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:		80 seconds (4 fails out of 5 samples at 16 seconds per sample)	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 Performance Diagnostic Enable is **TRUE**	= TRUE		
					IBS Current Performance Continuous Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B00		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		
					Battery Current Rationality Historical Diagnostic Enable is **FALSE**	= FALSE		
			IBS has open shunt condition: Battery Current Rationality Diagnostic Determination equals Diagnostic Failed	= CeEM_e_IBS_DiagFail	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.
			(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 up to 24 temperature samples at a rate of 1 set of sample per 30min 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:		8 seconds out of a 10 seconds window	
					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 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		

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 of crank. 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 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 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 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 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 inputthat 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 inputthat is too high (out-of-range high).	Analog Mode Switch high voltage threshold	> 4.7220 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 inputthat 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 1.0270 < sensed voltage < 1.1030 1.5220 < sensed voltage < 1.5980 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	
			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 100ms: 3/4 counts	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							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: 822 ms 10ms: 822 ms 25ms: 822 ms 50ms: 822 ms 100ms: 1,000 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:		40 seconds out of a 50 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		
					Temperature Erratic 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 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				
			IBSCurrOORAndRatIFOM ARC:	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	> 11.00 volts (with hysteresis disable < 10.00)	0.25 seconds (200 fails out of 250 samples at 0.001 second loop rate)	Type B, 2 Trips
					IBS NormalCommEnable is **TRUE**	= TRUE		
					Battery Voltage Out of Range High Diagnostic Enable is **TRUE**	= TRUE		
					Battery Voltage 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		
					Battery Voltage Out of Range High Historical Diagnostic Enable is **FALSE**	= FALSE		
			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: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** IBS Current Out of Range High Diagnostic Enable is **TRUE** IBS Current 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 Shunt 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 Current above 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 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 up to 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 up to 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:		All of the following conditions are met:		5 seconds out of a 6 seconds window	Type B, 2 Trips
			IBS Config Return Battery Type is NOT equal to Vehicle Battery Type Configuration	NOT equal to Vehicle Battery Type Configuration CeEPM_ADV_BATT_ TECH_AGM	System 12V Battery Voltage is above 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 Continuous Enable is **TRUE**	= TRUE		
			IBS Config Return Battery Cal #2 U80% is above threshold	>0.50	Battery Monitor Module Data Incompatible Determination Historical Diagnostic Enable is **FALSE**	= FALSE		
			IfSOC Bounding Limit Configuration check is **TRUE** then following conditions are included	= TRUE	No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
			SOC Bounding Limit Hr3 Difference is above the threshold	>0.01	No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		
			SOC Bounding Limit Hr8 Difference is above the threshold	>0.01				
			SOC Bounding Limit Hr24 Difference is above threshold	>0.01				
			Any of the following criteria are met		All of the following conditions are met:		1 second	
			IBS Config Return		System 12V Battery Voltage is above			

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 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 Hr8 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_AGM >5.00 >0.50 >0.50 = TRUE >0.01 >0.01 >0.01	threshold IBS NormalCommEnable is TRUE IBS Configuration Diagnostic Historical 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		

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 Communicati on With TCM	U0101	This DTC monitors for a loss of communication with the Transmission Control Module.	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 10 ms loop	Type B, 2 Trips
			Message $02E	>10,031.25 milliseconds	Time since power-up reset, running reset, recovery from under/over voltage condition	>=5,000 milliseconds		
			Message $031	>10,031.25 milliseconds	All below criteria have been met for	>=3,000 milliseconds		
			Message $452	>12,500.00 milliseconds	If message is on Bus A: U0073 not active			
					If message is on Bus B: LI0074 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	>11.00 Volts		
					Controller is an OBD controller Or 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.
					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		General Enable Criteria:		Diagnostic runs in 10 ms loop	Type B, 2 Trips
			Message $425	> 12,500.00 milliseconds	Time since power-up reset, running reset, recovery from under/over voltage condition	>=5,000 milliseconds		
			Message $427	> 12,500.00 milliseconds	All below criteria have been met for	>=3,000 milliseconds		
			Message $20D	> 10,625.00 milliseconds	If message is on Bus A: U0073 not active			
			Message $209	> 10,250.00 milliseconds	If message is on Bus B: LI0074 not active			
			Message $561	> 12,500.00 milliseconds	If message is on Bus S: U0076 not active			
			Message $562	> 12,500.00 milliseconds	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	>11.00 Volts		
					Controller is an OBD controller Or 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.
					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_P DU IBSAmpHrDisChrg_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		
			DRCDNDP-ARC:	8 fail counts out of 10 sample counts	Battery Voltage	>11.00 Volts		
			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: BVSCRP-ARC: BVSCRP_MAC: VSANDP-ARC: VSANDP_MAC:	18 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 8 fail counts out of 10 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: TEGP_ARC: TEGP-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.
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:		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		
			BSPMP_ARC:	15 fail counts out of 16 sample counts	Partial Network is active			
			BSPMP_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.
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 $015 Message $017 Message $415 Message $417 Message $4B5 Message $028 Message $210	>10,625.00 milliseconds >10,625.00 milliseconds >12,500.00 milliseconds >10,025.00 milliseconds >10,025.00 milliseconds >10,025.00 milliseconds >10,250.00 milliseconds >12,500.00 milliseconds >12,500.00 milliseconds >10,025.00 milliseconds >10,625.00 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 Message $011 Message $01C Message $01D Message $213 Message $21D Message $227 Message $229 Message $22A Message $41D Message $499 Message $4BB Message $4BC Message $4C1	 >10,031.25 milliseconds >10,031.25 milliseconds >10,031.25 milliseconds >10,250.00 milliseconds >10,250.00 milliseconds >10,625.00 milliseconds >10,250.00 milliseconds >10,625.00 milliseconds >12,500.00 milliseconds >12,500.00 milliseconds >12,500.00 milliseconds >12,500.00 milliseconds >11,250.00 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 A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Message $087 Message $41F Message $214 Message $4BD Message $254 Message $222 Message $546	>10,062.50 milliseconds >12,500.00 milliseconds >10,625.00 milliseconds >12,500.00 milliseconds >10,625.00 milliseconds >10,250.00 milliseconds >12,500.00 milliseconds	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.

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.
Bus-Off detected on Communication CAN Bus1	U1002	This fault is set if Communication CAN Bus1 enters the Bus-Off state	Bus Off Event on CAN Bus1 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	U2413	This fault is set if Communication CAN	Bus Off Event on CAN Bus2	= TRUE	Vehicle Supply Voltage	>= k_Battery Voltage Low Threshold (7V)	100[msec] for	Type B
Bus-Off detected on Communication CAN Bus3	U1004	This fault is set if Communication CAN Bus3 enters the Bus-Off state	Bus Off Event on CAN Bus3 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 Bus5	U1006	This fault is set if Communication CAN Bus5 enters the Bus-Off state	Bus Off Event on CAN Bus5 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
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

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 HVAC_FP_R Detected	U220A	This monitoring shall check a supervised message from the HVAC_FP_R 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 SIB Detected	U220D	This monitoring shall check a supervised message from the SIB 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_InvalidData_cal Vehicle Supply Voltage AND Any participating Partial Network FOR	= True >= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Invalid Data Received from BCM Power Mode Time	0.75 [sec] min 1.5 [sec] max	Type B 2 Trips
Central Gateway Module Key Table Not Provisioned	U1982	Upon start up, if the key table has not been provisioned, this fault is set. If the table is, or becomes, provisioned, it is cleared.	Key table is provisioned	= False	k_OBD_APP_KeyNotPovisioned_cal Vehicle Supply Voltage AND Any participating Partial Network FOR	= True >= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Key Table Not Provisioned Diagnostic Time	150 [msec] min 5.0 [sec] max (startup)	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	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 List NVM Corruption	U197C	ECUIdentification List NVM 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's or 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	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.
WSSSHORTFRONTLEFT	C0503	This monitor checks if: • HS Shorted to Battery • LS Shorted to Battery • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX HS OC = TRUE when High side current > 40mA	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 Battery • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX HS OC = TRUE when High side current > 40mA	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_REAR_LEFT	C050F	This monitor checks if: • HS Shorted to Battery • LS Shorted to Battery • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX HS OC = TRUE when High side current > 40mA	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_REAR_RIGHT	C0515	This monitor checks if: • HS Shorted to Battery • LS Shorted to Battery • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX HS OC = TRUE when High side current > 40mA	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.
WSS_LS_SHORT_TO_GND_FRONT_RIGHT	C0508	This monitor checks if: • LS Shorted to Battery • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Wheel speed sensor supply is enabled • Tested only during power up or after clear DTC.	100 ms	Type A. MIL Illumination.

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_REAR_LEFT	C050E	This monitor checks if: • LS Shorted to Battery • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Wheel speed sensor supply is enabled • Tested only during power up or after clear DTC.	100 ms	Type A. MIL Illumination.
WSS_LS_SHORT_TO_GND_REAR_RIGHT	C0514	This monitor checks if: • LS Shorted to Battery • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Wheel speed sensor supply is enabled • Tested only during power up or after clear DTC.	100 ms	Type A. MIL Illumination.
WSS_MISSING_FRONT_LEFT	C0505	This monitor checks if: • Wheel speed sensor not mounted correctly. • Wheel speed sensor to tone-ring gap out of tolerance. • Demagnetized tone-ring.	Missing Wheel Speed Sensor If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs. The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undroven wheel speed is greater than 6km/h, the fault detection time is faster. The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during TC, ABS or MOCO then the detection is run and the detection time is increased. The failsafe will not run in case • exactly one axle is moving (other axle is standstill) while the moving axle shows an average velocity of less than 10km/h (to prevent setting Missing Wss faults on a roller bench). • the dynamic failsafe is currently disabled because the system is currently in Diagnostic mode. Counter type: Counter up and the fault counter reset If all sensors show a speed greater than 6 km/h or the vehicle is in standstill (all sensors lower than 1.5 km/h) 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 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.
WSS_MISSING_REAR_LEFT	C0511	This monitor checks if: • Wheel speed sensor not mounted correctly. • Wheel speed sensor to tone-ring gap out of tolerance. • Demagnetized tone-ring.	Missing Wheel Speed Sensor If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs. The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undroven wheel speed is greater than 6km/h, the fault detection time is faster. The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during TC, ABS or MOCO then the detection is run and the detection time is increased. The failsafe will not run in case • exactly one axle is moving (other axle is standstill) while the moving axle shows an average velocity of less than 10km/h (to prevent setting Missing Wss faults on a roller bench). • the dynamic failsafe is currently disabled because the system is currently in Diagnostic mode. Counter type: Counter up and the fault counter reset If all sensors show a speed greater than 6 km/h or the vehicle is in standstill (all sensors lower than 1.5 km/h) Fault maturation time for one Wss missing: a. TC active: 60 sec b. ABS or MOCO not active: 3 sec. c. ABS or MOCO active: 15 sec 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.

<table>
<tr><th>Component/ System</th><th>Fault Code</th><th>Monitoring Strategy Description</th><th>Fault Detection Criteria</th><th>Threshold Value</th><th>Secondary Parameter and Enable Condition</th><th>Maturation Time</th><th>MIL Illumination</th></tr>
<tr><td>WSS_MISSING_REAR_RIGHT</td><td>C0517</td><td>This monitor checks if:
• Wheel speed sensor not mounted correctly.
• Wheel speed sensor to tone-ring gap out of tolerance.
• Demagnetized tone-ring.</td><td>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</td><td>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.</td><td>• 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</td><td>3-120s depending on number of missing wss and situation</td><td>Type B. MIL Illumination.</td></tr>
<tr><td>WSSERRATICFRONTLEFT</td><td>C0504</td><td>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).</td><td>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</td><td>|Wheel_Accel| > 491 m/s^2</td><td>• reference_vehicle_velocity > 3.58 m/s

• Diagnostic Mode Inactive
• Emissions Rolls Test Inactive</td><td>Goal: 40000
Continuous failure Time: 200ms</td><td>Type A. MIL Illumination.</td></tr>
<tr><td>WSS_ERRATIC_FRONT_RIGHT</td><td>C050A</td><td>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).</td><td>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</td><td>|Wheel_Accel| > 491 m/s^2</td><td>• reference_vehicle_velocity > 3.58 m/s

• Diagnostic Mode Inactive
• Emissions Rolls Test Inactive</td><td>Goal: 40000
Continuous failure Time: 200ms</td><td>Type A. MIL Illumination.</td></tr>
<tr><td>WSS_ERRATIC_REAR_LEFT</td><td>C0510</td><td>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).</td><td>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</td><td>|Wheel_Accel| > 491 m/s^2</td><td>• reference_vehicle_velocity > 3.58 m/s

• Diagnostic Mode Inactive
• Emissions Rolls Test Inactive</td><td>Goal: 40000
Continuous failure Time: 200ms</td><td>Type A. MIL Illumination.</td></tr>
</table>

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.
WSS_DROPOUT_FRONT_LEFT	C0505	This monitor checks if: • Defective wheel speed sensor. • Wheel speed sensor not mounted correctly. • Defective wheel speed sensor wiring harness. • Missing tooth or teeth on the wheel speed sensor tone-ring.	• Wheel Speed Sensor Dropout • When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. • Once the timer decays to zero (or is already zero), the wheel speed sensor dropout monitor checks if any wheel speed sensor edges have been detected. If wheel speed sensor edges have been detected then we check if the wheel velocity is greater than 0.2236 m/s. If it is then we can pass this failsafe. If not we reset the fault monitor because we can not monitor this fault condition at this time. • If no wheel speed sensor edges have been detected for more than 150ms while the last valid wheel velocity (which was calculated based on real speed edges) was greater than 30km/h a WSS Dropout fault will be detected. Furthermore the filtered vehicle velocity must be greater than 3.58m/s to detect the fault. • Counter: Count 1-up • Monitor Rate: 7ms	When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. If no wheel speed sensor edges have been detected then we see which axle the wheel is on because there can be different wheel speed thresholds. We also check if the brake pedal is applied. Wheels can decelerate much faster when the brake pedal is applied than when it is not applied so the brake pedal is used to determine the speed threshold at which the sensor dropout monitor can be executed. If the brake pedal is applied, a higher wheel speed threshold is used than when the brake pedal is not applied. If the brake pedal is applied the wheel speed sensor velocity threshold is 9 m/s for wheels on the front axle and 9 m/s for wheels on the back axle. If the brake pedal is not applied then the wheel speed sensor velocity threshold is 5.38 m/s for wheels on the front axle and 5.38 m/s for wheels on the back axle. If the last valid wheel velocity is greater than the wheel speed velocity threshold set above, the difference in time from the last time we checked for this fault is greater than 40 msec, and the filtered vehicle velocity is above 3.58 m/s then a wheel speed sensor dropout fault is detected. If any of these conditions are not true then conditions are not correct to do dropout detection so reset the fault monitor.	• Wheel speed sensor supply is enabled. • No ohmic wheel speed sensor failure present • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	40 ms	Type B. MIL Illumination.
WSS_DROPOUT_FRONT_RIGHT	C050B	This monitor checks if: • Defective wheel speed sensor. • Wheel speed sensor not mounted correctly. • Defective wheel speed sensor wiring harness. • Missing tooth or teeth on the wheel speed sensor tone-ring.	• Wheel Speed Sensor Dropout • When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. • Once the timer decays to zero (or is already zero), the wheel speed sensor dropout monitor checks if any wheel speed sensor edges have been detected. If wheel speed sensor edges have been detected then we check if the wheel velocity is greater than 0.2236 m/s. If it is then we can pass this failsafe. If not we reset the fault monitor because we can not monitor this fault condition at this time. • If no wheel speed sensor edges have been detected for more than 150ms while the last valid wheel velocity (which was calculated based on real speed edges) was greater than 30km/h a WSS Dropout fault will be detected. Furthermore the filtered vehicle velocity must be greater than 3.58m/s to detect the fault. • Counter: Count 1-up • Monitor Rate: 7ms	When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s Willreset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. If no wheel speed sensor edges have been detected then we see which axle the wheel is on because there can be different wheel speed thresholds. We also check if the brake pedal is applied. Wheels can decelerate much faster when the brake pedal is applied than when it is not applied so the brake pedal is used to determine the speed threshold at Whichthe 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. Wheels can decelerate much faster when the brake pedal is applied than when it is not applied so the brake pedal is used to determine the speed threshold at Which the sensor dropout monitor can be executed. If the brake pedal is applied, a higher wheel speed threshold is used than when the brake pedal is not applied. If the brake pedal is applied the wheel speed sensor velocity threshold is 9 m/s for wheels on the front axle and 9 m/s for wheels on the back axle. If the brake pedal is not applied then the wheel speed sensor velocity threshold is 5.38 m/s for wheels on the front axle and 5.38 m/s for wheels on the back axle. If the last valid wheel velocity is greater than the wheel speed velocity threshold set above, the difference in time from the last time we checked for this fault is greater than 40 msec, and the filtered vehicle velocity is above 3.58 m/s then a wheel speed sensor dropout fault is detected. If any of these conditions are not true then conditions are not correct to do dropout detection so reset the fault monitor.	• Wheel speed sensor supply is enabled. • No ohmic wheel speed sensor failure present • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	40 ms	Type B. MIL Illumination.
WSS_DROPOUT_REAR_RIGHT	C0517	This monitor checks if: • Defective wheel speed sensor. • Wheel speed sensor not mounted correctly. • Defective wheel speed sensor wiring harness. • Missing tooth or teeth on the wheel speed sensor tone-ring.	• Wheel Speed Sensor Dropout • When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. • Once the timer decays to zero (or is already zero), the wheel speed sensor dropout monitor checks if any wheel speed sensor edges have been detected. If wheel speed sensor edges have been detected then we check if the wheel velocity is greater than 0.2236 m/s. If it is then we can pass this failsafe. If not we reset the fault monitor because we can not monitor this fault condition at this time. • If no wheel speed sensor edges have been detected for more than 150ms while the last valid wheel velocity (which was calculated based on real speed edges) was greater than 30km/h a WSS Dropout fault will be detected. Furthermore the filtered vehicle velocity must be greater than 3.58m/s to detect the fault. • Counter: Count 1-up • Monitor Rate: 7ms	When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. If no wheel speed sensor edges have been detected then we see which axle the wheel is on because there can be different wheel speed thresholds. We also check if the brake pedal is applied. Wheels can decelerate much faster when the brake pedal is applied than when it is not applied so the brake pedal is used to determine the speed threshold at which the sensor dropout monitor can be executed. If the brake pedal is applied, a higher wheel speed threshold is used than when the brake pedal is not applied. If the brake pedal is applied the wheel speed sensor velocity threshold is 9 m/s for wheels on the front axle and 9 m/s for wheels on the back axle. If the brake pedal is not applied then the wheel speed sensor velocity threshold is 5.38 m/s for wheels on the front axle and 5.38 m/s for wheels on the back axle. If the last valid wheel velocity is greater than the wheel speed velocity threshold set above, the difference in time from the last time we checked for this fault is greater than 40 msec, and the filtered vehicle velocity is above 3.58 m/s then a wheel speed sensor dropout fault is detected. If any of these conditions are not true then conditions are not correct to do dropout detection so reset the fault monitor.	• Wheel speed sensor supply is enabled. • No ohmic wheel speed sensor failure present • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	40 ms	Type 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.
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.

