
CeTRMR_e_C3_Clutch	35	35	35	35	35	4,096	35
CeTRMR_e_C4_Clutch	4,096	175	175	175	175	175	4,096
CeTRMR_e_C5_Clutch	44	44	44	44	44	210	44
CeTRMR_e_C6_Clutch	4,096	77	77	77	77	77	79
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - 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
CeTRMR_e_C1_Clutch	101	101	4,096	4,096	101	106	101
CeTRMR_e_C2_Clutch	101	97	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	65	35	4,096	35	4,096	35	636

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

CeTRMR_e_C4_Clutch	175	547	4,096	175	175	4,096	175
CeTRMR_e_C5_Clutch	4,096	44	4,096	44	210	44	4,096
CeTRMR_e_C6_Clutch	77	4,096	4,096	77	77	79	77
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - 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
CeTRMR_e_C1_Clutch	101	110	101	101	106	106	101
CeTRMR_e_C2_Clutch	4,096	97	101	97	101	97	97
CeTRMR_e_C3_Clutch	35	4,096	4,096	4,096	65	35	35
CeTRMR_e_C4_Clutch	724	4,096	175	547	4,096	4,096	175
CeTRMR_e_C5_Clutch	44	210	4,096	431	4,096	44	44
CeTRMR_e_C6_Clutch	4,096	79	77	4,096	119	4,096	77
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - 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
CeTRMR_e_C1_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	4,096	4,096	101	97
CeTRMR_e_C3_Clutch	35	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	175	175	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutch	44	4,096	4,096	210	210	4,096	431
CeTRMR_e_C6_Clutch	4,096	77	77	79	79	119	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 8

y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	
CeTRMR_e_C1_Clutch	4,096	4,096	167	106	101	110	
CeTRMR_e_C2_Clutch	111	102	277	4,096	4,096	4,096	
CeTRMR_e_C3_Clutch	4,096	65	4,096	636	4,096	4,096	
CeTRMR_e_C4_Clutch	547	4,096	4,096	4,096	724	4,096	
CeTRMR_e_C5_Clutch	4,096	4,096	4,096	4,096	4,096	728	
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	

Initial Supporting table - Cmnd Tie Up Monitor Output Lock Thresh

Description: Maximum pressure command allowed for each invalid combination of clutches which can lead to an output tie-up

Value Units: Pressure (kPa)
X Unit: Possible Output Tie-up Combination (unitless)
Y Units: Clutch

y/x	CeTCLR_e_TUM_OutLockl	CeTCLR_e_TUM_OutLock2	CeTCLR_e_TUM_OutLock3	CeTCLR_e_TUM_OutLock4	CeTCLR_e_TUM_OutLock5	CeTCLR_e_TUM_OutLock6	CeTCLR_e_TUM_OutLock7
CeTRMR_e_C1_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C2_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C3_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C4_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C5_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C6_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C7_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096

Initial Supporting table - Illegal Drive Clutch Combinations

Description: All combinations of clutch commands which can lead to reverse when the driver is requesting drive (1 indicates clutch on, 0 incdicates clutch off)

Value Units: Boolean (1 for on, 0 for off)
X Unit: Illegal Clutch Combination
Y Units: Clutch

y/x	CeTRMR_e_IllegalDrv_Rev1	CeTRMR_e_IllegalDrv_Rev2
CeTRMR_e_C1_Clutch	1	1
CeTRMR_e_C2_Clutch	1	1
CeTRMR_e_C3_Clutch	0	0
CeTRMR_e_C4_Clutch	1	1
CeTRMR_e_C5_Clutch	0	0
CeTRMR_e_C6_Clutch	1	1
CeTRMR_e_C7_Clutch	0	0

Initial Supporting table - Illegal Park-Neutral Clutch Combinations

Description: All combinations of clutch commands which can lead to drive or reverse when the driver is requesting park or neutral (1 indicates clutch on, 0 incdicates clutch off)

Value Units: Boolean (1 for on, 0 for off)
X Unit: Illegal Clutch Combination
Y Units: Clutch

Illegal Park-Neutral Clutch Combinations - Part 1

y/x	CeTRMR_e_IllegalPN_Rev	CeTRMR_e_IllegalPN_1A	CeTRMR_e_IllegalPN_1Ac	CeTRMR_e_IllegalPN_1Ad	CeTRMR_e_IllegalPN_1Af
CeTRMR_e_C1_Clutch	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	0	0	0	0
CeTRMR_e_C3_Clutch	0	0	1	0	0
CeTRMR_e_C4_Clutch	1	0	0	1	0
CeTRMR_e_C5_Clutch	0	1	1	1	1
CeTRMR_e_C6_Clutch	1	0	0	0	1
CeTRMR_e_C7_Clutch	0	0	0	0	0

Illegal Park-Neutral Clutch Combinations - Part 2

y/x	CeTRMR_e_IllegalPN_1M	CeTRMR_e_IllegalPN_1Me	CeTRMR_e_IllegalPN_1Md	CeTRMR_e_IllegalPN_1Mf	CeTRMR_e_IllegalPN_2A
CeTRMR_e_C1_Clutch	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	1	1	1	0
CeTRMR_e_C3_Clutch	0	1	0	0	1
CeTRMR_e_C4_Clutch	0	0	1	0	1
CeTRMR_e_C5_Clutch	1	1	1	1	0
CeTRMR_e_C6_Clutch	0	0	0	1	0
CeTRMR_e_C7_Clutch	0	0	0	0	0