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_FRONT_LEFT	C0505	This monitor checks if: - Wheel speed sensor not mounted correctly. - Wheel speed sensor to tone-ring gap out of tolerance. - Demagnitized tone-ring	If this wheelspeed sensor reaches a speed over 3.73mph (6 km/h) while the other three show a speed of less than 0.93mph (1.5 km/h) the fault is detected.	If fault detection criteria is fulfilled then WSS_TOO_FAST_SENSOR_XX will latch if WSS_MISSING_XX or WSS_FAST_MISSING_XX or WSS_DROPOUT_XX faults are not latched.	• No electrical failure is currently present	40 msec	Type 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 this wheelspeed sensor reaches a speed over 3.73mph (6 km/h) while the other three show a speed of less than 0.93mph (1.5 km/h) the fault is detected.	If fault detection criteria is fulfilled then WSS_TOO_FAST_SENSOR_XX will latch if WSS_MISSING_XX or WSS_FAST_MISSING_XX or WSS_DROPOUT_XX faults are not latched.	• No electrical failure is currently present	40 msec	Type B. MIL Illumination.
WSS_TOO_FAST_SENSOR_REAR_LEFT	C0511	This monitor checks if: - Wheel speed sensor not mounted correctly. - Wheel speed sensor to tone-ring gap out of tolerance. - Demagnitized tone-ring	If this wheelspeed sensor reaches a speed over 3.73mph (6 km/h) while the other three show a speed of less than 0.93mph (1.5 km/h) the fault is detected.	If fault detection criteria is fulfilled then WSS_TOO_FAST_SENSOR_XX will latch if WSS_MISSING_XX or WSS_FAST_MISSING_XX or WSS_DROPOUT_XX faults are not latched.	• No electrical failure is currently present	40 msec	Type B. MIL Illumination.
WSS_TOO_FAST_SENSOR_REAR_RIGHT	C0517	This monitor checks if: - Wheel speed sensor not mounted correctly. - Wheel speed sensor to tone-ring gap out of tolerance. - Demagnitized tone-ring	If this wheelspeed sensor reaches a speed over 3.73mph (6 km/h) while the other three show a speed of less than 0.93mph (1.5 km/h) the fault is detected.	If fault detection criteria is fulfilled then WSS_TOO_FAST_SENSOR_XX will latch if WSS_MISSING_XX or WSS_FAST_MISSING_XX or WSS_DROPOUT_XX faults are not latched.	• No electrical failure is currently present	40 msec	Type 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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.
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_HSOC_FRONT_LEFT	C0503	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC sets any of these bits = TRUE	Polaris ASIC sets HS Over Current = TRUE High Side Over Current (HS current > 40mA)	• Wheel speed sensor supply is enabled. • High Side failsafe is not blocked	100 msec	Type A. MIL Illumination.
WSSHSOCFRONTRIGHT	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_HS_OC_REAR_LEFT	C050F	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC sets any of these bits = TRUE	Polaris ASIC sets any of these bits = TRUE High Side Over Current (HS current > 40mA)	• Wheel speed sensor supply is enabled. • High Side failsafe is not blocked	100 msec	Type A. MIL Illumination.
WSS_HS_OC_REAR_RIGHT	C0515	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC sets any of these bits = TRUE	Polaris ASIC sets any of these bits = TRUE High Side Over Current (HS current > 40mA)	• Wheel speed sensor supply is enabled. • High Side failsafe is not blocked	100 msec	Type A. MIL Illumination.
WSS_UNDER_VOLTAGE_FRONT_LEFT	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_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	15 msec	Type A. 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	• 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.	Set fault if time between stand still pulse if > 390 ms	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_TWO_LEVEL_DATA_READ_FAULT_LF	P0606	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the PWM Pulse Width and Standstill SPI register fields, the ASIC shall also set the Data Read SPI flag.	The MCU shall monitor each wheel's Data Read SPI flag, and verify that the bit is set after every sensor falling edge.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_DECODE_THREE_LEVEL_FAULT_RF	C0556	This monitor checks if: • wrong vehicle config file used • misbuild using wrong WSS	Look for ASIC decoding a three level sensor when a two level sensor is configured: Check for the number of VDA bits received indicates that the ASIC is decoding for a three level sensor or Check for the tp out of range bit received indicates that the ASIC is decoding for a three level sensor	While a wheelspeed channel is expected to be configured for a 2-level sensor (i.e. decode modes 1 or 2), the MCU shall monitor the tp Out of Range and VDA Bit Counter SPI bits. If these bits are not zero, the MCU shall detect that the ASIC is incorrectly decoding in mode 3.	• Polaris is initialized	15 msec	Type A. MIL Illumination.

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_RF	C0507	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the VDA Data, VDA Bit Counter, Standstill, and tp Out of Range SPI fields, the ASIC shall also set the Data Read SPI flag.	Set fault if time between stand still pulse if > 390 ms	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_TWO_LEVEL_DATA_READ_FAULT_RF	P0606	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the PWM Pulse Width and Standstill SPI register fields, the ASIC shall also set the Data Read SPI flag.	The MCU shall monitor each wheel's Data Read SPI flag, and verify that the bit is set after every sensor falling edge.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_DECODE_THREE_LEVEL_FAULT_LR	C0557	This monitor checks if: • wrong vehicle config file used • misbuild using wrong WSS	Look for ASIC decoding a three level sensor when a two level sensor is configured: Check for the number of VDA bits received indicates that the ASIC is decoding for a three level sensor or Check for the tp out of range bit received indicates that the ASIC is decoding for a three level sensor	While a wheelspeed channel is expected to be configured for a 2-level sensor (i.e. decode modes 1 or 2), the MCU shall monitor the tp Out of Range and VDA Bit Counter SPI bits. If these bits are not zero, the MCU shall detect that the ASIC is incorrectly decoding in mode 3.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_THREE_LEVEL_DATA_READ_FAULT_LR	C050D	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the VDA Data, VDA Bit Counter, Standstill, and tp Out of Range SPI fields, the ASIC shall also set the Data Read SPI flag.	Set fault if time between stand still pulse if > 390 ms	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_TWO_LEVEL_DATA_READ_FAULT_LR	P0606	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the PWM Pulse Width and Standstill SPI register fields, the ASIC shall also set the Data Read SPI flag.	The MCU shall monitor each wheel's Data Read SPI flag, and verify that the bit is set after every sensor falling edge.	• Polaris is initialized	15 msec	Type A. MIL Illumination.

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	15 msec	Type A. MIL Illumination.
ASIC_THREE_LEVEL_DATA_READ_FAULT_RR	C0513	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the VDA Data, VDA Bit Counter, Standstill, and tp Out of Range SPI fields, the ASIC shall also set the Data Read SPI flag.	Set fault if time between stand still pulse if > 390 ms	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_TWO_LEVEL_DATA_READ_FAULT_RR	P0606	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the PWM Pulse Width and Standstill SPI register fields, the ASIC shall also set the Data Read SPI flag.	The MCU shall monitor each wheel's Data Read SPI flag, and verify that the bit is set after every sensor falling edge.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
WSS_3L_INFO_MISSING_FRONT_LEFT	C0555	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long.	Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long. Furthermore it checks the number of received data bits in the transmission. If less than the minimum number of data bits (3) are received, a fault will be latched.	• Polaris is initialized. • Wheel Speed Sensor supply is enabled • No WSS electrical fault is present • SYSTEM_VOLTAGE_EXCESSIVE_LOW fault is not present	250 msec	Type A. MIL Illumination.
WSS_3L_INFO_MISSING_FRONT_RIGHT	C0556	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long.	Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long. Furthermore it checks the number of received data bits in the transmission. If less than the minimum number of data bits (3) are received, a fault will be latched.	• Polaris is initialized. • Wheel Speed Sensor supply is enabled • No WSS electrical fault is present • SYSTEM_VOLTAGE_EXCESSIVE_LOW fault is not present	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_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.
WSS_PARITY_FRONT_LEFT	C0555	This monitor checks if: VDA data bits are corrupted	Decodes the additional information of a Philips KMI22/1 wheelspeed sensor which is a 3-level VDA compliant sensor.	It's a VDA compliant Philips KMI22/1 sensor so use the following mask for the data bits: 0 airgap (1=too large) 1 mode state (1=initial mode, Oactive 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)	• 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)	• Polaris is initialized. • Wheel Speed Sensor supply is enabled	35 msec	Type A. MIL Illumination.
WSSPARITYREARLEFT	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)	• 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_REAR_RIGHT	C0558	This monitor checks if: VDA data bits are corrupted	Decodes the additional information of a Philips KMI22/1 wheelspeed sensor which is a 3-level VDA compliant sensor.	It's a VDA compliant Philips KMI22/1 sensor so use the following mask for the data bits: 0 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_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	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	15 msec -375ms	Type A. MIL Illumination.
WSS_VDA_TP_OUT_OF_RANGE_REAR_LEFT	C050D	This monitor checks if: • standstill pulse width out of range • Defective system ASIC	• The ASIC shall measure the width of each speed pulse or speed replacement pulse (tp). If tp is less than tp minimum threshold or greater than tp maximum threshold, the ASIC shall set the tp Out of Range SPI flag.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse width is out of range (error bit equals 1) (3 level WSS only)	• Polaris is initialized • Wheel speed edge or stand still pulse received	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_REAR_RIGHT	C0513	This monitor checks if: • standstill pulse width out of range • Defective system ASIC	• The ASIC shall measure the width of each speed pulse or speed replacement pulse (tp). If tp is less than tp minimum threshold or greater than tp maximum threshold, the ASIC shall set the tp Out of Range SPI flag.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse width is out of range (error bit equals 1) (3 level WSS only)	• Polaris is initialized • Wheel speed edge or stand still pulse received	15 msec -375ms	Type A. MIL Illumination.
WSS_STANDSTILL_FAST_FRONT_LEFT	C0501	This monitor checks if: • Defective system ASIC Standstill VDA transmission too short	• The MCU shall detect if standstill pulses occur faster than every 95ms, for 5 consecutive standstill pulses.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too short - less than 105 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and detection rules. Range is from 25 - 475ms.	Type A. MIL Illumination.
WSS_STANDSTILL_SLOW_FRONT_LEFT	C0501	This monitor checks if: • Defective system ASIC • Standstill VDA transmission too long	• The MCU shall detect if standstill pulses occur slower than every 205ms, or no standstill pulse at all for 1025ms.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too long - more than 195 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and Detection Rules. Range is from 1025 -5100ms.	Type A. MIL Illumination.
WSS_STANDSTILL_FAST_FRONT_R|GHT	C0507	This monitor checks if: • Defective system ASIC Standstill VDA transmission too short	• The MCU shall detect if standstill pulses occur faster than every 95ms, for 5 consecutive standstill pulses.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too short - less than 105 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and detection rules. Range is from 25 - 475ms.	Type A. MIL Illumination.
WSS_STANDSTILL_SLOW_FRONT_RIGHT	C0507	This monitor checks if: • Defective system ASIC • Standstill VDA transmission too long	• The MCU shall detect if standstill pulses occur slower than every 205ms, or no standstill pulse at all for 1025ms.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too long - more than 195 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and Detection Rules. Range is from 1025 -5100ms.	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	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 every 205ms, or no standstill pulse at all for 1025ms.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too long - more than 195 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and Detection Rules. Range is from 1025 -5100ms.	Type A. MIL Illumination.
WSS_STANDSTILL_FAST_REAR_RIGHT	C0513	This monitor checks if: • Defective system ASIC Standstill VDA transmission too short	• The MCU shall detect if standstill pulses occur faster than every 95ms, for 5 consecutive standstill pulses.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too short - less than 105 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and detection rules. Range is from 25 - 475ms.	Type A. MIL Illumination.
WSS_STANDSTILL_SLOW_REAR_R|GHT	C0513	This monitor checks if: • Defective system ASIC • Standstill VDA transmission too long	• The MCU shall detect if standstill pulses occur slower than every 205ms, or no standstill pulse at all for 1025ms.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too long - more than 195 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and Detection Rules. Range is from 1025 -5100ms.	Type A. MIL Illumination.
SYS_ASIC_WSS_EDGE_MISMATCH_LF	P0606	This monitor checks if: • Nominal cause: 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_RF	P0606	This monitor checks if: • Nominal cause: 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_LR	P0606	This monitor checks if: • Nominal cause: 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: • Nominal cause: 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.
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.
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_R|GHT	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.
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.

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_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.
SYS_ASIC_U_WS_OVER_VOLT	C05A3	This monitor checks if: • Defective system ASIC	If VU_WS exceeds the rising U_WS over-voltage detection threshold for the detection debounce time, the ASIC sets the U_WS Overvoltage Warning SPI flag and disable the four high-side switches.	The MCU shall configure the wheelspeed sensor overvoltage bypass configuration to LOW. If the WSS overvoltage warning bit is set, fault is set.	• Polaris is initialized	50 msec	Type A. 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.
SYSASICWSSHSSTUCKON	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 B. MIL Illumination.
WSS_DIRECTION_FAILURE_FRONT_LEFT	C2A01	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	C2A02	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_DIRECT|ON_FAILURE_REAR_LEFT	C2A03	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	C2A04	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_UNKNOWN	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.
SOL_OPEN_ISO_FRONT_LEFT	C0010	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_ISO_FRONT_RIGHT	C0014	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On and not faulted 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_ISO_REAR_LEFT	C0018	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOLOPENISOREARRIGHT	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.

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_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.
SOL_OPEN_DUMP_FRONT_RIGHT	C0015	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_DUMP_REAR_LEFT	C0019	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_DUMP_REAR_RIGHT	C001D	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_3WAY_PRIMARY	C0001	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_OPEN_3WAY_SECONDARY	C0003	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2,375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_FDBK_UNEQUAL_TO_CMD_3WAY_PRIMARY	C0001	This monitor checks if: • Deviation in PWM output status • Defective microprocessor. • Defective printed circuit board. • Defective solenoid. • Defective solenoid driver FET.	Whenever the power switch is closed and the driver FET is not turned on (solenoid commanded off) then the feedback voltage should be high. If the solenoid feedback voltage is measured to be > 43.49% and < 65.23% of the coil supply voltage for 30 msec, an open solenoid fault is indicated	For too short on time = Ontime - 7.5% period For too long on time = Ontime + 7.5% period	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	60 ms	Type A. MIL Illumination.
SOL_FDBK_UNEQUAL_TO_CMD_3WAY_SECONDARY	C0003	This monitor checks if: • Deviation in PWM output status • Defective microprocessor. • Defective printed circuit board. • Defective solenoid. • Defective solenoid driver FET.	Whenever the power switch is closed and the driver FET is not turned on (solenoid commanded off) then the feedback voltage should be high. If the solenoid feedback voltage is measured to be > 43.49% and < 65.23% of the coil supply voltage for 30 msec, an open solenoid fault is indicated.	For too short on time = Ontime - 7.5% period For too long on time = Ontime + 7.5% period	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	60 ms	Type A. MIL Illumination.
SOL_OPEN_NORMAL_CLOSE_DAP	C0004	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOLOPENPEDALSIMISO	C0024	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_OPEN_NORMAL_OPEN_DAP	C0002	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2,375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_SIM_TEST	C05D5	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_ISO_FRONT_LEFT	C0010	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver • Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_ISO_FRONT_RIGHT	C0014	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver • Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_ISO_REAR_LEFT	CO018	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	coon	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver • Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_DUMP_FRONT_RIGHT	C0015	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver • Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SH0 RT_DUMP_REAR_LEFT	CO019	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_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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
DRIVER_SHORT_3WAY_PRIMARY	C0001	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SH0 RT_3WAY_SECONDARY	C0003	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_NORMAL_CLOSE_DAP	C0004	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DR|VER_SHORT_PEDAL_SIM_ISO	C0024	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_NORMAL_OPEN_DAP	C0002	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
DRIVER_SHORT_SIM_TEST	C05D5	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_SHORT_ISO_FRONT_LEFT	CO010	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_ISO_FRONT_RIGHT	CO014	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_ISO_REAR_LEFT	C0018	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOLSHORTISOREARRIGHT	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.