Illegal Park-Neutral Clutch Combinations - Part 3

y/x	CeTRMR_e_IllegalPN_2M	CeTRMR_e_IllegalPN_3	CeTRMR_e_IllegalPN_4	CeTRMR_e_IllegalPN_5	CeTRMR_e_IllegalPN_6
CeTRMR_e_C1_Clutch	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	0	0	0	0
CeTRMR_e_C3_Clutch	1	1	1	1	0
CeTRMR_e_C4_Clutch	1	1	1	0	1
CeTRMR_e_C5_Clutch	0	1	0	1	1
CeTRMR_e_C6_Clutch	0	0	1	1	1
CeTRMR_e_C7_Clutch	0	0	0	0	0

Illegal Park-Neutral Clutch Combinations - Part 4

y/x	CeTRMR_e_IllegalPN_7	CeTRMR_e_IllegalPN_8	CeTRMR_e_IllegalPN_9	CeTRMR_e_IllegalPN_10	
CeTRMR_e_C1_Clutch	0	0	0	0	
CeTRMR_e_C2_Clutch	0	1	1	1	

Initial Supporting table - Illegal Park-Neutral Clutch Combinations

CeTRMR_e_C3_Clutch	1	0	1	1	
CeTRMR_e_C4_Clutch	1	1	0	1	
CeTRMR_e_C5_Clutch	1	1	1	0	
CeTRMR_e_C6_Clutch	1	1	1	1	
CeTRMR_e_C7_Clutch	0	0	0	0	

Initial Supporting table - Illegal Reverse Clutch Combinations

Description: All combinations of clutch commands which can lead to drive when the driver is requesting reverse (1 indicates clutch on, 0 incdicates clutch off)

Value Units: Boolean (1 for on, 0 for off)
X Unit: Illegal Clutch Combination
Y Units: Clutch

Illegal Reverse Clutch Combinations - Part 1

y/x	CeTRMR_e_IllegalRev_1A	CeTRMR e HlegalRev 1Ac	CeTRMR e HlegalRev 1Ad	CeTRMR_e_IllegalRev_1Af	CeTRMR_e_IllegalRev_1M	CeTRMR_e_IllegalRev_1Me
CeTRMR_e_C1_Clutch	1	1	1	1	1	1
CeTRMR_e_C2_Clutch	0	0	0	0	1	1
CeTRMR_e_C3_Clutch	0	1	0	0	0	1
CeTRMR_e_C4_Clutch	0	0	1	0	0	0
CeTRMR_e_C5_Clutch	1	1	1	1	1	1
CeTRMR_e_C6_Clutch	0	0	0	1	0	0
CeTRMR_e_C7_Clutch	0	0	0	0	0	0

Illegal Reverse Clutch Combinations - Part 2

y/x	CeTRMR_e_IllegalRev_1Md	CeTRMR_e_IllegalRev_1Mf	CeTRMR_e_IllegalRev_2A	CeTRMR_e_IllegalRev_2M	CeTRMR_e_IllegalRev_3	CeTRMR_e_IllegalRev_4
CeTRMR_e_C1_Clutch	1	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	1	0	1	0	0
CeTRMR_e_C3_Clutch	0	0	1	1	1	1
CeTRMR_e_C4_Clutch	1	0	1	1	1	1
CeTRMR_e_C5_Clutch	1	1	0	0	1	0
CeTRMR_e_C6_Clutch	0	1	0	0	0	1
CeTRMR_e_C7_Clutch	0	0	0	0	0	0

Illegal Reverse Clutch Combinations - Part 3

y/x	CeTRMR_e_IllegalRev_5	CeTRMR_e_IllegalRev_6	CeTRMR_e_IllegalRev_7	CeTRMR_e_IllegalRev_8	CeTRMR_e_IllegalRev_9	CeTRMR e HlegalRev 10
CeTRMR_e_C1_Clutch	1	1	0	0	0	0
CeTRMR_e_C2_Clutch	0	0	0	1	1	1
CeTRMR_e_C3_Clutch	1	0	1	0	1	1
CeTRMR_e_C4_Clutch	0	1	1	1	0	1
CeTRMR_e_C5_Clutch	1	1	1	1	1	0
CeTRMR_e_C6_Clutch	1	1	1	1	1	1
CeTRMR_e_C7_Clutch	0	0	0	0	0	0

Initial Supporting table - Incorrect Direction Range Change Delay Time

Description: Time delay after PRNDL change before incorrect direction monitor will be enabled

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	1	1	1	1	1

Initial Supporting table - Incorrect Drive Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded drive condition

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Incorrect Neutral Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded neutral condition

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Incorrect Park Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded park condition

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Incorrect Reverse Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded reverse condition

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - P0606 PFM Sequence Fail f(Loop Time)

Description: Fail threshold for PFM per operating loop.

Value Units: Fail threshold for PFM (count)
X Unit: Operating Loop (enum)

P0606 PFM Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msFlow	CePISR_e_3p125msFlow	CePISR_e_5msFlow	CePISR_e_6p25msFlow
1	8	8	8	8

P0606 PFM Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_1OmsFlow	CePISR_e_12p5msFlow	CePISR_e_20msFlow	CePISR_e_25msFlow
1	8	8	8	8

P0606 PFM Sequence Fail f(Loop Time) - Part 3

y/x	CePISR_e_40msFlow	CePISR_e_5OmsFlow	CePISR_e_80msFlow	CePI8R_e_1OOmsFlow
1	4	4	2	2

P0606 PFM Sequence Fail f(Loop Time) - Part 4

y/x	CePISR_e_250msFlow			
1	2			

Initial Supporting table - P0606 PFM Sequence Sample f(Loop Time)

Description: Sample threshold for PFM per operating loop.