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_LEFT	C0011	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_DUMP_FRONT_RIGHT	C0015	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_DUMP_REAR_LEFT	C0019	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_DUMP_REAR_RIGHT	C001D	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_3WAY_PRIMARY	C0001	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_SHORT_3WAY_SECONDARY	C0003	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_NORMAL_CLOSE_DAP	C0004	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_PEDAL_SIM_ISO	C0024	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_NORMAL_OPEN_DAP	C0002	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_SIM_TEST	C05D5	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.

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_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.
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_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_R|GHT	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	CO015	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	CO019	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_RIGHT	C001D	This monitor checks if: • Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOL_OVERTEMP_3WAY_PR|MARY	C0001	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOL_OVERTEMP_3WAY_SECONDARY	C0003	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_OVERTEMP_NORMAL_CLOSE_DAP	C0004	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOL_OVERTEMP_PEDAL_SIM_ISO	C0024	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOL_OVERTEMP_NORMAL_OPEN_DAP	C0002	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOL_OVERTEMP_SIM_TEST	C05D5	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOL_DRIVER_OVERTEMP_ISO_FRONT_LEFT	C0010	This monitor checks if: • Anything that causes the solenoid driver to be active for excessive (usually unintended) period of time	• Driver Overtemp info transmitted via SPI from Polaris ASIC	Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature. Microprocessor recieves the information via SPI from the ASIC	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	5 msec	Type A. MIL Illumination.

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	CO014	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	CO018	This monitor checks if: • Anything that causes the solenoid driver to be active for excessive (usually unintended) period of time	• Driver Overtemp info transmitted via SPI from Polaris ASIC	Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature. Microprocessor recieves the information via SPI from the ASIC	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	5 msec	Type A. MIL Illumination.
SOL_DRIVER_OVERTEMP_ISO_REAR_RIGHT	C001C	This monitor checks if: • Anything that causes the solenoid driver to be active for excessive (usually unintended) period of time	• Driver Overtemp info transmitted via SPI from Polaris ASIC	Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature. Microprocessor recieves the information via SPI from the ASIC	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	5 msec	Type A. MIL Illumination.
SOL_DRIVER_OVERTEMP_PEDAL_SIM_ISO	C0024	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Driver Overtemp info transmitted via SPI from Polaris ASIC	Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature. Microprocessor recieves the information via SPI from the ASIC	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	5 msec	Type A. MIL Illumination.
SOL_DRIVER_OVERTEMP_NORMAL_OPEN_DAP	C0002	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Driver Overtemp info transmitted via SPI from Polaris ASIC	Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature. Microprocessor recieves the information via SPI from the ASIC	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	5 msec	Type A. MIL Illumination.

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_LEFT	CO010	This monitor checks if: • Defective / Missing Flyback Diode • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured.	1. Coil Overcurrent DTC is not set 2. No CLAMP_ACTIVATION_FAILURE DTC is set 3. execute as part of Power-Up System Test, Periodic Coil Test or anytime ABS Iso is activated during performance	45 counts (minimum 3 failures in 10 attempts)	Type A. MIL Illumination.
CLAMP_ACTIVATION_FAILURE_ISO_FRONT_RIGHT	C0014	This monitor checks if: • Defective / Missing Flyback Diode • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured.	1. Coil Overcurrent DTC is not set 2. No CLAMP_ACTIVATION_FAILURE DTC is set 3. execute as part of Power-Up System Test, Periodic Coil Test or anytime ABS Iso is activated during performance	45 counts (minimum 3 failures in 10 attempts)	Type A. MIL Illumination.
CLAMP_ACTIVATION_FAILURE_ISO_REAR_LEFT	CO018	This monitor checks if: • Defective / Missing Flyback Diode • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured.	1. Coil Overcurrent DTC is not set 2. No CLAMP_ACTIVATION_FAILURE DTC is set 3. execute as part of Power-Up System Test, Periodic Coil Test or anytime ABS Iso is activated during performance	45 counts (minimum 3 failures in 10 attempts)	Type A. MIL Illumination.
CLAMP_ACT|VAT|ON_FA|LURE_ISO_REAR_R|GHT	C001C	This monitor checks if: • Defective / Missing Flyback Diode • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured.	1. Coil Overcurrent DTC is not set 2. No CLAMP_ACTIVATION_FAILURE DTC is set 3. execute as part of Power-Up System Test, Periodic Coil Test or anytime ABS Iso is activated during performance	45 counts (minimum 3 failures in 10 attempts)	Type A. MIL Illumination.
CLAMP_ACTIVATION_FAILURE_NORMAL_OPEN_DAP	C0002	This monitor checks if: • Defective / Missing Flyback Diode • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured.	1. Coil Overcurrent DTC is not set 2. No CLAMP_ACTIVATION FAILURE DTC is set 3. execute as part of Power-Up System Test, Periodic Coil Test or anytime ABS Iso is activated during performance	45 counts (minimum 3 failures in 10 attempts)	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
CLAMP_ACTIVATION_FAILURE_PEDAL_SIM_ISO	C0024	This monitor checks if: • Defective / Missing Flyback Diode • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured.	1. Coil Overcurrent DTC is not set 2. No CLAMP_ACTIVATION_FAILURE DTC is set 3. execute as part of Power-Up System Test, Periodic Coil Test or anytime ABS Iso is activated during performance	45 counts (minimum 3 failures in 10 attempts)	Type A. MIL Illumination.
LEAKY_DRIVER_UNKNOWN_ABS_CIRCUITS	C0024	This monitor checks if: • Defective FET • Defective printed circuit board	• Slip Control Power Switch must be commanded ON than subsequently commanded OFF	If the 8 or more coil supply voltages decreased at a rate that is faster than expected, fault will be set.	• Power Switch is ON, then OFF • will only be retested after a power cycle	8 Count	Type A. MIL Illumination.
LEAKY_DRIVER_UNKNOWN_BOOST_CIRCUITS	C0024	This monitor checks if: • Defective FET • Defective printed circuit board	• Slip Control Power Switch must be commanded ON than subsequently commanded OFF	If the 8 or more coil supply voltages decreased at a rate that is faster than expected, fault will be set.	• Power Switch is ON, then OFF • will only be retested after a power cycle	8 Count	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_HIGHJSO_FRONT_R|GHT	CO014	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	CO014	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	CO010	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_HIGH_ISO_REAR_RIGHT	C001C	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	• Polaris is initialized. • 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_REAR_R|GHT	C001C	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_HIGH_ISO_REAR_LEFT	CO018	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_ISO_REAR_LEFT	C0018	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_HIGH_NORMAL_OPEN_DAP	C0002	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	• Polaris is initialized. • 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_NORMAL_OPEN_DAP	C0002	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_HIGH_PEDAL_SIM_ISO	C0024	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	• Polaris is initialized. • 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_PEDAL_SIM_ISO	C0024	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_OVER_VOLTAGE_NORMAL_CLOSE_DAP	C0004	This monitor checks if: Defective/Missing Suppression diode Defective PCB	If the suppression diode is missing or failed the ASIC detects it by monitoring the solenoid back EMF. Reading above +40V sets the Overvoltage Warning SPI flag. The coils output is not shut-off by the ASIC. Software matures the fault by monitoring the SPI flag. NOTE: There are no suppression diodes on any of the Dump coils because they are not PWM'd.	Duty cycle is out of range	Polaris is initialized	100ms	Type A. MIL Illumination.
SOL_OVER_VOLTAGE_SIM_TEST	C05D5	This monitor checks if: Defective/Missing Suppression diode Defective PCB	If the suppression diode is missing or failed the ASIC detects it by monitoring the solenoid back EMF. Reading above +40V sets the Overvoltage Warning SPI flag. The coils output is not shut-off by the ASIC. Software matures the fault by monitoring the SPI flag. NOTE: There are no suppression diodes on any of the Dump coils because they are not PWM'd.	Duty cycle is out of range	Polaris is initialized	100ms	Type A. MIL Illumination.
DC_SOL_REGULATION_FAILURE	P0606	This monitor checks if: • Defective system ASIC	• The ASIC shall monitor the state of each DROx output and report if it does not match the commanded state.	The MCU shall monitor ASIC's "DROx Gate Monitor Fault" SPI bits.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SOL_DUTY_CYCLE_FDBK_PLAUS_FAULT	P0606	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	The MCU shall monitor battery voltage and maintain an estimated coil temperature/resistance model. For a given current command, the MCU shall estimate the required duty cycle. The MCU shall verify that the estimated duty cycle against the ASIC's reported "CC_DRx Duty Cycle Command Feedback" match within a TBD tolerance. Current threshold is 20%	The MCU shall monitor battery voltage and maintain an estimated coil temperature/resistance model. For a given current command, the MCU shall estimate the required duty cycle. The MCU shall verify that the estimated duty cycle against the ASIC's reported "CC_DRx Duty Cycle Command Feedback" match within a TBD tolerance. Current threshold is 10%	• Polaris is initialized	15 msec	Type A. MIL Illumination.
COIL_CURRENT_FDBK_PLAUS_FAULT	P0606	This monitor checks if: • Defective system ASIC ASIC cannot control sol current properly	For CC_DRx channels in duty-cycle control mode: While a CC_DRx coil drive is commanded to greater than 0% duty cycle, the MCU shall monitor the ASIC's CC_DRx Current Result SPI field and verity the result matches the expected current. When a duty cycle command results in an CC_DRx on-time less than the minimum on time, no coil current measurement is possible. The reported CC_DRx Current Result will retain its prior value, and the corresponding Data Read bit will be 0. SW shall suspend SM102 while Data Read is 0.	For CC_DRx channels in duty-cycle control mode: While a CC_DRx coil drive is commanded to greater than 0% duty cycle, the MCU shall monitor the ASIC's CC_DRx Current Result SPI field and verity the result matches the expected current. When a duty cycle command results in an CC_DRx on-time less than the minimum on time, no coil current measurement is possible. The reported CC_DRx Current Result will retain its prior value, and the corresponding Data Read bit will be 0. SW shall suspend SM102 while Data Read is 0.	• Polaris is initialized • Coil Commanded in Duty Cycle mode	50 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.
NVRAM_DEVICE_INOPERATIVE	P062F	This monitor checks if: • Problem in chip select line • fault in SPI driver related code/circuit.	• This fault is set 1. When SPI driver is unable to do message transfer 2. If unable to write or time out before write operation could complete. 3. If requested message transfer not in time (including wait time)	device operational flag = FALSE (error during read write request occured)	• Power Switch is ON	5ms	Type A. MIL Illumination.
NVRAM_WRITE_FAILURE	P062F	This monitor checks if: • Communication problem with NVRAM chip • NVRAM hardware problem • PCB problem	• This fault is detected by the NVRAM handler. The NVRAM handler verifies a successful write event by reading back the information that is expected to be stored in NVRAM and also verifying the checksum.	If the NVRAM handler detects an unsuccessful write event three times, the fault is set.	• Power Switch in ON	60 msec	Type A. MIL Illumination.
COIL_DRIVER_SPI_FAILURE	P0606	This monitor checks if: • Defective system ASIC	• After a rising SYNC pin edge has occurred, the SW shall read the ASIC's "SYNC Armed Status" flag and detects if the bit is still high (indicating the rising SYNC pin edge was not detected).	The ASIC clears the "SYNC Armed" bit after a rising edge has occurred on the SYNC pin. The ASIC provides the "SYNC Armed Status" SPI flag, which reflects the state of the "SYNC Armed" SPI bit. After a rising SYNC pin edge has occurred, the SW reads the ASIC's "SYNC Armed Status" SPI bit and detects if the bit is still high (indicating the rising SYNC pin edge was not detected).	• Polaris is initialized	15 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	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 ½ bridge pre-driver pins (PDG and PRG), (3) the ENQ digital output pin, and (4) the low-side coil drivers (CC_DRx) and pre-drivers (DROx).	• Polaris is initialized	10 msec	Type A. MIL Illumination.
AD_PERIPHERAL_TIMEOUT_FAILURE	P060B	This monitor checks if: • Defective printed circuit board. • Defective Polaris ASIC. • Defective microprocessor.	• A/D Peripheral Timeout Failure • When reading an A/D channel, the software enters a "wait" loop where it looks for a bit in an A/D register to be set, indicating that the conversion is complete. A "timeout" mechanism exists that breaks out of the wait loop after 100 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_LOCKUP	P060B	This monitor checks if: • Defective printed circuit board. • Defective Polaris ASIC. • Defective microprocessor.	A/D Event Lockup Failure Two detection methods: No A/D conversions in the last 5 msec: A counter is incremented when A/D conversion results are retrieved. Every 5 msec this counter is checked. If it is 0, then the AD_EVENT_LOCKUP fault will begin to mature. If greater than 0, then it is cleared. 2 consecutive failures are needed to set the fault. Adc_Synchronization_Failed flag is TRUE: The ASIC will set this flag TRUE when the conversion count (number of channels converted) is larger than what is expected (9). 2 consecutive failures are needed to set the fault.	Adc Lockup Count = 0 or Adc Synchronization Failed = TRUE	• Power Switch is ON	5ms	Type A. MIL Illumination.
SOLENOID_TIMEOUT_FAILURE	P0606	This monitor checks if: • Defective microprocessor. • Incorrect microprocessor application code.	Each solenoid in the system is expected to generate ON test pulses to indicate the end of a solenoid pulse duration. At the completion of the System Self-Test, the number of ON test pulses issued during initial test and compare them with the number of ON tests performed from the failsafe monitor. If the number of ON test pulses issued does not equal the expected number of pulses, a failure is indicated and this fault is set.	Solenoid[solenoid_id].Sol_On_Test_Cnt != Solenoid[solenoid_id].Expected_Sol_Test_Cnt	• Mode manager is normal mode • Power switch is not faulted • System is not initializing • System is not re-initializing • Engine is not being cranked • Diagnostic commands are not requested • System is not shutting down	5ms	Type A. MIL Illumination.

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 113FET 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.
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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYS_ASIC_ADC_REF_HIGH	P060B	This monitor checks if: • Defective system ASIC	• The ASIC shall provide three ADC test voltage channels fixed to internal voltage references: Vhigh (ADREFHI),Vlow (GND_Q1), and Vmid (ADREFHI/2).	Each software loop, the MCU shall read the ADC conversion results for the Vhigh, Vlow and Vmid ASIC ADC channels over SPI, and compare them against fixed detection thresholds. Note: This MCU requirement is the same as in SM137.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_ADC_REF_MID	P060B	This monitor checks if: • Defective system ASIC	• The ASIC shall provide three ADC test voltage channels fixed to internal voltage references: Vhigh (ADREFHI).Vlow (GND_Q1), and Vmid (ADREFHI/2).	Each software loop, the MCU shall read the ADC conversion results for the Vhigh, Vlow and Vmid ASIC ADC channels over SPI, and compare them against fixed detection thresholds. Note: This MCU requirement is the same as in SM137.	• Polaris is initialized	25 msec	Type A. MIL Illumination.
SYS_ASIC_ADC_REF_LOW	P060B	This monitor checks if: • Defective system ASIC	• The ASIC shall provide three ADC test voltage channels fixed to internal voltage references: Vhigh (ADREFHI).Vlow (GND_Q1), and Vmid (ADREFHI/2).	Each software loop, the MCU shall read the ADC conversion results for the Vhigh, Vlow and Vmid ASIC ADC channels over SPI, and compare them against fixed detection thresholds. Note: This MCU requirement is the same as in SM137.	• Polaris is initialized	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.
SYSASICADCATTNFACTOR	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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.
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.
SYS_ASIC_MISSING_SYNC_EDGE	P0606	This monitor checks if: • Defective system ASIC	• After a rising SYNC pin edge has occurred, the SW shall read the ASIC's "SYNC Armed Status" flag and detects if the bit is still high (indicating the rising SYNC pin edge was not detected).	The ASIC clears the "SYNC Armed" bit after a rising edge has occurred on the SYNC pin. The ASIC provides the "SYNC Armed Status" SPI flag, which reflects the state of the "SYNC Armed" SPI bit. After a rising SYNC pin edge has occurred, the SW reads the ASIC's "SYNC Armed Status" SPI bit and detects if the bit is still high (indicating the rising SYNC pin edge was not detected).	• Polaris is initialized	15 msec	Type A. MIL Illumination.
DC_SOL_ON_TIME_MON_FAILED	P0606	This monitor checks if: • Defective system ASIC ASIC is not controlling PWM properly	The ASIC shall monitor the filtered DRDx feedback voltage and shall provide an on-time counter (for each channel) which shall accumulate the QDRx on-time. At each valid SYNC edge, the ASIC shall latch the current accumulated value into the DRDx On-Time Feedback Register and clear the on-time counter. The MCU shall integrate the commanded on-time between valid SYNC pulses and verify it matches the ASIC's reported result. Current threshold is 250 * MICROSECOND	Compare the solenoid commanded on time to the measured on time. If the difference in the two times is >250 microsec for 10 consecutive checks then the fault is immediately matured	• Polaris is initialized	50 msec	Type A. MIL Illumination.
SYS_ASIC_UNEXPECTED_SYNC_PULSE	P0606	This monitor checks if: • Defective Polaris ASIC.	• The MCU shall monitor the ASIC's Unarmed SYNC Edge Detected SPI bit and verify no expected SYNC pin edges have occurs. • After a rising SYNC pin edge has occurred (e.g. at the start of the next software loop), the MCU shall read the ASIC's SYNC Armed Status SPI bit and confirm that the rising SYNC pin edge occurred (in which case the bit will be low).	Fault will set if the MCU detects an unexpected sync pulse from the ASIC by monitoring the Unarmed SYNC Edge Detected SPI bit	• Polaris is initialized	15 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYS_ASIC_SYNC_TIMEOUT	P0606	This monitor checks if: • Defective Polaris ASIC. • Defective microprocessor. • Operating system failure	The ASIC detects if the time since the prior valid rising SYNC edge exceeds the SYNC timeout time. Then the ASIC turns off the coil drivers and sets the "SYNC Timeout" SPI bit. The SW monitors the ASIC's "SYNC Timeout" SPI bit to detect if a SYNC Timeout has occurred.	This fault would be set if the SPI bit SYNC Timeout is set for 25msec	• Polaris is initialized	max 17ms	Type A. MIL Illumination.
SYS_ASIC_CONFIG_REG_FAILURE	P0606	This monitor checks if: • register error • register rewrite error	• Configuration Registers: (These are written once at startup.) After writing once, read back and verify their contents during every subsequent 5ms SPI loop.	Rewrite registers with an incorrect value Verify if the write was successful during the following 5ms SPI loop's read & verify. If the rewrite is not successful after 3 attempts in a row, set a fault.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_CONTROL_REG_FAILURE	P0606	This monitor checks if: • register error • register rewrite error	• Control Registers: (These are written every 5ms loop for control or failsafing purposes.) For those registers not covered by other SMs, read and verify every 5ms loop, prior to performing the write.	Rewrite registers with an incorrect value Verify if the write was successful during the following 5ms SPI loop's read & verify. If the rewrite is not successful after 3 attempts in a row, set a fault.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ENQ_PIN_FAILED	P0606	This monitor checks if: • Defective ASIC.	• The Polaris ASIC provides a digital push-pull output, ENQ. ENQ is high when the ENQ Enable SPI bit is set, the Watchdog Status is "in range", WDEN Status is high, and nRST Status is high. Otherwise ENQ is low. ENQ is used as a pre-driver to enable ECU circuitry.	The MCU shall continuously monitor the ASIC ENQ feedback signal state and verify that it has the expected state. The HW shall provide a digital feedback signal of ASIC ENQ signal to MCU digital input.	• Polaris is initialized	10 msec	Type A. MIL Illumination.
BROKEN_WIRE_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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
CANFD1_SPI_FAILURE	P0606	This monitor checks if: • Problem in chip select line • fault in SPI driver related code/circuit. • If SPI communication is not successful and if we are not able to communicate with the CAN transceiver	• 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	1 count	Type A. MIL Illumination.
CANFD2_SPI_FAILURE	P0606	This monitor checks if: • Problem in chip select line • fault in SPI driver related code/circuit. • If SPI communication is not successful and if we are not able to communicate with the CAN transceiver	• 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	1 count	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	1 count	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	1 count	Type A. 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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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	1 count	Type A. MIL Illumination.
SYS_ASIC_U1_SELECT_FAILURE	P0606	This monitor checks if: • Defective printed circuit board. • Defective ASIC. • Defective microprocessor.	• The U1 operating mode and voltage level selections are viewable via the U1 Mode Select Status and U1 Voltage Select Status SPI fields. The SPI feedback signals are internally routed so that they monitor the true state of the mode and voltage control circuits.	The MCU verifies that the U1 Mode Select Status and U1 Voltage Select Status SPI fields in register 0x45 match the values which are hard-coded into SW corresponding the application's intended HW population. If a mismatch is detected, fault is set.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_NVM_FAIL	P062F	This monitor checks if: • Defective printed circuit board. • Defective ASIC. • Defective microprocessor.	• During the ASIC's full active logic reset sequence (within the active mode), the ASIC shall read and compare the primary and inverted U1 mode and voltage SPI fields. • If primary and inverted SPI fields do not match, the ASIC shall configure the U1 regulator in the 1.1V, supervisor mode configuration and shall set the TRW NVM Fail SPI bit in registers 0x45 and 0x61,	The MCU shall periodically verify that the TRW NVM Fail SPI bit (reg 0x45) is low. If the bit is read as high, fault is set.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYSASICSMDISABLED	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.
ROM_CRC_FAILURE	P0606	This monitor checks if: • Defective microprocessor • Incorrect fault detection algorithm	• CRC ROM Failure R4 • The ROM self-test is a dynamic test that is called from the scheduler at a rate of 5 msec. Each ROM section is checksummed byte by byte. Each byte will be added to the current checksum for a section. If the byte being checked is the last byte of a section, then the setion is verified for a correct checksum stored at the end of the section.	calculated CRC != stored CRC	• Power Switch is ON	5 msec	Type A. MIL Illumination.
LMU_DATA_PATH_TEST_FAILURE	P0606	This monitor checks if: Permanent failure of the LMU (Local Memory Unit) SRAM data path	The fault will be set if the data written to the LMU SRAM does not match the data read back from the same location of the LMU SRAM	The test consists of the following sequence: 1. Write 8 different 8-bit values to sequential addresses in LMU SRAM. Data pattern: 0x1122334455667788 2. Perform a 64-bit read and compare against expected values 3. Write 4 different 16-bit values to sequential addresses in LMU SRAM. Data pattern: 0XEEDDCCBBAA998877 4. Perform a 64-bit read and compare against expected values 5. Write 2 different 32-bit values to sequential addresses in LMU SRAM. Data pattern: 0xA5A5A5A5A5A5A5A5 6. Perform a 64-bit read and compare against expected values	Always runs during initialization	1 Count	Type A. MIL Illumination.
OS_TASK_MON|TOR_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.
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.
RTOSFAILURECOREO	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_CORE1	P0606	This monitor checks if: Software Error	EB OS detects an error situation and calls ErrorHook with a status code for which there is no other fault code.	None	Always Enabled	5*Number of errors in 10ms update Cycle	Type A. MIL Illumination.
RTOS_FAILURE_CORE2	P0606	This monitor checks if: Software Error	EB OS detects an error situation and calls ErrorHook with a status code for which there is no other fault code.	None	Always Enabled	5*Number of errors in 10ms update Cycle	Type A. MIL Illumination.
UNEXPECTED_EXCEPTION_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.
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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.
LOGICAL_SEQUENCE_FAULT_CORE1	P0606	This monitor checks if: Improper sequencing of runnables	If the software finds mismatch in current sequence compared to predefined sequence of the runnables then LSM flag in Core 1 is set.	Fault is set if LSM flag in Core 1 is set.	Continuous Failsafing	1 count	Type A. MIL Illumination.
LOGICAL_SEQUENCE_FAULT_CORE2	P0606	This monitor checks if: Improper sequencing of runnables	If the software finds mismatch in current sequence compared to predefined sequence of the runnables then LSM flag in Core 2 is set.	Fault is set if LSM flag in Core 2 is set.	Continuous Failsafing	1 count	Type A. MIL Illumination.
CPU_FAILURE_SEVERITY_X	P0606	This monitor checks if: • Defective microprocessor • Improper Application Code	The SW shall configure the MCU's fault manager to signal MCU faults via alarm but don't require the MCU to be held in reset.	See Aurix_Alarms_Update.xlxs for which alarm indicates what MCU faults and set the CPU_FAILURE_SEVERITY_X fault.	• Power Switch in ON		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_SEVERITY_Y	P0606	This monitor checks if: • Defective microprocessor • Improper Application Code	Activates the FSP then checks to see if it truly got activated. Also, checks to see if the ASIC saw the FSP pin activate.	If Polaris feedback does not match FSP command OR If Aurix feedback does not match FSP command	• Power Switch in ON		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		Type A. MIL Illumination.
SYS_ASIC_SYNC_TIME_MISMATCH_FAULT	P0606	This monitor checks if: • Defective system ASIC	• At each valid SYNC edge, the ASIC shall store the time between that edge and the prior valid SYNC edge in the Prior SYNC Interval Time SPI register field.	The MCU shall measure time between SYNC edges (based upon the MCU clock) and verify the time matches the ASIC's Prior SYNC Interval Time SPI field.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_TARGET_CURRENT_DETECT	P0606	This monitor checks if: When any ABS ISOs, NO DAP or PEDAL_SIM solenoids are: • Shorted Solenoid OR • Open Solenoid Driver OR • Open Flyback diode OR • Power input to module is noisy	tests all pass on next ignition cycle	Periodically (e.g. once per ignition cycle), the MCU commands the maximum coil current with the solid state relay off for three, 5ms SW loops. SW checks the "CC_DRx High Target Unreachable" SPI flag each 5ms SW loop from time of the first maximum current command to two loops after the third command loop (i.e. 5 loops total). At any point, if the "CC_DRx High Target Unreachable" SPI flag is read back high, the High Target Current Unreachable diagnostic test passes, and the remainder of the High Target Current Unreachable test (command and flag read backs) are aborted. If the "CC_DRx High Target Unreachable" flag is never set during the 5 read loop, the diagnostic test fails. Periodically (e.g. once per ignition cycle), the MCU shall command the minimum non-zero coil current with the solid state relay on for three, 5ms SW loops. SW shall check the "CC_DRx Low Target Unreachable" SPI flag each 5ms SW loop from time of the first minimum current command to two loops after the third command loop (i.e. 5 loops total). At any point, if the "CC_DRx Low Target Unreachable" SPI flag is read back high, the Low Target Current Unreachable diagnostic test passes, and the remainder of the Low Target Current Unreachable test (command and flag read backs) are aborted. If the "CC_DRx Low Target Unreachable" flag is never set during the 5 read loop, the diagnostic test fails.	• 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	• 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). (1 b) 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	30 msec	Type A. 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.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYS_ASIC_U1_UV_RESET_FAULT	P0606	This monitor checks if: • ASIC power supply block problem • Defective ASIC • PCB problem	When the U5 or U3 Undervoltage Diagnostic SPI bit is set, the ASIC raises the effective U5 out of range lower warning level, or the U3 undervoltage fault threshold above the maximum U5 or U3 regulation voltage, thus forcing a U5 out of range warning or U3 undervoltage fault. Periodically, the MCU shall store a flag in NVM indicating that it will perform a U5, U3 or U1 undervoltage diagnostic. The MCU shall then force one of the three test modes and start a timer.	The MCU shall detect a fault if it does not receive a reset within the expected time. If a reset occurs, the MCU shall check NVM and the ASIC's Reset Source SPI Register, and verify that the reset was due to a planned test.	• Runs during initialization	10 msec	Type A. MIL Illumination.
SYS_ASIC_OSCI_RESET_TEST_FAULT	P0606	This monitor checks if: • Oscillator problem • Defective ASIC • PCB problem	• The ASIC shall provide a means to periodically verify that the ASIC is capable of detecting an Oscillator Fault condition and entering the Oscillator Fault Power-down Mode. • From within TRW Test Mode, the ASIC shall provide Main and Supervisor Oscillator Diagnostic bits, which are capable of diving the main oscillator frequency by 2, stopping the main oscillator, dividing the supervisor oscillator frequency by 2, and stopping the supervisor oscillator. • Periodically (e.g. once per ignition cycle) the MCU shall store a flag in NVM indicating that it will perform a oscillator diagnostic. The MCU shall then force one of the four oscillator test modes and start a timer.	The MCU shall detect a fault if it does not receive a reset within the expected time. If a reset occurs, the MCU shall check NVM and the ASIC's Reset Source SPI Register, and verify that the reset was due to a planned test.	• Runs during initialization	10 msec	Type A. MIL Illumination.
SYS_ASIC_LOGIC_RST_STUCK_DETECT	P0606	This monitor checks if: • Reset source register problem • ASIC problem • PCB problem	• The MCU continuously monitors the External LOGIC_RST Reset SPI bit within the Reset Source Register.	The MCU shall read the ASIC's External LOGIC_RST Reset SPI field. If the SPI bit is high, fault is set.	• Continuous failsafing	15 msec	Type A. MIL Illumination.
MULTIPLE_STARTUP_FAILURE	P0606	This monitor checks if: • Defective CPU	The library of micro safety tests are run at every power-up. If any test fails the results are stored and the system is soft reset. If after the reset, any different test or procedure fails then a MULTIPLE_STARTUP_FAILURE is latched	Any two different Safety Test flags are reported as FAILED in two consecutive tests	Enabled at power up	1 count	Type A. MIL Illumination.
SBST_CORE2_FAILURE	P0606	This monitor checks if: Failure of the CPU core	Fault is set if SafeTlib test "CpuTst_CpuSbstPTst()" fails	Every 1 second the SafeTlib test "CpuTst_CpuSbstPTst()" is run. The fault is set if it returns a failure.	Continous - Always enabled	1 Count	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
UNIMPLEMENTED_INTERRUPT_COREO	P0606	This monitor checks if: Defective CPU	When the failsafe is called during runtime, it will loop through all the SRC registers to find if there is any pending interrupt from disabled interrupt source	If SRPN bits in SRC register of Interrupt router is zero then the fault will set if SRR bit of SRC register is set	Continuous Failsafing	300 counts	Type A. MIL Illumination.
ADC_FAILURE	P060B	This monitor checks if: • Defective CPU	Fault sets under the following circumstances: An AD pin is read. Using the Conversion Diagnostics, a pull down is tied to the pin and read again. Then, a pull up is tied to the pin, and read again. Then, the pull devices are removed, and the pin is read a 4th time. The fault will be set if the pull down did not pull the value down by at least 20%, or, the pull up did not pull the value up by at least 20%, or the reread value changed from the initial value by more than 3%. Repeat on another AD pin.	If (pulled down value read > initial value read * 0.8) OR If (pulled up value read < initial value read * 1.2) OR If (reread value > initial value read'1 .03) OR If (reread value < initial value read '0.97) THEN Set ADC_FAILURE	performed at power up	1 count	Type A. MIL Illumination.
RESET_SSCHECK_FAILURE	P0606	This monitor checks if: • Defective CPU	After a warm reset the RSTCON2.CSS bits are checked. If any are 0, then the fault will be set	If (warm reset == TRUE) AND (RSTCON2.CSS == 0)	performed at power up	1 count	Type A. MIL Illumination.
SPB_FAILURE	P0606	This monitor checks if: failed System Peripheral Bus	The correct value of different registers shall be tested to ensure the proper functioning of the SPB address lines. Fault set if any of the registers have an unexpected value after 5 consecutive checks in the 20 ms task .	Each of the required registers will be read during runtime to see if they provide the expected value that was loaded during initialization.	Power Switch is ON	100msec	Type A. MIL Illumination.
SMU_CONFIG_REGISTER_READBACK_FAILURE	P0606	This monitor checks if: • Defective CPU	after the SMU has been initialized it will loop through a table of SMU registers and compare each register value to the value that the MCAL has previously written to it. If there is a difference, then the SMU will be unlocked, the register updated, and then the SMU will be put back to it's previous state. The register will then be checked again. If it fails 3 times, then the SMU_CONFIG_REGISTER_READBACK_FAILURE will be set.	register value is not equal to test value written to it	performed at power up	1 count	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SBCU_CONFIG_REGISTER_READBACK_FAILURE	P0606	This monitor checks if: • Defective CPU	after the SMU has been initialized it will loop through a table of SMU registers and compare each register value to the value that the MCAL has previously written to it. If there is a difference, then the SMU will be unlocked, the register updated, and then the SMU will be put back to it's previous state. The register will then be checked again. If it fails 3 times, then the SMU_CONFIG_REGISTER_READBACK_FAILURE will be set.	register value is not equal to test value written to it	performed at power up	1 count	Type A. MIL Illumination.
WDT_CONFIG_REGISTER_READBACK_FAILURE	P0606	This monitor checks if: • Defective CPU	On initialization: One or more of these Safety Watchdog registers has an incorrect value: WDTSCONO.REL WDTSCON1.IRO WDTSC0N1.IR1 WDTSCON1.DR WDTSCON1.UR WDTSCON1.TCTR During runtime: One or more of these CPUO Watchdog registers has an incorrect value for 4 consecutive checks: WDTCPUOCONO.REL WDTCPUOCON1.IRO WDTCPUOCON1.IR1 WDTCPUOCON1.DR WDTCPUOCON1.UR WDTCPUOCON1.TCTR	any register has an incorrect value for four consecutive checks	Enabled at power up	4 count	Type A. MIL Illumination.
CPU_BUS_MPU_CONFIG_REGISTER_READBACK_FAILURE	P0606	This monitor checks if: • Defective CPU	after the MPU has been initialized it will loop through a table of MPU registers and compare each register value to the value that the MCAL has previously written to it. If there is a difference, then the MPU will be unlocked, the register updated, and then the SMU will be put back to it's previous state. The register will then be checked again. If it fails 3 times, then the CPU_MPU_CONFIG_REGISTER_READBACK_FAILURE will be set.	register value is not equal to test value written to it	performed at power up	1 count	Type A. MIL Illumination.
LMU_MPU_CONFIG_REGISTER_READBACK_FAILURE	P0606	This monitor checks if: • Defective CPU	after the MPU has been initialized it will loop through a table of MPU registers and compare each register value to the value that the MCAL has previously written to it. If there is a difference, then the MPU will be unlocked, the register updated, and then the SMU will be put back to it's previous state. The register will then be checked again. If it fails 3 times, then the CPU_MPU_CONFIG_REGISTER_READBACK_FAILURE will be set.	register value is not equal to test value written to it	performed at power up	1 count	Type A. MIL Illumination.
PB_MICRO_REGISTER_READBACK_FAILURE	P0606	This monitor checks if: • Defective CPU	The ECU provides the capability to ensure the data integrity of register configuration. The software shall ensure the data integrity of the register configuration and compare the calculated checksum against an expected value.	register value is not equal to test value written to it	performed at power up	1 count	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SAFETY_LIB_DETECTED_FAILURE	P0606	This monitor checks if: • Defective CPU	The library of micro safety tests are run at every power-up. If any test fails the results are stored and the system is soft reset. If after the reset, the same test or procedure fails then a SAFETY_LIB_DETECTED_FAILURE is latched	Any one Safety Test flag is reported as FAILED in two consecutive tests	Enabled at power up	1 count	Type A. MIL Illumination.
STM_PLAUSIBILITY_FAILURE	P0606	This monitor checks if: • Defective CPU	STM and TBU timers are read without interrupt between, then after 20 ms, STM and TBU elaspsed times are read without interrupt between the readings, the 2.5% error is checked and Up/down failsafe monitor function is called. The fault is continiously checked every 20 ms.	The difference between the System Timer and Time Base Unit channel 1 >= 2.5%	Enabled at power up	105 msec	Type A. MIL Illumination.
EVR_CFGMON_FAILURE	P0606	This monitor checks if: • Defective CPU	The Power Management Status Register is checked at power-up. Two configuration bits are checked. Also the EVR Active flag is checked.	If any of the checked flags are FALSE then the fault is set immediately	performed at power up	1 count	Type A. MIL Illumination.
RAM_STARTUP_MBIST_FAILURE	P0604	This monitor checks if: • Defective CPU	The micro runs a RAM self test at power-up. If a failure is detected the the BIST is rerun after a warm reset. If a failure still exists then the failed bit will be set	If the failed bit is TRUE then set the fault	performed at power up	1 count	Type A. MIL Illumination.
MD_PU_I_SENSE_COMMON_MODE_FAULT	C0596	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	If {common mode Isense offset - zero Isense offset} is outside the normal range (+/- SPUT_ISENSE_MAX_CM_ISHIFT), this fault is set.	If the current sampled at power-up with an injected common mode I-sense offset (positive & negative together), is outside +/- maximum common mode offset range (from the zero offset reading), this fault is raised.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_PU_I_SENSE_NEGATIVE_FAULT	C0596	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	If {zero Isense offset - negative Isense offset } is outside the normal range (SPUTJSENSE_MIN_NEG_ISHIFT to SPUT_ISENSE_MAX_NEG_ISHIFT), this fault is set	If the current sampled at power-up with an injected negative I-sense offset, is outside minimum to maximum negative offset range (from the zero offset reading), this fault is raised.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1 ms	Type A. MIL Illumination.
MDPUISENSEPOSITIVEFAULT	C0596	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	If {positive Isense offset - zero Isense offset} is outside the normal range (SPUTJSENSE_MIN_POS_ISHIFT to SPUT_ISENSE_MAX_POS_ISHIFT), this fault is set.	If the current sampled at power-up with an injected positive I-sense offset, is outside minimum to maximum positive offset range (from the zero offset reading), this fault is raised.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1 ms	Type A. MIL Illumination.
MD_IEM_OCCURRENCE_FAULT	C0582	This monitor checks if: • Bridge FET failure • Invalid execution rate of a motor interrupt.	Compares the number of times each electric drive interrupt has occurred in a 4ms period, and sets if the interrupt count does not fall in an acceptable range	The occurrence counter of any enabled motor interrupt is outside an expected interval.	ECU is not shutting down.	1 count/4 ms	Type A. MIL Illumination.
MDJEM_PLAUSIBILITY_FAULT	C0582	This monitor checks if: • Bridge FET failure • Invalid execution reason of a motor interrupt.	This fault sets if a motor control interrupt is executed with the wrong proirity level, or an interrupt is executed when it should be disabled.	Either a motor interrupt has been executed which wasn't explicitly enabled.	Motor Drive is in either "Running" or "Paused" state (i.e, not in "Init" or intermediate "Resuming" or "Terminated" state)	1 count	Type A. MIL Illumination.
MD_MOTOR_PHASE_VOLTAGE_1_HIGH_FAULT	C057F	This monitor checks if: Bridge FET failure	When phase 1 voltage is high, the microcontroller shall capture {M1_PH1_SEN phase voltage high}, if {M1_PH1_SEN phase voltage high} is less than RT_PHASE_VOLTAGE_HIGH_MIN then this fault is raised. Motor Phase Voltage HIGH Test is executed when the Inverter FET is switched on. IF motor phase <n> voltage < PHASE VOLTAGE THRESHOLD HIGH THEN faulty bucket is incremented	M1_PH1_SEN phase voltage high < 3.46V	executed when the Inverter FET is switched on. Motor PWM is on	18 msec/128 counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_MOTOR_PHASE_VOLTAGE_1_LOW_FAULT	C0580	This monitor checks if: Bridge FET failure	When phase 1 voltage is low, the microcontroller shall capture {M1_PH1_SEN phase voltage low}, if {M1_PH1_SEN phase voltage low} is greater than RT_PHASE_VOLTAGE_LOW_MAX then this fault is raised Motor Phase Voltage LOW Test is executed when the lower Inverter FET is switched on. IF motor phase <n> voltage > PHASE VOLTAGE THRESHOLD LOW THEN faulty bucket is incremented	M1_PH1_SEN phase voltage low > 0.99V	executed when the lower Inverter FET is switched on. Motor PWM is on	18 msec/128 counts	Type A. MIL Illumination.
MD_MOTOR_PHASE_VOLTAGE_2_HIGH_FAULT	C057F	This monitor checks if: Bridge FET failure	When phase 2 voltage is high, the microcontroller shall capture {M1_PH2_SEN phase voltage high}, if {M1_PH2_SEN phase voltage high} is less than RT_PHASE_VOLTAGE_HIGH_MIN then this fault is raised. Motor Phase Voltage HIGH Test is executed when the Inverter FET is switched on. IF motor phase <n> voltage < PHASE VOLTAGE THRESHOLD HIGH THEN faulty bucket is incremented	M1_PH1_SEN phase voltage high < 3.46V	executed when the Inverter FET is switched on.	18 msec/128 counts	Type A. MIL Illumination.