Value Units: Sample threshold for PFM (count)
X Unit: Operating Loop (enum)

P0606 PFM Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msFlow	CePISR_e_3p125msFlow	CePISR_e_5msFlow	CePISR_e_6p25msFlow
1	10	10	10	10

P0606 PFM Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_1OmsFlow	CePISR_e_12p5msFlow	CePISR_e_20msFlow	CePISR_e_25msFlow
1	10	10	10	10

P0606 PFM Sequence Sample f(Loop Time) - Part 3

y/x	CePISR_e_40msFlow	CePISR_e_5OmsFlow	CePISR_e_80msFlow	CePISR_e_1OOmsFlow
1	5	5	3	3

P0606 PFM Sequence Sample f(Loop Time) - Part 4

y/x	CePISR_e_250msFlow			
1	3			

Initial Supporting table - P0606 PFM Enable f(Loop Time)

Description: PFM Enable

Value Units: PFM enable flag (boolean)
X Unit: Operating Loop Time Sequence (enum)

P0606 PFM.Enable f(Loop Time) - Part 1

y/x	CePISR_e_2p5msFlow	CePISR_e_3p125msFlow	CePISR_e_5msFlow	CePISR_e_6p25msFlow
1	0	1	0	1

P0606 PFM.Enable f(Loop Time) - Part 2

y/x	CePISR_e_1OmsFlow	CePISR_e_12p5msFlow	CePISR_e_20msFlow	CePISR_e_25msFlow
1	0	1	0	1

P0606 PFM.Enable f(Loop Time) - Part 3

y/x	CePISR_e_40msFlow	CePISR_e_50msFlow	CePISR_e_80msFlow	CePISR_e_1OOmsFlow
1	0	1	0	1

P0606 PFM.Enable f(Loop Time) - Part 4

y/x	CePISR_e_250msFlow			
1	1			

Initial Supporting table - Ratio Monitor Clutch States

Description: Array of valid combinations of clutch held/off which constitues a valid gear (1 = clutch held, 0 = clutch off)

Value Units: Clutch Held Boolean
X Unit: Gear
Y Units: Clutch

Ratio Monitor Clutch States - Part 1

y/x	CeTRMR_e_GRX_GearR	CeTRMR_e_GRX_Gear1A	CeTRMR_e_GRX_Gear1Ac	CeTRMR_e_GRX_Gear1Ad	CeTRMR_e_GRX_Gear1Af
CeTSER_e_C1_Clutch	1	1	1	1	1
CeTSER_e_C2_Clutch	1	0	0	0	0
CeTSER_e_C3_Clutch	0	0	1	0	0
CeTSER_e_C4_Clutch	1	0	0	1	0
CeTSER_e_C5_Clutch	0	1	1	1	1
CeTSER_e_C6_Clutch	1	0	0	0	1

Ratio Monitor Clutch States - Part 2

y/x	CeTRMR_e_GRX_Gear1M	CeTRMR_e_GRX_Gear1Me	CeTRMR_e_GRX_Gear1Md	CeTRMR_e_GRX_Gear1Mf	CeTRMR_e_GRX_Gear2A
CeTSER_e_C1_Clutch	1	1	1	1	1
CeTSER_e_C2_Clutch	1	1	1	1	0
CeTSER_e_C3_Clutch	0	1	0	0	1
CeTSER_e_C4_Clutch	0	0	1	0	1
CeTSER_e_C5_Clutch	1	1	1	1	0
CeTSER_e_C6_Clutch	0	0	0	1	0

Ratio Monitor Clutch States - Part 3

y/x	CeTRMR_e_GRX_Gear2M	CeTRMR_e_GRX_Gear3	CeTRMR_e_GRX_Gear4	CeTRMR_e_GRX_Gear5	CeTRMR_e_GRX_Gear6
CeTSER_e_C1_Clutch	1	1	1	1	1
CeTSER_e_C2_Clutch	1	0	0	0	0
CeTSER_e_C3_Clutch	1	1	1	1	0
CeTSER_e_C4_Clutch	1	1	1	0	1
CeTSER_e_C5_Clutch	0	1	0	1	1
CeTSER_e_C6_Clutch	0	0	1	1	1

Ratio Monitor Clutch States - Part 4

y/x	CeTRMR_e_GRX_Gear7	CeTRMR_e_GRX_Gear8	CeTRMR_e_GRX_Gear9	CeTRMR_e_GRX_Gear10	
CeTSER_e_C1_Clutch	0	0	0	0	
CeTSER_e_C2_Clutch	0	1	1	1	
CeTSER_e_C3_Clutch	1	0	1	1	
CeTSER_e_C4_Clutch	1	1	0	1	
CeTSER_e_C5_Clutch	1	1	1	0	

Initial Supporting table - Ratio Monitor Clutch States

CeTSER_e_C6_Clutch	1	h	h	h	l

Initial Supporting table - Ratio Monitor Fail Increment Rate (Percent per Loop)

Description: Ratio Monitor Fail Increment Rate

Value Units: Percent Increment Per Loop
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Ratio Monitor Slip Threshold

Description: Threshold slip value below which the clutch is considered holding

Value Units: clutch slip (RPM)
X Unit: Clutch

y/x	CeTRMR_e_ClchSlipC1	CeTRMR_e_ClchSlipC2	CeTRMR_e_ClchSlipC5	CeTRMR_e_ClchSlipC3C4	CeTRMR_e_ClchSlipC3C6	CeTRMR_e_ClchSlipC4C6
1	30	30	30	25	25	25

Initial Supporting table - Shift Monitor Lowest Allowed Gear

Description: Y axis shows lowest allowed gear for the current vehicle speed and transfer case range

Value Units: Vehicle Speed (kph)
X Unit: Transfer Case Range
Y Units: Lowest Allowed Gear

y/x	CeTCLR_e_4WD_Hi	CeTCLR_e_4WD_Lo
CeTGRR_e_Gear1	54	20
CeTGRR_e_Gear2	86	32
CeTGRR_e_Gear3	119	44
CeTGRR_e_Gear4	143	53
CeTGRR_e_Gear5	166	61
CeTGRR_e_Gear6	195	72
CeTGRR_e_Gear7	246	91
CeTGRR_e_Gear8	289	107
CeTGRR_e_Gear9	358	133
CeTGRR_e_Gear10	390	144

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	1.500	1.000	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 when C1 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C
Y Units: C1 clutch

y/x	-40.0	-20.0	0.0	30.0	110.0
1.0	-0.2500	-0.2500	-0.2500	-0.2500	-0.2500

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 when C2 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C
Y Units: C2 clutch

y/x	-40.0	-20.0	0.0	30.0	110.0
1	-0.2500	-0.2500	-0.2500	-0.2500	-0.2500

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 when C3 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C
Y Units: C3 clutch

y/x	-40.0	-20.0	0.0	30.0	110.0
1	-0.2500	-0.2500	-0.2500	-0.2500	-0.2500

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 when C4 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C
Y Units: C4 clutch

y/x	-40.0	-20.0	0.0	30.0	110.0
1	-0.2500	-0.2500	-0.2500	-0.2500	-0.2500

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 when C5 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C
Y Units: C5 clutch

y/x	-40.0	-20.0	0.0	30.0	110.0
1	-0.2500	-0.2500	-0.2500	-0.2500	-0.2500

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 when C6 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C
Y Units: C6 clutch

y/x	-40.0	-20.0	0.0	30.0	110.0
1	-0.2500	-0.2500	-0.2500	-0.2500	-0.2500

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	400	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

XUnit: 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
XUnit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

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	0.300	0.300	0.300	0.150	0.150

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 - 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	300.0	200.0	150.0	150.0	150.0	200.0	1,000.0	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	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

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 - 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	CeTNSR_e_InternalSpdSnsr1	CeTNSR_e_InternalSpdSnsr2	CeTNSR_e_InternalSpdSnsr3
1	350	225	10

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	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

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 - 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	100.0	100.0	150.0	200.0	250.0	250.0	250.0

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
XUnit: °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
XUnit: °C

y/x	-10	5	15	30	110
1	-32,768	-32,768	-3,500	-2,000	-2,000

Initial Supporting table - speed sensor directional rationality enable calibration

Description: speed sensor directional rationality enable calibration

Value Units: Boolean
X Unit: scheduled gear
Y Units: unitless

y/x	CeCGSR_FwdCmded	CeCGSR_NeutCmded	CeCGSR_RvrsCmded	CeCGSR_ParkCmded
1	1	1	0	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	1,500.0	1,200.0	600.0	60.0

Initial Supporting table - Clutch Connectivity C1 On Threshold

Description: Pressure command above which C1 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C2 On Threshold

Description: Pressure command above which C2 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C3 On Threshold

Description: Pressure command above which C3 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C4 On Threshold

Description: Pressure command above which C4 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C5 On Threshold

Description: Pressure command above which C5 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C6 On Threshold

Description: Pressure command above which C6 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C7 On Threshold

Description: Pressure command above which SOWC will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	300	300	300	300	300

Initial Supporting table - Clutch Connectivity Wrong Direction FP

Description: Fault pending time for cluch connectivity detecting wrong direction

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	1	1	1	1	1

Initial Supporting table - Clutch PCS Pressure Gain

Description: Gain value to convert clutch pressure command to regulator valve command

Value Units: Gain (unitless)
X Unit: 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	1	1	1	1	1	1

Initial Supporting table - Clutch PCS Pressure Offset

Description: Offset value to convert clutch pressure command to regulator valve command

Value Units: offset (kPa)
X Unit: 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	0	0	0	0	0	0

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

Description: Maximum pressure command allowed for each combination of clutches which can lead to a multi-clutch tie up

Value Units: Pressure (kPa)
X Unit: Commanded Gear
Y Units: Clutch

Cmnd Tie Up Monitor Multi-Clutch Thresh - 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
CeTRMR_e_C1_Clutch	272	272	4,096	272	272	285	272
CeTRMR_e_C2_Clutch	261	261	261	4,096	261	261	273
CeTRMR_e_C3_Clutch	96	96	96	96	4,096	96	175
CeTRMR_e_C4_Clutch	471	471	471	471	471	4,096	471
CeTRMR_e_C5_Clutch	119	119	119	119	568	119	4,096
CeTRMR_e_C6_Clutch	207	207	207	207	207	213	207
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - 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
CeTRMR_e_C1_Clutch	272	4,096	4,096	4,096	4,096	4,096	272
CeTRMR_e_C2_Clutch	261	4,096	4,096	261	261	273	4,096
CeTRMR_e_C3_Clutch	96	4,096	96	4,096	96	175	4,096
CeTRMR_e_C4_Clutch	1,476	4,096	471	1,476	4,096	471	471
CeTRMR_e_C5_Clutch	119	4,096	119	568	119	4,096	568
CeTRMR_e_C6_Clutch	4,096	4,096	207	213	213	207	207
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 3

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
CeTRMR_e_C1_Clutch	285	272	272	296	272	272	285
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	261	273	261	273
CeTRMR_e_C3_Clutch	96	1,716	96	4,096	4,096	4,096	175
CeTRMR_e_C4_Clutch	4,096	471	1,955	4,096	471	1,476	4,096
CeTRMR_e_C5_Clutch	119	4,096	119	568	4,096	1,164	4,096
CeTRMR_e_C6_Clutch	213	207	4,096	213	207	4,096	321
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - 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
CeTRMR_e_C1_Clutch	285	272	272	4,096	272	272	285
CeTRMR_e_C2_Clutch	261	261	261	261	4,096	261	261
CeTRMR_e_C3_Clutch	96	96	96	96	96	4,096	96
CeTRMR_e_C4_Clutch	4,096	471	471	471	471	471	4,096
CeTRMR_e_C5_Clutch	119	119	119	119	119	568	119
CeTRMR_e_C6_Clutch	4,096	207	207	207	207	207	213
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - 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
CeTRMR_e_C1_Clutch	272	272	4,096	4,096	272	285	272
CeTRMR_e_C2_Clutch	273	261	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	175	96	4,096	96	4,096	96	1,716