MD_MOTOR_PHASE_VOLTAGE_2_LOW_FAULT	C0580	This monitor checks if: Bridge FET failure	When phase 2 voltage is low, the microcontroller shall capture {M1_PH2_SEN phase voltage low}, if {M1PH2SEN phase voltage low} is greater than RT_PHASE_VOLTAGE_LOW_MAX then this fault is raised. Motor Phase Voltage LOW Test is executed when the lower Inverter FET is switched on. IF motor phase <n> voltage > PHASE VOLTAGE THRESHOLD LOW THEN faulty bucket is incremented	M1_PH1_SEN phase voltage low > 0.99V	executed when the lower Inverter FET is switched on.	18 msec/128 counts	Type A. MIL Illumination.
MD_MOTOR_PHASE_VOLTAGE_3_HIGH_FAULT	C057F	This monitor checks if: Bridge FET failure	When phase 3 voltage is high, the microcontroller shall capture {M1_PH3_SEN phase voltage high}, if {M1_PH3_SEN phase voltage high} is less than RT_PHASE_VOLTAGE_HIGH_MIN then this fault is raised. Motor Phase Voltage HIGH Test is executed when the Inverter FET is switched on. IF motor phase <n> voltage < PHASE VOLTAGE THRESHOLD HIGH THEN faulty bucket is incremented	M1_PH1_SEN phase voltage high < 3.46V	executed when the Inverter FET is switched on.	18 msec/128 counts	Type A. MIL Illumination.
MD_MOTOR_PHASE_VOLTAGE_3_LOW_FAULT	C0580	This monitor checks if: Bridge FET failure	When phase 3 voltage is low, the microcontroller shall capture {M1_PH3_SEN phase voltage low}, if {M1_PH3_SEN phase voltage low} is greater than RT_PHASE_VOLTAGE_LOW_MAX then this fault is raised. Motor Phase Voltage LOW Test is executed when the lower Inverter FET is switched on. IF motor phase <n> voltage > PHASE VOLTAGE THRESHOLD LOW THEN faulty bucket is incremented	M1_PH1_SEN phase voltage low > 0.99V	executed when the lower Inverter FET is switched on.	18 msec/128 counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_PU_PHASE_1_STUCK_HIGH_FAULT	C057F	This monitor checks if: • Top FET shorted • Top FET drive stuck on or • Phase sense stuck high	Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit Drive stage power up tests confirm that with all FETs off, no phases are driven, Phase voltages checked against expectation, if high raise fault	If the motor phase 1 voltage is near to battery level, before the bridge is activated, probably caused by a short circuit top motor FET, the fault is raised.	Battery/link between 7.1v and 18v	400 ms	Type A. MIL Illumination.
MD_PU_PHASE_1_STUCK_LOW_FAULT	C0580	This monitor checks if: • Bottom FET shorted • Bottom FET drive stuck on or • Phase sense stuck low	Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit Drive stage power up tests confirm that with all FETs off, no phases are driven, Phase voltages checked against expectation, if low raise fault	If the motor phase 1 voltage is near to Ov,before the bridge is activated, probably caused by a short circuit bottom motor FET, the fault is raised.	Battery/link between 7.1v and 18v	400 ms	Type A. MIL Illumination.
MD_PU_PHASE_2_STUCK_HIGH_FAULT	C057F	This monitor checks if: • Top FET shorted • Top FET drive stuck on or • Phase sense stuck high	Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit Drive stage power up tests confirm that with all FETs off, no phases are driven, Phase voltages checked against expectation, if high raise fault	If the motor phase 1 voltage is near to battery level, before the bridge is activated, probably caused by a short circuit top motor FET, the fault is raised.	Battery/link between 7.1v and 18v	400 ms	Type A. MIL Illumination.
MD_PU_PHASE_2_STUCK_LOW_FAULT	C0580	This monitor checks if: • Bottom FET shorted • Bottom FET drive stuck on or • Phase sense stuck low	Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit Drive stage power up tests confirm that with all FETs off, no phases are driven, Phase voltages checked against expectation, if low raise fault	If the motor phase 2 voltage is near to Ov,before the bridge is activated, probably caused by a short circuit bottom motor FET, the fault is raised.	Battery/link between 7.1v and 18v	400 ms	Type A. MIL Illumination.
MD_PU_PHASE_3_STUCK_HIGH_FAULT	C057F	This monitor checks if: • Top FET shorted • Top FET drive stuck on or • Phase sense stuck high	Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit Drive stage power up tests confirm that with all FETs off, no phases are driven, Phase voltages checked against expectation, if high raise fault	If the motor phase 1 voltage is near to battery level, before the bridge is activated, probably caused by a short circuit top motor FET, the fault is raised.	Battery/link between 7.1v and 18v	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
MD_PU_PHASE_3_STUCK_LOW_FAULT	C0580	This monitor checks if: • Bottom FET shorted • Bottom FET drive stuck on or • Phase sense stuck low	Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit Drive stage power up tests confirm that with all FETs off, no phases are driven, Phase voltages checked against expectation, if low raise fault	If the motor phase 3 voltage is near to Ov,before the bridge is activated, probably caused by a short circuit bottom motor FET, the fault is raised.	Battery/link between 7.1v and 18v	400 ms	Type A. MIL Illumination.
MD_PU_BRIDGE_BH1_UV_FAULT	C0580	This monitor checks if: • ECU hardware failure	Bridge driver boostrap high side 1 capacitor under voltage fault reported during Bridge driver configuration.	With bridge enabled and SOFF off, the FET IL1 is driven for 200us. After 200us, "high side buffer capacitor 1 under voltage" error in internal error register is still set.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1ms	Type A. MIL Illumination.
MD_PU_BRIDGE_ERR_STUCK_HI_FAULT	C0582	This monitor checks if: • Bridge Driver ERR line connectivity • Bridge driver incorrect operation.	Verify Error line goes active (low), when error condition is injected.	During self test, the Bridge Driver HW error output pin (|0HWAB_BRIDGE_1 ERROR) was not active, when Current Sense Amplifier 1&2 - Gain 2 was set to a invalid value	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	32 ms	Type A. MIL Illumination.
MD_PU_BR|DGE_ERR_STUCK_LO_FAULT	C0582	This monitor checks if: • Bridge Driver ERR signal connectivity.	Verify Error line goes inactive (high), when injected error condition is removed.	When Bridge configuration is started by driving the HW output Pin (IOHWAB_BRIDGE_1_INHIBIT) inactive, the HW Input Pin (IOHWAB_BR|DGE_1_ERROR) stays active.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	20 - 30ms	Type A. MIL Illumination.
MD_PU_BRIDGE_INIT_TIMEOUT_FAULT	C0582	This monitor checks if: • Micro controller SPI failure. • Bridge Driver failure.	Verify Bridge Driver initialization completed within SPUT_DRV_INIT_MAX_TIME.	If initialization of the bridge driver does not occur within 100ms @ 1ms /bit	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1ms	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
MD_PU_BRIDGE_MAX_POWER_DOWN_FAULT	C0582	This monitor checks if: • Incorrect Bridge Driver operation	Allow only BD_PU_MAX_POWER_DOWN_CYCLES of retry, during Bridge Driver power up sequence.	the number of power down cycles during a bridge driver power up sequence exceeds 3	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1ms	Type A. MIL Illumination.
MD_PU_BRIDGE_OC_TIMEOUT_FAULT	C0582	This monitor checks if: • Incorrect Bridge Driver operation	Verify intermediate over current tests are completed within SPUT_DRV_OVER_CURRENT_MAX_TIME.	Immediate overcurrent tests are not completed within 10ms @ 0.1us/bit	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	2 counts/2ms	Type A. MIL Illumination.
MD_PU_BRIDGE_OCT_NOT_COMPLETED	C0582	This monitor checks if: • Incorrect Bridge Driver operation	Verify over current test is completed within SPUT_DRV_OCT_MAX_EXECUTION_TIME.	overcurrent tests are not completed within 50ms @ 0.1us/bit	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	2 counts/2ms	Type A. MIL Illumination.
MD_PU_BRIDGE_UNACCEPTABLE_ERR	C0582	This monitor checks if: • Incorrect Bridge Driver operation	Verify no un-acceptable errors are reported by Bridge device during power up.	If the below unacceptable error bits are set. - Global test mode (gtm) - Overvoltage Internal Regulator 6 Error (err_ov_reg6) - Charge Pump 1 Overload Error(err_cp1) - Charge Pump 2 Overload Error (err_cp2) - Overtemperature Shutdown (sd_ot) - Charge PumpOvervoltage Shutdown at Pin CB or Pin CH2-CL2 (sd_ov_cp), - Vs Path Charge Pump Input Overload (sd_cp1), - Overtemperature Detection (err_ot_w) - Latent Fault Warning (lfw) - Error Correction of Control Register Failed(ctrl_reg_invalid), - err_ov_ld_vdh in External Errors.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	3 counts/3ms	Type A. MIL Illumination.
MD_PU_ISENSE_ZERO_OFFSET_FAULT	C0596	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	Zero 1sense outside valid range The microcontroller shall test that while M1_ITP (positive) offset is inactive and M1JTN (negative) offset is inactive, M1_ISENSE_1 (zero I-sense offset) is within SPUT_ISENSE1_OFFSET_MAX_ERROR	zero Isense offset (M1_ISENSE_1) is outside the normal range	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_PU_MCU_FET_OP_STUCK_ON_FAULT	C0582	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	While bridge driver is enabled and prior to driving top or bottom FETs a power up test shall be performed to check no top or bottom FET is stuck on Turn all FETs off (MCU outputs off, bridge should drive FETs off) Monitor phase voltage whether is high/low	Top and Bottom FET stuck on during a Power up test. (Phase voltage is high when FETs are turned OFF)	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	400 ms	Type A. MIL Illumination.
MD_PU_BRIDGE_CONFIGSTATE_CHG_FAULT	C0594	This monitor checks if: • Micro controller SPI failure. • Bridge Driver failure.	This failsafe guarantees that the bridge driver is in an acceptable mode (Normal, Safe Off, Config, or Error) during the power-up test sequence. Unknown, Idle, Config Lock, Self Test, Rectification, and Sleep modes will cause this fault to latch.	Bridge Driver remains in "Idle Mode" for 5ms in which it was expected that it transits to "Configuration Mode", after the configuraion has been sent via SPI.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	145 ms	Type A. MIL Illumination.
MD_PU_BRIDGE_OVER_CURRENT_FAULT	C0590	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	This failsafe tests that over current detection on the bridge driver is working as it should. This failsafe operates during the power-up test.	Self test was started and Current Sense Amplifier 1&2 - Gain 2 was set to a invalid value and bridge driver error output pin (IOHWAB_BRIDGE_1_ERROR) was active, but over current fault bit was not set in sBridgeDriver.CurrentSenseAmpErrorStatus. OR Self test was startedandCurrent Sense Amplifier 1&2 - Gain 2 was set to a valid value and bridge driver error output pin (IOHWAB_BRIDGE_1_ERROR) was inactive, but over current fault bit was set in sBridgeDriver.CurrentSenseAmpErrorStatus.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	40 msec	Type A. MIL Illumination.
MD_MOTOR_OPEN_PHASE1_FAULT	C0591	This monitor checks if: • Open Phase	d-axis and q-axis demand is compared with phase 1 measured current, if difference is less than threshold and if actual current is less then threshold, raise a fault	Low Speed Detection (0rpm.,400rpm): average D-axis current errors (over last 12 samples in 200ps cycle) > 6A (ID_OPEN—PHASE_ERR_THRESHOLD) AND maximum of phase current amplitude > 10A (PHASE_CURRENT_DIAG_ENABLE)AND last 3 samples A1 or C1 < 0.5A (ZERO CURRENT SAMPLE THRESHOLD) AND motor phase 1 current < 1A (ZERO_PHASE_CURRENT_THRESHOLD) High Speed Detection (400rpm..2400rpm): last 4 samples of Q-axis current demand > 10A (CURR DEM THRESHOLD) AND motor phase 1 current < 1A (ZERO_PHASE_CURRENT_THRESHOLD)	• NOT in Motor Open Phase Back-Up Mode AND • motor mechanical speed < 2400 rpm (MAX_MECH_SPD_OPEN_PHASE_DIAG_EN) AND • ECU assist enabled	4 counts/4ms	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
MD_MOTOR_OPEN_PHASE2_FAULT	C0591	This monitor checks if: • Open Phase	d-axis and q-axis demand is compared with phase 2 measured current, if difference is less than threshold and if actual current is less then threshold, raise a fault	Low Speed Detection (0rpm..400rpm): average D-axis current errors (over last 12 samples in 200ps cycle) > 6A (ID_OPEN_PHASE_ERR_THRESHOLD) AND maximum of phase current amplitude > 10A (PHASE_CURRENT_DIAG_ENABLE)AND last 3 samples A1 or C1 < 0.5A (ZERO CURRENT SAMPLE THRESHOLD) AND motor phase 2 current < 1A (ZERO_PHASE_CURRENT_THRESHOLD) High Speed Detection (400rpm..2400rpm): last 4 samples of Q-axis current demand > 10A (CURR DEM THRESHOLD) AND motor phase 1 current < 1A (ZERO_PHASE_CURRENT_THRESHOLD)	• NOT in Motor Open Phase Back-Up Mode AND • motor mechanical speed < 2400 rpm (MAX_MECH_SPD_OPEN_PHASE_DIAG_EN) AND • ECU assist enabled	4 counts/4ms	Type A. MIL Illumination.
MD_MOTOR_OPEN_PHASE3_FAULT	C0591	This monitor checks if: • Open Phase	d-axis and q-axis demand is compared with phase 3 measured current, if difference is less than threshold and if actual current is less then threshold, raise a fault	Low Speed Detection (0rpm..400rpm): average D-axis current errors (over last 12 samples in 200ps cycle) > 6A (ID_OPEN_PHASE_ERR_THRESHOLD) AND maximum of phase current amplitude > 10A (PHASE_CURRENT_DIAG_ENABLE)AND last 3 samples A1 or C1 < 0.5A (ZERO CURRENT SAMPLE THRESHOLD) AND motor phase 3 current < 1A (ZERO_PHASE_CURRENT_THRESHOLD) High Speed Detection (400rpm..2400rpm): last 4 samples of Q-axis current demand > 10A (CURR DEM THRESHOLD) AND motor phase 1 current < 1A (ZERO_PHASE_CURRENT_THRESHOLD)	• NOT in Motor Open Phase Back-Up Mode AND • motor mechanical speed < 2400 rpm (MAX_MECH_SPD_OPEN PHASE_DIAG_EN) AND • ECU assist enabled	4 counts/4ms	Type A. MIL Illumination.
MD_MOTOR_I_SENSE_DYNAMIC_COMM_MODE_FAULT	C0582	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	If ({common mode I-sense offset} - {zero I-sense offset}) is outside RT_ISENSE1_MAX_CM_ISHIFT_RANGE then this fault is raised. reference value is taken before applying both voltage offsets (Common), diagnostic_sample point is measured, if diagnostic_sample > reference +/- threshold then raise a fault	Either current sample is outside a valid range set by the respective reference sample plus /minus [-35A (DM_ISenseRtMaxCmlShiftNeg)...+35A (DMJSenseRtMaxCmlShiftPos)]	• ECU assist enabled AND • ECU is not initializing or shutting down	4count/16ms	Type A. MIL Illumination.
MD_MOTOR_I_SENSE_DYNAMIC_POSITIVE_FAULT	C0582	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	If {M1_ISENSE1 positive offset current} is outside expected limits then this fault is raised. reference value is taken before applying positive voltage offset (P), diagnostic_sample point is measured, if reference is not saturated and if diagnostic_sample < reference + threshold then raise a fault	the absolute current sample during test is lower than the induced offset	• ECU assist enabled AND • ECU is not initializing or shutting down	4count/16ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_MOTOR_I_SENSE_DYNAMIC_NEGATIVE_FAULT	C0582	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	If {M1_ISENSE1 negative offset current} is outside expected limits then this fault is raised. reference value is taken before applying negative voltage offset (N), diagnostic_sample point is measured, if reference is not saturated and if diagnostic_sample > reference + threshold then raise a fault	the absolute current sample during test is lower than the induced offset	• ECU assist enabled AND • ECU is not initializing or shutting down	4count/16ms	Type A. MIL Illumination.
MD_MOTOR_POSITION_SENSOR_FAULT	C058A	This monitor checks if: • The MPS indicates a failure or a "not normal" mode • The MPS has detected an internal problem • The SPI message has a CRC failure • The motor position data is not in the valid range	SPI error bits set during communication with MPS, or CRC error detected in SPI message.	mode_not_normal or fail bits set, incorrect CRC calculation, or invalid MPS data	• ECU is not shutting down.	5 msec	Type A. MIL Illumination.
MD_MOTOR_POSITION_MISSING_CALIB_FAULT	C2A1C	This monitor checks if: • Malfunctioning MPS • Unpowered MPS	The motor position sensor electrical offset calibration has failed or has not yet been completed	• Fail if motor position calibration state = MPS_CALIB OFF, MPS_CALIB_FAILED_VARIANCE, or MPS_CALIB_FAILED_FORWARD • Pass if motor position calibration state = MPS_CALIB_COMPLETED	• ECU is not shutting down.	1 ms	Type A. MIL Illumination.
MD_MOTOR_POSITION_SENSOR_EEPROM_FAULT	C058A	This monitor checks if: • Malfunctioning MPS • Unpowered MPS	▪SPI error bits set during communication with EEPROM on MPS sensor, or incorrect data fingerprint found in EEPROM data read from sensor	o QSPIO_STATUS bit 3 or bit 6 are set during communication with EEPROM o EEPROM identification page[0] != 0x20 || EEPROM identification page[1] != 0x00 || EEPROM identification page[2] != 0x09	N/A	1 count	Type A. MIL Illumination.
MDISENSECROSSCHECKFAULT	C0582	This monitor checks if: • Current Sense Circuitry	The microcontroller shall capture M1ISENSE1 and M1JSENSE2 current samples, if average difference between M1ISENSE1 and M1JSENSE2 over five samples is greater than RT_ISENSE_CROSS_CHECK_LIMIT, then this fault is raised and assist removed reads two independent ADC by 5 samples and averages it to measure current flow and compares, if difference is more than allowed,	The sum of the error between phase current samples (internal and external amplifier) is not in the range [-47A (MIN_ISENSE_DIFFERENCE) .. +47A (MAX_ISENSE_DIFFERENCE)] OR no new data from current sensors received	• ECU assist enabled AND • ECU is not initializing or shutting down	20 counts/80ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_IEM_SEQUENCE_ ERROR_FAULT	C0595	This monitor checks if: • Interrupt failure	Motor Control tasks are deemed to not be executing in the correct order. For every configured interrupt, read out any complete sequences that are in the log. For each sequence read out, the CRC is calculated for the observation points, and is compared against the expected value for that interrupt/mode. Mode is determined from the first observation point in the sequence. A fault is raised when there is a mismatch and the CRC check is stopped for that interrupt.	Whenever a motor interrupt is entered and exited, everytime it writes a unique number into a rolling buffer. The diagnostic calculates the CRC over complete interrupt sequences (depending on the motor state) in the buffer and raises a fault if there is a mismatch.	• ECU is not shutting down	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_CLOCK_FAIL_FAULT	C0595	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	During run time Bridge Driver reports internal clock failure (using ERR line and SPI error registers).	• bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND • In register shutdown error "Internal Clock Supervision Shutdown" is set.	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_CONFIG_COMP_FAULT	C0595	This monitor checks if: • Bridge Driver incorrect operation.	To ensure correct configuraiton data is written into Bridge Driver IC. Configuration failure detection is required in order to mitigate: - Micro controller SPI failure. - Bridge Driver failure..	During initialization, if Bridge Driver state changes to CONFIG_LOCK, report config invalid fault.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	3 counts/3ms	Type A. MIL Illumination.
MD_BR|DGE_CONFIG_ERROR_FAULT	C0595	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	During run time Bridge Driver reports config error (using ERR line and SPI error registers).	• bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) AND • SPI status "config valid" bit is not set AND • the fault has occurred more than once in this ignition cycle.	• ECU provides assist AND • No safe state on bridge driver	1 count/Ims	Type A. MIL Illumination.
MD_BRIDGE_CONFIG_ INVALIDFAULT	C0595	This monitor checks if: • Incorrect CRC transmitted during initialisation. • Micro controller SPI failure. • Bridge Driver failure.	During initialisation, if Bridge Driver state changes to CONFIG_LOCK, report config invalid fault.	Bridge Driver has entered the "Configuration Lock Mode" during configuration.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	3 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
MD_BRIDGE_CONFIG_STALLED—FAULT	C0595	This monitor checks if: • Micro controller SPI failure. • Bridge Driver failure.	Verify configuration check is completed within BRIDGE_DRV_CFG_STALLED_TIMEOUT.	Bridge Driver configuration data check was not completed within 20ms.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	200 ms	Type A. MIL Illumination.
MD_BRIDGE_CB_UNDER_VOLTAGE_FAULT	C0580	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	During run time, the Bridge Driver reports charge pump buffer under voltage error on the CB pin of the Bridge driver ASIC (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND (In register shutdown error "CB undervoltage shutdown" is set AND In register internal error "CB undervoltage detection error" is set).	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_CF_BRIDGE_CONFIG_FAULT	C0595	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	During run time Bridge Driver reports error (using ERR line and SPI error registers).	• bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) AND • SPI status "config valid" bit is not set AND • the fault has occurred more than once in this ignition cycle.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/Ims	Type A. MIL Illumination.
MD_BR|DGE_CF_BR|DGE_ECC_FAULT	C0595	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	During run time Bridge Driver reports error (using ERR line and SPI error registers).	special event register of bridge driver indicates that error correction of control register failed AND the fault has occurred more than once in this ignition cycle.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_CF_REG1_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	During run time Bridge Driver reports error (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB—BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register internal errors "overvoltage internal regulator 1 error" is set AND the fault has occurred only once in this ignition cycle.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_BRIDGE_REFERENCE_VOLTAGE_FAULT	C0580	This monitor checks if: • Micro controller • Bridge Driver amplifier reference voltage ADC failure.	Verify Bridge Driver reference voltage is within limits.	HW Pin for reference voltage (IOHWAB_BRIDGE_1_REF_VOLTAGE) is not between 2.25V and 2.75V.	• ECU provides assist AND • No safe state on bridge driver	18ms/128 counts	Type A. MIL Illumination.
MD_BRIDGE_3V3_UNDER_VOLTAGE_FAULT	C0580	This monitor checks if: • Bridge Driver incorrect operation.	Monitor Bridge Driver reporting under voltage error on its VCC (V3V3) pin.	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register external errors "VCC Undervoltage Detection Error" is set.	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_3V3_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bridge Driver incorrect operation.	Bridge Driver is reporting over voltage on its VCC (V3V3) pin.	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register external errors "VCC Undervoltage Detection Error" is set.	• ECU provides assist AND • No safe state on bridge driver	1 count/Ims	Type A. MIL Illumination.
MD_BR|DGE_ERR_STUCK_LO_FAULT	C0582	This monitor checks if: • Bridge Driver ERR line connectivity • Bridge driver incorrect operation.	Check M1_BD_ERR line state.	During self test, the bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR), when Current Sense Amplifier 1&2 - Gain 2 (=BD_REG_0P_GAI_2) was set to a valid value.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	3 msec	Type A. MIL Illumination.
MD_BRIDGE_VS_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bridge Driver incorrect operation • Battery Voltage	During run time Bridge Driver reports VS over voltage error (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND (In register shutdown error "Vs Overvoltage Shutdown" is set OR In register external error "Vs Overvoltage Detection Error" is set).	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_BRIDGE_VS_UNDER_VOLTAGE_A_FAULT	P0562	This monitor checks if: • Low battery voltage	Bridge driver will detect undervoltage condition. The software shall interrogate the Bridge Driver to determine whether the fault is valid and if valid raises the fault.	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register external errors "Vs Undervoltage Detection Error" is set.	• ECU provides assist AND • No safe state on bridge driver	18ms/128 counts	Type C, No MIL, "Emissions Neutral Diagnostic "
MD_BRIDGE_VS_UNDER_VOLTAGE_B_FAULT	C0580	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports VS under voltage error (using ERR line and SPI error registers), but battery voltage is greater than BD_VSU_UV_DETECT_THRESHOLD.	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register external errors "VS Undervoltage Detection Error" is set AND battery voltage is >= 6.5V.	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_VOLTAGE_TOO_HI_EVENT	P0563	This monitor checks if: High battery voltage	Bridge voltage state is checked to see if it is normal. Then is checked for sustained abnormal battery voltage. If battery voltage is higher than high pause threshold for high pause holdoff period, and the transient over voltage threshold is not in use (bridge limit at 0%), then "too high" event is raised and bridge voltage state is changed to too high.	Voltage at bridge driver > 26.0V	• Motor power switch on AND • ENQ pin active	1 count/Ims	Type B. MIL Illumination.
MD_BR|DGE_VDHP_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bridge Driver incorrect operation • Battery Voltage	During run time Bridge Driver reports VDHP over voltage error (using ERR line and SPI error registers).	• The voltage on the VS pin of the bridge driver ASIC is above 39.95V • Bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND (In register shutdown error "VDHP Overvoltage Shutdown" is set AND In register external error "VDHP Overvoltage Detection Error" is set).	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MDBRIDGEVDHPUVAFAULT	C0580	This monitor checks if: • Excessive local temperature OR failures that cause incorrect detection of over temperature.	Data read from Bridge Driver over SPI indicates an undervoltage on the VDHP pin of the Bridge Driver ASIC.	• The voltage on the VS pin of the bridge driver ASIC is below 3.96V • Bridge driver error output pin is active IOHWAB-BRIDGE—1_ERROR) OR the SPI status "error flag" is set AND In register External errors "VDHP Undervoltage Detection Error" is set	• ECU provides assist AND • No safe state on bridge driver	18msec/128 counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_BRIDGE_VDHP_UV_B_FAULT	C0580	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports VDHP under voltage error (using ERR line and SPI error registers), but battery voltage is greater than BD_VDHU_UV_DETECT_ THRESHOLD.	• The voltage on the VS pin of the bridge driver ASIC is below 3.96V • Bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register External errors "VDHP Undervoltage Detection Error" is set AND battery voltage is > 6.5V.	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_UNDEFINED_ERROR_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	During run time SPI error status flag OR Bridge ERR line is active, but no faults are reported in SPI error registers.	Bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set	• ECU provides assist AND • No safe state on bridge driver	1 count/1 ms	Type A. MIL Illumination.
MD_BRIDGE_UNEXPECTED_MODE_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	Bridge Driver reports unexpected state.	Below conditions are not satisfied. ((sBridgeDriver.ICMode == BRDG_NORMAL_OPERATION) || (sBridgeDriver.State == BD_SHUTDOWN) || ((sBridgeDriver.ICMode == BRDG_ERROR_MODE) && (IOHWAB_BRIDGE_1_ERROR == ACTIVE)))	• ECU provides assist AND • No safe state on bridge driver	16 counts/ 16ms	Type A. MIL Illumination.
MD_BR|DGE_UNEXPECTED_STATE_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	Verify Bridge driver state is as expected during initialisation.	Bridge driver mode is not at the expected state during configuration.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	3 counts / 3 ms	Type A. MIL Illumination.
MD_BRIDGE_SOFF_STUCK_LO_FAULT	C0582	This monitor checks if: • M1_BD_SOFF signal not working correctly.	Check bridge driver status is reported as "normal" mode" when M1_BD_SOFF is inactive.	When bridge test pin (IOHWAB_BRIDGE_1_ TEST) is driven active, bridge driver state (sBridgeDriver.State) did not change to BD_NORMAL.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	2 counts /2ms	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
MD_BRIDGE_SPI_MSG_FAILED_FAULT	C0595	This monitor checks if: • Bridge Driver incorrect operation • Microcontroller SPI failure.	Bridge Driver reports SPI errors (using SPI error registers) OR received SPI message CRC is invalid.	("SPI error flag" is set in SPI status AND Either "Invalid Address Access", "SPI Time-out", "SPI Frame error", "SPI Time-out", "SPI CRC error" is set in SPI communication and configuration error register) OR Invalid SPI response is received.	Ignition State = ON OR Wake ON CAN	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_SPI_RESP_TIMEOUT_FAULT	C0595	This monitor checks if: • Incorrect low level SPI driver operation.	Verify Bridge Driver low level SPI communication is working.	Low level SPI driver is not responding.	(Ignition State = ON OR Wake ON CAN AND Battery Voltage > 6V AND Bridge Driver is not reporting under voltage	1 count/1 ms	Type A. MIL Illumination.