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

CeTRMR_e_C4_Clutc h	471	1,476	4,096	471	471	4,096	471
CeTRMR_e_C5_Clute h	4,096	119	4,096	119	568	119	4,096
CeTRMR_e_C6_Clute h	207	4,096	4,096	207	207	213	207
CeTRMR_e_C7_Clute h	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 6

y/x	CeCGSR_e_Park_wN C2C6	CeCGSR_e_Park_wN C3C4	CeCGSR_e_Park_wN C3C5	CeCGSR_e_Park_wN C3C6	CeCGSR_e_Park_wN C4C5	CeCGSR_e_Park_wN C4C6	CeCGSR_e_Park_wN C1C2C3C6
CeTRMR_e_C1_Clutc h	272	296	272	272	285	285	272
CeTRMR_e_C2_Clutc h	4,096	261	273	261	273	261	261
CeTRMR_e_C3_Clutc h	96	4,096	4,096	4,096	175	96	96
CeTRMR_e_C4_Clutc h	1,955	4,096	471	1,476	4,096	4,096	471
CeTRMR_e_C5_Clutc h	119	568	4,096	1,164	4,096	119	119
CeTRMR_e_C6_Clutc h	4,096	213	207	4,096	321	4,096	207
CeTRMR_e_C7_Clutc h	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 7

y/x	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW	CeCGSR_e_SecondL ckd	CeCGSR_e_SecondF W	CeCGSR_e_Third	CeCGSR_e_Fourth
CeTRMR_e_C1_Clutc h	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C2_Clutc h	4,096	4,096	4,096	4,096	4,096	273	261
CeTRMR_e_C3_Clutc h	96	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutc h	4,096	471	471	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutc h	119	4,096	4,096	568	568	4,096	1,164
CeTRMR_e_C6_Clutc h	4,096	207	207	213	213	321	4,096
CeTRMR_e_C7_Clutc h	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 8

y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	
CeTRMR_e_C1_Clutch	4,096	4,096	451	285	272	296	
CeTRMR_e_C2_Clutch	299	276	747	4,096	4,096	4,096	
CeTRMR_e_C3_Clutch	4,096	175	4,096	1,716	4,096	4,096	
CeTRMR_e_C4_Clutch	1,476	4,096	4,096	4,096	1,955	4,096	
CeTRMR_e_C5_Clutch	4,096	4,096	4,096	4,096	4,096	1,965	
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

Description: Maximum pressure command allowed for each combination of clutches which can lead to a multi-clutch tie up when transfer case is in 4WD low range

Value Units: Pressure (kPa)
X Unit: Commanded Gear
Y Units: Clutch

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - 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
CeTRMR_e_C1_Clutch	101	101	4,096	101	101	106	101
CeTRMR_e_C2_Clutch	97	97	97	4,096	97	97	101
CeTRMR_e_C3_Clutch	35	35	35	35	4,096	35	65
CeTRMR_e_C4_Clutch	175	175	175	175	175	4,096	175
CeTRMR_e_C5_Clutch	44	44	44	44	210	44	4,096
CeTRMR_e_C6_Clutch	77	77	77	77	77	79	77
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - 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
CeTRMR_e_C1_Clutch	101	4,096	4,096	4,096	4,096	4,096	101
CeTRMR_e_C2_Clutch	97	4,096	4,096	97	97	101	4,096
CeTRMR_e_C3_Clutch	35	4,096	35	4,096	35	65	4,096
CeTRMR_e_C4_Clutch	547	4,096	175	547	4,096	175	175
CeTRMR_e_C5_Clutch	44	4,096	44	210	44	4,096	210
CeTRMR_e_C6_Clutch	4,096	4,096	77	79	79	77	77
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 3

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
CeTRMR_e_C1_Clutch	106	101	101	110	101	101	106
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	97	101	97	101
CeTRMR_e_C3_Clutch	35	636	35	4,096	4,096	4,096	65
CeTRMR_e_C4_Clutch	4,096	175	724	4,096	175	547	4,096
CeTRMR_e_C5_Clutch	44	4,096	44	210	4,096	431	4,096
CeTRMR_e_C6_Clutch	79	77	4,096	79	77	4,096	119
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - 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
CeTRMR_e_C1_Clutch	106	101	101	4,096	101	101	106
CeTRMR_e_C2_Clutch	97	97	97	97	4,096	97	97
CeTRMR_e_C3_Clutch	35	35	35	35	35	4,096	35
CeTRMR_e_C4_Clutch	4,096	175	175	175	175	175	4,096
CeTRMR_e_C5_Clutch	44	44	44	44	44	210	44
CeTRMR_e_C6_Clutch	4,096	77	77	77	77	77	79
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - 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
CeTRMR_e_C1_Clutch	101	101	4,096	4,096	101	106	101
CeTRMR_e_C2_Clutch	101	97	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	65	35	4,096	35	4,096	35	636

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

CeTRMR_e_C4_Clutch	175	547	4,096	175	175	4,096	175
CeTRMR_e_C5_Clutch	4,096	44	4,096	44	210	44	4,096
CeTRMR_e_C6_Clutch	77	4,096	4,096	77	77	79	77
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - 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
CeTRMR_e_C1_Clutch	101	110	101	101	106	106	101
CeTRMR_e_C2_Clutch	4,096	97	101	97	101	97	97
CeTRMR_e_C3_Clutch	35	4,096	4,096	4,096	65	35	35
CeTRMR_e_C4_Clutch	724	4,096	175	547	4,096	4,096	175
CeTRMR_e_C5_Clutch	44	210	4,096	431	4,096	44	44
CeTRMR_e_C6_Clutch	4,096	79	77	4,096	119	4,096	77
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - 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
CeTRMR_e_C1_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	4,096	4,096	101	97
CeTRMR_e_C3_Clutch	35	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	175	175	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutch	44	4,096	4,096	210	210	4,096	431
CeTRMR_e_C6_Clutch	4,096	77	77	79	79	119	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 8

y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	
CeTRMR_e_C1_Clutch	4,096	4,096	167	106	101	110	
CeTRMR_e_C2_Clutch	111	102	277	4,096	4,096	4,096	
CeTRMR_e_C3_Clutch	4,096	65	4,096	636	4,096	4,096	
CeTRMR_e_C4_Clutch	547	4,096	4,096	4,096	724	4,096	
CeTRMR_e_C5_Clutch	4,096	4,096	4,096	4,096	4,096	728	
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	

Initial Supporting table - Cmnd Tie Up Monitor Output Lock Thresh

Description: Maximum pressure command allowed for each invalid combination of clutches which can lead to an output tie-up

Value Units: Pressure (kPa)
X Unit: Possible Output Tie-up Combination (unitless)
Y Units: Clutch

y/x	CeTCLR_e_TUM_OutLockl	CeTCLR_e_TUM_OutLock2	CeTCLR_e_TUM_OutLock3	CeTCLR_e_TUM_OutLock4	CeTCLR_e_TUM_OutLock5	CeTCLR_e_TUM_OutLock6	CeTCLR_e_TUM_OutLock7
CeTRMR_e_C1_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C2_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C3_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C4_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C5_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C6_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C7_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096

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
XUnit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

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	0.300	0.300	0.300	0.150	0.150

Initial Supporting table - Illegal Drive Clutch Combinations

Description: All combinations of clutch commands which can lead to reverse when the driver is requesting drive (1 indicates clutch on, 0 incdicates clutch off)

Value Units: Boolean (1 for on, 0 for off)
X Unit: Illegal Clutch Combination
Y Units: Clutch

y/x	CeTRMR_e_IllegalDrv_Rev1	CeTRMR_e_IllegalDrv_Rev2
CeTRMR_e_C1_Clutch	1	1
CeTRMR_e_C2_Clutch	1	1
CeTRMR_e_C3_Clutch	0	0
CeTRMR_e_C4_Clutch	1	1
CeTRMR_e_C5_Clutch	0	0
CeTRMR_e_C6_Clutch	1	1
CeTRMR_e_C7_Clutch	0	0

Initial Supporting table - Illegal Park-Neutral Clutch Combinations

Description: All combinations of clutch commands which can lead to drive or reverse when the driver is requesting park or neutral (1 indicates clutch on, 0 incdicates clutch off)

Value Units: Boolean (1 for on, 0 for off)
X Unit: Illegal Clutch Combination
Y Units: Clutch

Illegal Park-Neutral Clutch Combinations - Part 1

y/x	CeTRMR_e_IllegalPN_Rev	CeTRMR_e_IllegalPN_1A	CeTRMR_e_IllegalPN_1Ac	CeTRMR_e_IllegalPN_1Ad	CeTRMR_e_IllegalPN_1Af
CeTRMR_e_C1_Clutch	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	0	0	0	0
CeTRMR_e_C3_Clutch	0	0	1	0	0
CeTRMR_e_C4_Clutch	1	0	0	1	0
CeTRMR_e_C5_Clutch	0	1	1	1	1
CeTRMR_e_C6_Clutch	1	0	0	0	1
CeTRMR_e_C7_Clutch	0	0	0	0	0

Illegal Park-Neutral Clutch Combinations - Part 2

y/x	CeTRMR_e_IllegalPN_1M	CeTRMR_e_IllegalPN_1Me	CeTRMR_e_IllegalPN_1Md	CeTRMR_e_IllegalPN_1Mf	CeTRMR_e_IllegalPN_2A
CeTRMR_e_C1_Clutch	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	1	1	1	0
CeTRMR_e_C3_Clutch	0	1	0	0	1
CeTRMR_e_C4_Clutch	0	0	1	0	1
CeTRMR_e_C5_Clutch	1	1	1	1	0
CeTRMR_e_C6_Clutch	0	0	0	1	0
CeTRMR_e_C7_Clutch	0	0	0	0	0

Illegal Park-Neutral Clutch Combinations - Part 3

y/x	CeTRMR_e_IllegalPN_2M	CeTRMR_e_IllegalPN_3	CeTRMR_e_IllegalPN_4	CeTRMR_e_IllegalPN_5	CeTRMR_e_IllegalPN_6
CeTRMR_e_C1_Clutch	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	0	0	0	0
CeTRMR_e_C3_Clutch	1	1	1	1	0
CeTRMR_e_C4_Clutch	1	1	1	0	1
CeTRMR_e_C5_Clutch	0	1	0	1	1
CeTRMR_e_C6_Clutch	0	0	1	1	1
CeTRMR_e_C7_Clutch	0	0	0	0	0

Illegal Park-Neutral Clutch Combinations - Part 4

y/x	CeTRMR_e_IllegalPN_7	CeTRMR_e_IllegalPN_8	CeTRMR_e_IllegalPN_9	CeTRMR_e_IllegalPN_10	
CeTRMR_e_C1_Clutch	0	0	0	0	
CeTRMR_e_C2_Clutch	0	1	1	1	

Initial Supporting table - Illegal Park-Neutral Clutch Combinations

CeTRMR_e_C3_Clutch	1	0	1	1	
CeTRMR_e_C4_Clutch	1	1	0	1	
CeTRMR_e_C5_Clutch	1	1	1	0	
CeTRMR_e_C6_Clutch	1	1	1	1	
CeTRMR_e_C7_Clutch	0	0	0	0	