MD_BRIDGE_REG_UNDER_VOLTAGE_FAULT	C0580	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports internal regulator under voltage error (using ERR line and SPI error registers), but battery voltage is greater than BD_IRU_UV_DETECTTHRESHOLD.	• Bridge Driver internal regulator voltage < 6.5V @1/256V/bit • Bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register internal error "Undervoltage Internal Regulator 4 or 5 or 6 Error" is set.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1 ms	Type A. MIL Illumination.
MD_BR|DGE_REG1_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports Internal regulator over voltage error (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register internal errors "overvoltage internal regulator 1 error" is set AND the fault has occurred only once in this ignition cycle.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1 ms	Type A. MIL Illumination.
MD_BRIDGE_REG6_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports Internal regulator over voltage error (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register internal errors "overvoltage internal regulator 6 error" is set	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_BRIDGE_RECONFIGURED_EVENT	C0582	This monitor checks if: • Faults detected which require reconfiguration of Bridge driver.	To indicate when Bridge driver reconfiguration was performed.	Bridge Driver reconfiguration was requested.	EcuC.rootState_active == EcuC_MotorDriveOn AND DrvStg.SafeStateRequired == FALSE AND Battery Voltage > 6V AND Bridge Driver is not reporting under voltage	1 count/1 ms	Type A. MIL Illumination.
MD_BRIDGE_OVER_CURRENT_FAULT	C0590	This monitor checks if: • Bridge Driver incorrect operation.	Bridge Driver reporting amplifier over current errors.	IOHWAB_BRIDGE_1_ERROR is active OR in SPI status "error flag" is set AND In register current sense amplifier errors "err_oc_op1 or err_oc_op2 or err_oc_op3" are set.	EcuC.rootState_active == EcuC_MotorDriveOn AND DrvStg.SafeStateRequired == FALSE AND Battery Voltage > 6V AND Bridge Driver is not reporting under voltage	1 count/1 ms	Type A. MIL Illumination.
MD_BRIDGE_OVER_TEMP_ERROR_FAULT	C05C2	This monitor checks if: • Excessive local temperature OR failures that cause incorrect detection of over temperature.	During run time Bridge Driver reports over temperature error (using SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register shutdown error "Overtemperature Shutdown" is set.	• ECU provides assist AND • No safe state on bridge driver	1 count/1 ms	Type A. MIL Illumination.
MD_BRIDGE_OSF_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports output stage feedback failure (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register for output stage feedback errors any error is set	• ECU provides assist AND • No safe state on bridge driver	1 count /1ms	Type A. MIL Illumination.
MDBRIDGEECCFAILFAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports ECC failure (using SPI error registers).	special event register of bridge driver indicates that error correction of control register failed AND the fault has occurred more than once in this ignition cycle.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_BRIDGE_HS_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports high side capacitor over voltage error (using ERR line and SPI error registers).	• Bridge Driver highside capacitor voltage < 6.5V @1/256V/bit • bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register internal error "High-side Buffer Capacitor 1 or 2 or 3 Overvoltage Detection Error" is set.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_HS_UNDER_VOLTAGE_FAULT	C0580	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports high side capacitor under voltage error (using ERR line and SPI error registers), but battery voltage is greater than BD_HBCU_UV_DETECT_THRESHOLD.	• Bridge Driver highside capacitor voltage < 6.5V @1/256V/bit • bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register internal error "High-side Buffer Capacitor 1 or 2 or 3 Undervoltage Detection Error" is set.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_NOT_DISABLED_FAULT	C0582	This monitor checks if: • Bridge Driver enable signal connectivity.	The microprocessor shall test that when M1_BD_ENA (bridge driver enable) is inactive, motor FETs can not be driven.	Set bridge driver HW enable Pin (IOHWAB—BRIDGE_1-ENABLE) inactive and set all three bottom FETs ON. After 100us all bottom FETS were not disabled.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	39 ms	Type A. MIL Illumination.
MD_BR|DGE_SOFF_NOT_DISABLED_FAULT	C0582	This monitor checks if: • Bridge Driver SOFF signal connectivity.	The microprocessor shall test that when SOFF pin is inactive, motor FETs can not be driven.	Set bridge driver HW SOFF Pin inactive and set all three bottom FETs ON. After 100us all bottom FETS were not disabled.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	40 ms	Type A. MIL Illumination.
MD_BRIDGE_SOFF_NOT_ENABLED_FAULT	C0582	This monitor checks if: • Bridge Driver SOFF signal connectivity.	The microprocessor shall test that whenSOFF pin is active motor FETs can be driven.	Set bridge driver HW SOFF Pin active with all three bottom FETS already ON. After 100us even one bottom FET was not enabled.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	30 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
MD_BRIDGE_LATENT_WARNING_EVENT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	The BD has reported a 'latent fault' (over SPI)	In SPI status "SPI special event" is set AND In special events register "SPI Latent Fault Warning" is set.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_NOT_ENABLED_FAULT	C0582	This monitor checks if: • Bridge Driver enable signal connectivity.	The microprocessor shall test that when M1_BD_ENA (bridge driver enable) is active motor FETs can be driven.	Set bridge driver HW enable Pin (IOHWAB_BRIDGE_1_ENABLE) active with all three bottom FETS already ON. After 100us even one bottom FET was not enabled.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	29 msec	Type A. MIL Illumination.
MD_BRIDGE_CP_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports charge pump over voltage error (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register external error "charge pump overvoltage detection error" is set.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/Ims	Type A. MIL Illumination.
MD_BR|DGE_CP1_OVERLOAD_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports CP1 overload error (using ERR line and SPI error registers).	special event register of bridge driver indicates that error correction of control register failed AND (In register internal errors "Charge Pump 1 Overload Error" is set OR In register shutdown errors "Vs Path Charge Pump Input Overload" is set).	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_CP2_OVERLOAD_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports CP2 overload error (using ERR line and SPI error registers).	special event register of bridge driver indicates that error correction of control register failed AND (In register internal errors "Charge Pump 2 Overload Error" is set	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_BRIDGE_DDP_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports digital driving path failure (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register shutdown error "Digital Driving Path Stucked Shutdown" is set.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_DRV_BIST_CB_UV_FAULT	C0580	This monitor checks if: • Bridge Driver incorrect operation.	Perform Bridge driver charge pump buffer (CB) under voltage self test.	When Bridge Driver was put into CB under voltage self test mode and after 5msec, bridge driver error output pin was not active (IOHWAB_BRIDGE_1_ERROR)	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	85 ms	Type A. MIL Illumination.
MD_BRIDGE_DRV_BIST_CSA_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	Perform Bridge driver amplifier gain BIST.	When Bridge Driver was put into CSA Gain self test mode, bridge driver error output pin is not active (IOHWAB_BRIDGE_1_ERROR) OR Isense reading was not within limits.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	100 ms	Type A. MIL Illumination.
MD_BR|DGE_DRV_B|ST_CSA_VRO_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	Perform Bridge driver CSA VRO BIST.	When Bridge Driver was put into CSA VRO self test and self test was finished, one of the CSA 1/2/3 supply over voltage/under voltage error bit was not set.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	170 ms	Type A. MIL Illumination.
MD_BRIDGE_DRV_BIST_SHORT_CCT_FAULT	C0582	This monitor checks if: • Bridge Driver short circuit detection not working.	Bridge driver built in high/low side short circuit detection test.	When Bridge Driver was put into short circuit test mode and FET was driven, bridge driver error output pin was not active (IOHWAB_BRIDGE_1_ERROR) OR Short circuit error bits were not set in register OR High-side 1/2/3 Drain Source Measurement were not at expected value.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	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
MD_BRIDGE_DRV_BIST_TIMEOUT_FAULT	C0582	This monitor checks if: • Bridge Driver BIST not working correctly.	Built-in selftest timeout.	Bridge Driver built in self test was not completed within 100msec.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_DRV_BIST_VCC_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	Perform Bridge Driver's VCC built in self test.	When Bridge Driver was put into VCC self test mode, bridge driver error output pin was not active (IOHWAB_BRIDGE_1_ERROR) OR VCC under voltage error bit was not set in external error register	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	2 counts/50ms	Type A. MIL Illumination.
MD_BRIDGE_DRV_INHIBIT_ FAULT	C0582	This monitor checks if: • Bridge Driver inhibit signal connectivity • Bridge Driver incorrect operation.	Verify Bridge Driver will be in SLEEP mode, if Bridge driver is inhibited.	When HW inhibit Pin (IOHWAB_BRIDGE_1JNHIBIT) is active, the bridge driver operation mode register did not indicate that it is in the expected Sleep Mode.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	2counts/2ms	Type A. MIL Illumination.
MD_BR|DGE_DRV_WAKE_UP_FAULT	C0582	This monitor checks if: • Bridge Driver inhibit signal connectivity • Bridge Driver incorrect operation.	Remove Bridge inhibit and verify SPI comms is started and Bridge Driver state changes to IDLE.	When HW inhibit Pin (IOHWAB_BRIDGE_1JNHIBIT) is driven inactive, the bridge driver operation mode register did not transit from Sleed Mode to the expected Idle Mode.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	2counts/2ms	Type A. MIL Illumination.
MD_BRIDGE_SHORT_CIRCUIT_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	This failsafe checks the SPI communication from the bridge driver to see if it is reporting a short circuit fault. This failsafe operates at run-time	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register Short Circuit Errors any of the "Short Circuit at High/Low-side 1 or 2 or 3" are set.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	3 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MOTOR_DEMAG_WARN	C05C2	This monitor checks if: Motor magnet over temperature.	Motor magnet temperature is greater than threshold.	Sets when the estimated motor magnet temperature is > 140°C	Power ON, Continuous Failsafing	5 msec	Type A. MIL Illumination.
MOTOR_DEMAG_FAIL	C05C2	This monitor checks if: Motor magnet over temperature.	Motor magent temperature is greater than threshold.	Sets when the estimated motor magnet temperature is>160°C	Power ON, Continuous Failsafing	20 msec	Type A. MIL Illumination.
MOTOR_OVER_TEMP_WARN	C05C2	This monitor checks if: Motor winding over temperature.	Motor winding temperature is greater than threshold.	Sets when the estimated motor winding temperature is>190°C	Power ON, Continuous Failsafing	20 msec	Type A. MIL Illumination.
MOTOR_OVER_TEMP_FAIL	C05C2	This monitor checks if: Motor winding over temperature.	Motor winding temperature is greater than threshold.	Sets when the estimated motor winding temperature is > 220°C	Power ON, Continuous Failsafing	20 msec	Type A. MIL Illumination.
MD_PU_BRIDGE_PIR_CLOSE1_LSD_FAULT	C0580	This monitor checks if: o Bridge driver disabled o Bridge driver in safe off mode o Bridge driver malfunctioning	■Driven phase is detected as not low when it should be driven low.	■Driven phase voltage > 1.2V when < 1.2V expected	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	2 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
MD_PU_BRIDGE_PIR_CLOSE1_OPEN_CCT_FAULT	C0580	This monitor checks if: o Open motor phase -Due to connector signals open -Due to open within ECU motor circuit -Due to open within ACU motor circuit	Non-driven phase voltages not pulled low while FETs are driven closed.	▪phase voltage > 1.2V when < 1.2V expected	• If MD_PU_BRIDGE_PIR_CLOSE1_LSD_FAULT detects, this fault will not detect.	2 msec	Type A. MIL Illumination.
SCP1CORRELATIONERROR	C0574	This monitor checks if: SCP1 signal failure	The SCP1.SCP2 and PTS sensor signals are used to compare and identify a single failed sensor signal. This fault is set if the difference exceeds the error threshold value.	|SCP_1 - SCP_2| > 5 Bar	Input signals valid for some time (allow system/signal to initialize)	125-500 ms 18000 Counts	Type A. MIL Illumination.
SCP2CORRELATIONERROR	C0574	This monitor checks if: SCP2 signal failure	The SCP1.SCP2 and PTS sensor signals are used to compare and identify a single failed sensor signal. This fault is set if the difference exceeds the error threshold value.	|SCP_1 - SCP_2| > 5 Bar	Input signals valid for some time (allow system/signal to initialize)	125-500 ms 18000 Counts	Type A. MIL Illumination.
SCP1_OFFSET_ERROR	C0574	This monitor checks if: SCP1 signal failure	The offset required to zero the Secondary circuit pressure sensor is larger than the specification limit.	|SCP_1_Off| > 10 Bar	The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result. To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake,	100 ms Goal: 18000	Type A. MIL Illumination.
SCP2OFFSETERROR	C0574	This monitor checks if: SCP2 signal failure	The offset required to zero the Secondary circuit pressure sensor is larger than the specification limit.	|SCP_2_Off| > 10 Bar	The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result. To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake,	100 ms Goal: 18000	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
BP_MODEL_TOO_HIGH_ERROR	C053D	This monitor checks if: Common cause Boost Pressure Sensor failure (in-range high)	The system models an expected boost pressure based on motor position change. This fault indicates that the boost pressure sensor indicates higher pressure than predicted by the model and than evidenced by the vehicle deceleration.	• Valid braking request (driver or autonomous) • BP_Model (MPS) < Boost pressure - 50 Bar • Vehicle deceleration is not observed	• Signal valid; • No ABS; • vehicle at speed and is slowing down. • driver not on throttle and requested enough pressure	500 ms Goal:18000	Type A. MIL Illumination.
BP_MODEL_TOO_LOW_ERROR	C053D	This monitor checks if: Common cause Boost_P failure (in-range-low)	The system models an expected boost pressure based on motor position change. This fault indicates that the boost pressure sensor indicates lower pressure than predicted by the model and than evidenced by the vehicle deceleration.	• Valid braking request (driver or autonomous) • BPJModel (MPS) > Boost pressure + 5 Bar • Vehicle deceleration is observed	• Signal valid; • No ABS; • DAP close to end position; • vehicle at speed not slowing down much; • driver not on throttle and requested enough pressure	500 ms Goal:18000	Type A. MIL Illumination.
BP1_CORRELATION_ERROR	C053D	This monitor checks if: BP1 signal failure	The BP1, BP2, and DAP position signals are used to compare and identify a single failed sensor signal	|Boost_P_1 - Boost_P_2| > 5 Bar	Input signals valid for some time (allow system/signal to initialize)	125-500 ms 18000 Counts	Type A. MIL Illumination.
BP2_CORRELATION_ERROR	C053D	This monitor checks if: BP2 signal failure	The BP1, BP2, and DAP position signals are used to compare and identify a single failed sensor signal	|Boost_P_1 - Boost_P_2| > 5 Bar	Input signals valid for some time (allow system/signal to initialize)	125-500 ms 18000 Counts	Type A. MIL Illumination.
BP_RAW_OFFSET_ERROR	C053D	This monitor checks if: Boost Pressure Sensor Failure	The offset required to zero the Boost Pressure sensor is larger than the specification limit of 50 bar.	|BP_RAW_Off| > 50 BAR	• Input signal valid; • Driver request, DAP position, suggest there should be no pressure; • Vehicle acceleration, vehicle at speed.	500 ms Goal:18000	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
BP1_OFFSET_ERROR	C053D	This monitor checks if: BP1 signal failure	The offset required to zero the Boost Pressure sensor is larger than the specification limit	|BOOST_P_1_Off| > 10 Bar	The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result. To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake.	100 ms Goal: 18000	Type A. MIL Illumination.
BP2_OFFSET_ERROR	C053D	This monitor checks if: BP2 signal failure	The offset required to zero the Boost Pressure sensor is larger than the specification limit	|BOOST_P_2_Off| > 10 Bar	The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result. To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake.	100 ms Goal: 18000	Type A. MIL Illumination.
MC_PRES_SEN_ERRATIC	C053D	This monitor checks if: • Intermittent failure of the pressure sensor. • Intermittent open or short in the internal circuitry of the printed circuit board.	• Pressure Sensor Erratic • This diagnostic checks both raw Boost Pressure principle and reference signals.	Ohmic 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
SC_PRES_SEN_SHORTED_LOW	C0571	This monitor checks if: • Defective pressure sensor. • Defective pressure sensor connector. • Defective printed circuit board. Defective microprocessor feedback input port.	• Pressure Sensor Shorted Low • This diagnostic checks both raw Boost Pressure principle and reference signals.	principal sensor voltage < 4.61% of principle sensor supply voltage OR reference sensor voltage < 4.85% of reference sensor supply voltage	• Sensor voltage supply in range • Secondary Circuit Pressure Sensor is enabled	100 ms	Type A. MIL Illumination.
SC_PRES_SEN_OPEN_OR_SHRT_HIGH	C0572	This monitor checks if: • Defective pressure sensor. • Defective pressure sensor connector. • Defective printed circuit board. Defective microprocessor feedback input port.	• Pressure Sensor Open or Shorted High • This diagnostic checks both raw Boost Pressure principle and reference signals.	principal sensor voltage > 95.24% of principle sensor supply voltage OR reference sensor voltage > 94.50% of reference sensor supply voltage	• Sensor voltage supply in range • Secondary Circuit Pressure Sensor is enabled	100 ms	Type A. MIL Illumination.
SC_PRES_SEN_ERRATIC	C0574	This monitor checks if: • Intermittent failure of the pressure sensor. • Intermittent open or short in the internal circuitry of the printed circuit board.	• Pressure Sensor Erratic • This diagnostic checks both raw Boost Pressure principle and reference signals.	Ohmic Status Faulted = Sensor open or shorted to sensor supply (conditions for SC_PRES_SEN_OPEN_OR_SHRT_HIGH) or Sensor shorted to ground (conditions for SC_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 • Secondary Circuit Pressure Sensor is enabled	80 ms Goal: 800	Type A. MIL Illumination.
PRESSURE_SENSOR_MISS|NG_CAL|BRAT|ON	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.
SWAGAINERROR	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 "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
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 "
SWARAWJDFFSETERROR	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_0FFSET_ERR0R_THR_S16 SWA_RAW_0FFSET_ERR0R_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 "
SWAMAXVALUEERROR	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 Corrected) > 1440° before initialization OR Relative SWA sensor: |Swa zeroed| > 720° after initialization	1. SWA is valid and calibrated 2. Emissions Rolls Test Inactive	200 ms OR 200 ms before initialization OR 200 ms after initialization	Type C, No MIL, "Emissions Neutral Diagnostic "
SWANOTALIVEERROR	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) > 57s [2]	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 "
SWASTEPERROR	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_NOT_ALIVE_ERROR	C0061	This monitor checks if: • electronic fault in sensor	• Lat Acceleration Sensor - Not Alive Fault • The Lat Acc signal does not change or is locked at a rail value. • This failure is set if the lateral acceleration sensor is not able to change its value anymore or if it is outside the specified max range.	1. lat acc signal ? +/- 25 m/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_STEP_ERROR	C0061	This monitor checks if: • electronic fault in sensor • mechanical mounting of sensor	• Lat Acceleration Sensor - Step Error • The Lat Acc signal has to show a gradient above a certain threshold.	Raw Lat Acc signal change is > 800 m/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 "
LAT_SENSOR_OFFSET_ERROR	C0061	This monitor checks if: • Sensor Open • Open circuit in ECU in series with sensor input	• Lat Acceleration Sensor - Offset Error • The Lat Acc signal shows an offset out of specification.	Before Initialization: 1. 1 Continuously learned offset is > 4 m/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 "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
LAT_SENSOR_GAIN_ERROR	C0061	This monitor checks if: • electronic fault in sensor	• Lat Acceleration Sensor - Gain Error • This function computes the difference between the measured ay signal and an ay estimate, based on a vehicle model. If the difference between the two is above a threshold for a certain period of time, a sensor fault is set.	1. The difference between the measured Lat Acc (zeroed) and the estimated Lat Acc is > failure threshold OR 2. The difference between the measured Lat Acc (zeroed) and the estimated Lat Acc is > two times the failure threshold The fault basic threshold is based on the initialization state: Before Initialization: 4 m/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. 1.5s 2. .75 s	Type C, No MIL, "Emissions Neutral Diagnostic "
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_STEP_ERROR	C0551	This monitor checks if: • electronic fault in sensor • mechanical mounting of sensor	• Long Acceleration Sensor - Step Error • The Long Acceleration signal has to show a gradient above a certain threshold.	Raw Long Acc signal change is > 800 m/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_GAIN_ERROR	C0551	This monitor checks if: • electronic fault in sensor	• Long Acceleration Sensor - Gain Error • This monitoring recognizes offset faults as well as amplification faults.	Change in estimated Long Acc > 0.2 m/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_AL1VE_ERROR	00063	This monitor checks if: • electronic fault in sensor	• Yaw Rate Sensor - Not Alive Error • The Yaw Rate signal does not change or is locked at a rail value.	1. Yaw rate is constant AND |Yaw rate| < 85°/s AND Vehicle Speed > 3 m/s^2 2. |Yaw rate| ? 130°/s	• Emissions Rolls Test Inactive AND 1. Yaw Rate is valid Wheel speed info is valid Vehicle speed > 3 m/s	1. 1 s 2. 100 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
YAW_SENSOR_STEP_ERROR	C0063	This monitor checks if: • defective sensor • mechanical mounting of the sensor • Stone impingement at the floor pan	• Yaw Rate Sensor - Step Error • The Yaw Rate signal has to show a gradient above a certain threshold.	Yaw rate gradient > 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 "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
YAW_SENSOR_OFFSET_ERROR	C0063	This monitor checks if: • electronic sensor fault	• Yaw Rate Sensor - Offset Error • The Yaw Rate signal shows an offset out of specification.	While Standing Still 1 Continously learned offset > 5 deg/sec while vehicle standing still. (Offset must remain present as vehicle driven away following statndstill condition) Before Initialization while driving: 2 learned offset is > 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 "
YAW_SENSOR_GAIN_ERROR	C0063	This monitor checks if: • electronic fault in sensor	• Yaw Rate Sensor - Gain Error • This monitoring recognizes offset faults as well as amplification faults.	1. The difference between the measured Yaw rate (zeroed) and the estimated Yaw rate is > failure threshold OR 2. The difference between the measured Yaw rate (zeroed) and the estimated Yaw rate is > two times the failure threshold The fault basic threshold is based on the initialization state: Before Initialization: 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 "
PTS_TO_SCP_MODEL_TOO_HIGH_ERROR	C05D2	This monitor checks if: • Master cylinder seal leakage to reservoir • Pedal Simulator seal leakage to reservoir • In-range failure of SOP sensor	The BHS function includes a model of expected simulator Pressure based on driver pedal position. MODEL_TOO_HIGH_ERROR detects the situation where the modeled pressure is much higher than the measured pressure. Given certain travel, some amount of minimun pressure is expected in the SC. Otherwise something is wrong.	BHS modeled pressure > SCP Measured Pressure + 20 Bar Look up table (add lookup table to appendices)	PTS > the minimum point on the lookup table	500 ms Goal: 18000 Counts	Type A. MIL Illumination.
PTS_TO_SCP_MODEL_TOO_LOW_ERROR	C05D3	This monitor checks if: • Pedal Simulator Valve is closed or blocked • Pedal Simulator seized/fails to store fluid • In-range failure of SOP sensor	The BHS function includes a model of expected simulator Pressure based on driver pedal position. MODEL_TOO_LOW_ERROR detects the situation where the modeled pressure is much lower than the measured pressure.	BHS modeled pressure < SCP Measured Pressure - 20 Bar	The brake event is not a fast apply (which may cause unpredictable high pressure)	500 ms 18000 Counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PTS1_OUT_OF_RANGE_ERROR	C05CC	This monitor checks if: • Failure of PTS1 • Failure of travel sensor cursor rod	During normal operation the input piston travel is physically limited to ~25 mm, and during NO_BOOST operation it is limited to ~36 mm. The sensor is capable of measuring travel up to 43 mm. Reported travel by a single sensor in excess of these limits is indicative of a sensor error.	• PTS1 signal > 38 mm AND • PTS2 signal and SCP signal agree that actual travel is in range Not checking for SCP	Signal is valid	5 s 18000 Counts	Type A. MIL Illumination.
PTS2_OUT_OF_RANGE_ERROR	C05CF	This monitor checks if: • Failure of PTS2 • Failure of travel sensor cursor rod	During normal operation the input piston travel is physically limited to ~25 mm, and during NO_BOOST operation it is limited to ~36 mm. The sensor is capable of measuring travel up to 43 mm. Reported travel by a single sensor in excess of these limits is indicative of a sensor error.	• PTS2 signal > 38 mm AND • PTS1 signal and SCP signal agree that actual travel is in range Not checking for SCP	Signal is valid	5 s 18000 Counts	Type A. MIL Illumination.
PTS1_STEP_ERROR	C05CC	This monitor checks if: • Failure of PTS1 signal line	The PTS1 sensor signal changes at a physically implausible rate, resulting in a signal that disagrees with PTS2 signal, and a modeled pressure that disagrees with the SCP (i.e. PTS2 model and SCP signals agree on driver braking level, PTS1 model and SCP disagree)	• PTS1 signal gradient > 700 mm/s • |PTS1 - PTS2| > Error_threshold • Model(PTSI) <> SCP and Model(PTS2) == SCP	Signal is valid	50 ms Goal: 10 Counts	Type A. MIL Illumination.
PTS2_STEP_ERROR	C05CF	This monitor checks if: • Failure of PTS2 signal line	The PTS2 sensor signal changes at a physically implausible rate, resulting in a signal that disagrees with PTS1 signal, and a modeled pressure that disagrees with the SCP (i.e. PTS1 model and SCP signals agree on driver braking level, PTS2 model and SCP disagree)	• PTS2 signal gradient > 700 mm/s • |PTS1 - PTS2| > Errorjhreshold • Model(PTS2) <> SCP and Model(PTS1) == SCP	Signal is valid	50 ms Goal: 10 Counts	Type A. MIL Illumination.
PTS1SENTRECEIVEERROR	C2A13	This monitor checks if: PTS1 SENT data error	The PTS2 SENT message is comprised of a 12 bit data value (pedal travel), a 12 bit data value (motor position), a 4 bit CRC, and a 4 bit status field.	PTS1 data < Lower_Threshold OR PTS1 data > Upper_Threshold OR PTS1 upper nibbles + PTS1 lower nibbles != 4095	Any of the following conditions: • SENT message Checksum error • SENT status field indicates receive failure • Received pedal travel is out-of-range low (0) • Received pedal travel is out-of-range high (4095)	5ms	Type A. MIL Illumination.

<table>
<tr><th>Component/ System</th><th>Fault Code</th><th>Monitoring Strategy Description</th><th>Fault Detection Criteria</th><th>Threshold Value</th><th>Secondary Parameter and Enable Condition</th><th>Maturation Time</th><th>MIL Illumination</th></tr>
<tr><td>PTS2_SENT_RECEIVE_ERROR</td><td>C2A14</td><td>This monitor checks if:
PTS2 SENT data error</td><td>The PTS1 SENT message is comprised of a 12 bit data value, its 12 bit complement, a 4 bit CRC, and a 4 bit status field</td><td>PTS2 data < Lower_Threshold OR
PTS2 data > Upper_Threshold</td><td>Any of the following conditions:
• SENT message Checksum error
• SENT status field indicates receive failure
• Data value and its complement do not combine to OxFFF
• Received position is out-of-range low (0)
• Received position is out-of-range high (4095)</td><td>5ms</td><td>Type A. MIL Illumination.</td></tr>
<tr><td>PTS1_SENT_MESSAGE_MISSING</td><td>C2A13</td><td>This monitor checks if:
Signal line is open or
shorted to GND.
Shorted to supply
Wiring</td><td>The SW indicates the failure to the driver interface and set the status of the received Pedal and Motor position value to invalid within FTTD_PEDAL_MOTOR POSITION_VALUE.</td><td>N/A</td><td>N/A</td><td>5 msec</td><td>Type A. MIL Illumination.</td></tr>
<tr><td>PTS2_MPS2_SENT_MESSAGE_MISSING</td><td>C2A14</td><td>This monitor checks if:
Signal line is open or
shorted to GND.
Shorted to supply
Wiring</td><td>the SW indicates the failure to the driver interface and set the status of the received Pedal and Motor position value to invalid within FTTD_PEDAL_MOTOR POSITION_VALUE.</td><td>N/A</td><td>N/A</td><td>5 msec</td><td>Type A. MIL Illumination.</td></tr>
<tr><td>PTS1_CORRELATION_ERROR</td><td>C05D0</td><td>This monitor checks if:
PTS1 Signal Failure</td><td>The PTS1, PTS2, and BAS sensor signals are used in a 2-out-of-3 correlation scheme to identify a single failed sensor signal</td><td>• |PTS1 - PTS2| > 2 mm AND
• |PTS1 - BAS| > 2 mm AND
• |PTS2 — BAS) < 2 mm</td><td>Signal is valid</td><td>125-500 ms
18000 Counts</td><td>Type A. MIL Illumination.</td></tr>
<tr><td>PTS2CORRELATIONERROR</td><td>C05D0</td><td>This monitor checks if:
PTS1 Signal Failure</td><td>The PTS1, PTS2, and BAS sensor signals are used in a 2-out-of-3 correlation scheme to identify a single failed sensor signal</td><td>• |PTS1 - PTS2| > 2 mm AND
• |PTS1 - BAS| > 2 mm AND
• |PTS2 — BAS| < 2 mm</td><td>Signal is valid</td><td>125-500 ms
18000 Counts</td><td>Type A. MIL Illumination.</td></tr>
</table>