Initial Supporting table - Illegal Reverse Clutch Combinations

Description: All combinations of clutch commands which can lead to drive when the driver is requesting reverse (1 indicates clutch on, 0 incdicates clutch off)

Value Units: Boolean (1 for on, 0 for off)
X Unit: Illegal Clutch Combination
Y Units: Clutch

Illegal Reverse Clutch Combinations - Part 1

y/x	CeTRMR_e_IllegalRev_1A	CeTRMR_e_IllegalRev_1Ac	CeTRMR_e_IllegalRev_1Ad	CeTRMR_e_IllegalRev_1Af	CeTRMR_e_IllegalRev_1M	CeTRMR_e_IllegalRev_1Me
CeTRMR_e_C1_Clutch	1	1	1	1	1	1
CeTRMR_e_C2_Clutch	0	0	0	0	1	1
CeTRMR_e_C3_Clutch	0	1	0	0	0	1
CeTRMR_e_C4_Clutch	0	0	1	0	0	0
CeTRMR_e_C5_Clutch	1	1	1	1	1	1
CeTRMR_e_C6_Clutch	0	0	0	1	0	0
CeTRMR_e_C7_Clutch	0	0	0	0	0	0

Illegal Reverse Clutch Combinations - Part 2

y/x	CeTRMR_e_IllegalRev_1Md	CeTRMR_e_IllegalRev_1Mf	CeTRMR_e_IllegalRev_2A	CeTRMR_e_IllegalRev_2M	CeTRMR_e_IllegalRev_3	CeTRMR_e_IllegalRev_4
CeTRMR_e_C1_Clutch	1	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	1	0	1	0	0
CeTRMR_e_C3_Clutch	0	0	1	1	1	1
CeTRMR_e_C4_Clutch	1	0	1	1	1	1
CeTRMR_e_C5_Clutch	1	1	0	0	1	0
CeTRMR_e_C6_Clutch	0	1	0	0	0	1
CeTRMR_e_C7_Clutch	0	0	0	0	0	0

Illegal Reverse Clutch Combinations - Part 3

y/x	CeTRMR_e_IllegalRev_5	CeTRMR_e_IllegalRev_6	CeTRMR_e_IllegalRev_7	CeTRMR_e_IllegalRev_8	CeTRMR_e_IllegalRev_9	CeTRMR_e_IllegalRev_10
CeTRMR_e_C1_Clutch	1	1	0	0	0	0
CeTRMR_e_C2_Clutch	0	0	0	1	1	1
CeTRMR_e_C3_Clutch	1	0	1	0	1	1
CeTRMR_e_C4_Clutch	0	1	1	1	0	1
CeTRMR_e_C5_Clutch	1	1	1	1	1	0
CeTRMR_e_C6_Clutch	1	1	1	1	1	1
CeTRMR_e_C7_Clutch	0	0	0	0	0	0

Initial Supporting table - Incorrect Direction Range Change Delay Time

Description: Time delay after PRNDL change before incorrect direction monitor will be enabled

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	1	1	1	1	1

Initial Supporting table - Incorrect Drive Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded drive condition

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Incorrect Neutral Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded neutral condition

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Incorrect Park Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded park condition

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Incorrect Reverse Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded reverse condition

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

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_Directionllnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_Directionllnknown	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_Directionllnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_Directionllnknown	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_Directionllnknown	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_Directionllnknown	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 - P0723 (MY21) transmission engaged state time threshold

Description: time necessary after transmission engaged state indicates transmsision engaged to allow P0723 enable

Value Units: seconds
seconds

y/x	-40	0	40
1	5	3	1

Initial Supporting table - P0723 Wheel Speed Calc

Description:

y/x	400	500	600	700	800
1	300	375	450	525	600

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	300.0	200.0	150.0	150.0	150.0	200.0	1,000.0	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	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

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 - 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	CeTNSR_e_InternalSpdSnsr1	CeTNSR_e_InternalSpdSnsr2	CeTNSR_e_InternalSpdSnsr3
1	350	225	10

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	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

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 - 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	100.0	100.0	150.0	200.0	250.0	250.0	250.0

Initial Supporting table - P2818 GR10 Oncoming Clutch Capacity Offset

Description: Primary Oncoming Clutch Capacity Offset from return spring pressure

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	150	50	50	50	50	150

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
XUnit: °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
XUnit: °C

y/x	-10	5	15	30	110
1	-32,768	-32,768	-3,500	-2,000	-2,000

Initial Supporting table - Ratio Monitor Clutch States

Description: Array of valid combinations of clutch held/off which constitues a valid gear (1 = clutch held, 0 = clutch off)

Value Units: Clutch Held Boolean
X Unit: Gear
Y Units: Clutch

Ratio Monitor Clutch States - Part 1

y/x	CeTRMR_e_GRX_GearR	CeTRMR_e_GRX_Gear1A	CeTRMR_e_GRX_Gear1Ac	CeTRMR_e_GRX_Gear1Ad	CeTRMR_e_GRX_Gear1Af
CeTSER_e_C1_Clutch	1	1	1	1	1
CeTSER_e_C2_Clutch	1	0	0	0	0
CeTSER_e_C3_Clutch	0	0	1	0	0
CeTSER_e_C4_Clutch	1	0	0	1	0
CeTSER_e_C5_Clutch	0	1	1	1	1
CeTSER_e_C6_Clutch	1	0	0	0	1

Ratio Monitor Clutch States - Part 2

y/x	CeTRMR_e_GRX_Gear1M	CeTRMR_e_GRX_Gear1Me	CeTRMR_e_GRX_Gear1Md	CeTRMR_e_GRX_Gear1Mf	CeTRMR_e_GRX_Gear2A
CeTSER_e_C1_Clutch	1	1	1	1	1
CeTSER_e_C2_Clutch	1	1	1	1	0
CeTSER_e_C3_Clutch	0	1	0	0	1
CeTSER_e_C4_Clutch	0	0	1	0	1
CeTSER_e_C5_Clutch	1	1	1	1	0
CeTSER_e_C6_Clutch	0	0	0	1	0

Ratio Monitor Clutch States - Part 3

y/x	CeTRMR_e_GRX_Gear2M	CeTRMR_e_GRX_Gear3	CeTRMR_e_GRX_Gear4	CeTRMR_e_GRX_Gear5	CeTRMR_e_GRX_Gear6
CeTSER_e_C1_Clutch	1	1	1	1	1
CeTSER_e_C2_Clutch	1	0	0	0	0
CeTSER_e_C3_Clutch	1	1	1	1	0
CeTSER_e_C4_Clutch	1	1	1	0	1
CeTSER_e_C5_Clutch	0	1	0	1	1
CeTSER_e_C6_Clutch	0	0	1	1	1

Ratio Monitor Clutch States - Part 4

y/x	CeTRMR_e_GRX_Gear7	CeTRMR_e_GRX_Gear8	CeTRMR_e_GRX_Gear9	CeTRMR_e_GRX_Gear10	
CeTSER_e_C1_Clutch	0	0	0	0	
CeTSER_e_C2_Clutch	0	1	1	1	
CeTSER_e_C3_Clutch	1	0	1	1	
CeTSER_e_C4_Clutch	1	1	0	1	
CeTSER_e_C5_Clutch	1	1	1	0	

Initial Supporting table - Ratio Monitor Clutch States

CeTSER_e_C6_Clutch	1	h	h	h	l

Initial Supporting table - Ratio Monitor Fail Increment Rate (Percent per Loop)

Description: Ratio Monitor Fail Increment Rate

Value Units: Percent Increment Per Loop
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Ratio Monitor Slip Threshold

Description: Threshold slip value below which the clutch is considered holding

Value Units: clutch slip (RPM)
X Unit: Clutch

y/x	CeTRMR_e_ClchSlipC1	CeTRMR_e_ClchSlipC2	CeTRMR_e_ClchSlipC5	CeTRMR_e_ClchSlipC3C4	CeTRMR_e_ClchSlipC3C6	CeTRMR_e_ClchSlipC4C6
1	30	30	30	25	25	25

Initial Supporting table - Shift Monitor Lowest Allowed Gear

Description: Y axis shows lowest allowed gear for the current vehicle speed and transfer case range

Value Units: Vehicle Speed (kph)
X Unit: Transfer Case Range
Y Units: Lowest Allowed Gear

y/x	CeTCLR_e_4WD_Hi	CeTCLR_e_4WD_Lo
CeTGRR_e_Gear1	54	20
CeTGRR_e_Gear2	86	32
CeTGRR_e_Gear3	119	44
CeTGRR_e_Gear4	143	53
CeTGRR_e_Gear5	166	61
CeTGRR_e_Gear6	195	72
CeTGRR_e_Gear7	246	91
CeTGRR_e_Gear8	289	107
CeTGRR_e_Gear9	358	133
CeTGRR_e_Gear10	390	144

Initial Supporting table - speed sensor directional rationality enable calibration

Description: speed sensor directional rationality enable calibration

Value Units: Boolean
X Unit: scheduled gear
Y Units: unitless

y/x	CeCGSR_FwdCmded	CeCGSR_NeutCmded	CeCGSR_RvrsCmded	CeCGSR_ParkCmded
1	1	1	0	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	1,500.0	1,200.0	600.0	60.0

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
XUnit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

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	0.300	0.300	0.300	0.150	0.150

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_Directionllnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_Directionllnknown	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_Directionllnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_Directionllnknown	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_Directionllnknown	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_Directionllnknown	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 - 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	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

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 - 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	CeTNSR_e_InternalSpdSnsr1	CeTNSR_e_InternalSpdSnsr2	CeTNSR_e_InternalSpdSnsr3
1	350	225	10

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	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

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 - 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	100.0	100.0	150.0	200.0	250.0	250.0	250.0

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	1,500.0	1,200.0	600.0	60.0

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
XUnit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

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	0.300	0.300	0.300	0.150	0.150

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_Directionllnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_Directionllnknown	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_Directionllnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_Directionllnknown	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_Directionllnknown	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_Directionllnknown	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 - 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	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

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 - 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	CeTNSR_e_InternalSpdSnsr1	CeTNSR_e_InternalSpdSnsr2	CeTNSR_e_InternalSpdSnsr3
1	350	225	10

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	0.5392	0.4173	0.4173
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	2.9508	1.7194	1.7194	1.3596	1.0000	0.8156	0.6313	0.6313

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 - 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	100.0	100.0	150.0	200.0	250.0	250.0	250.0

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	1,500.0	1,200.0	600.0	60.0

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
XUnit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

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	300.0	200.0	150.0	150.0	150.0	200.0	1,000.0	16,383.8

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	100.0	100.0	150.0	200.0	250.0	250.0	250.0

Initial Supporting table - P2818 GR10 Oncoming Clutch Capacity Offset

Description: Primary Oncoming Clutch Capacity Offset from return spring pressure

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	150	50	50	50	50	150

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 - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
XUnit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

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	300.0	200.0	150.0	150.0	150.0	200.0	1,000.0	16,383.8

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	100.0	100.0	150.0	200.0	250.0	250.0	250.0

Initial Supporting table - P2818 GR10 Oncoming Clutch Capacity Offset

Description: Primary Oncoming Clutch Capacity Offset from return spring pressure

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	150	50	50	50	50	150

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