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PTS_MISSING_CALIBRATION_ERROR	C05D4	This monitor checks if: • Missing Calibration • NVRAM error • ECU/ACU mismatch	The PTS calibrations are stored in NVRAM and reused at the start of each drive cycle. This fault sets if the stored calibrations don't match the values reported by the PTS sensor.	None	After system start up and read from NVRAM	30 msec	Type A. MIL Illumination.
PTS1_OFFSET_ERROR	C05CC	This monitor checks if: • defective sensor • mechanical mounting of the sensor	The offset required to zero the PTS sensor is larger than the specification limit.	|PTS1 Offset|>2.5 mm	The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result. To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake.	100ms Goal: 18000	Type A. MIL Illumination.
PTS2_OFFSET_ERROR	C05CF	This monitor checks if: • defective sensor • mechanical mounting of the sensor	The offset required to zero the PTS sensor is larger than the specification limit.	|PTS2 Offset) > 2.5 mm	The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result. To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake.	100ms Goal: 18000	Type A. MIL Illumination.
MPS2_CORRELAT|ON_ERROR	C058E	This monitor checks if: • MPS2 Failure • Note: MPS1 failure results in BOOSTED_BRAKE_SYSTEM_FAILURE for lack of motor rotation / pressure build	MPS1 is SPI based with a 50 usee update rate. MPS2 is SENT based with a 1 msec update rate. During motor rotation there is an expected difference in MPS1 and MPS2 based on the different time sampling rates (time lag on MPS2). MPS 1 and 2 moving different direction; or MPS 1 and 2 stopped at different relative postion than history	|MPS1 - MPS2| > 2 Degrees + 3 Degrees (motor speed offset) MPS 1 and 2 moving different direction; or MPS 1 and 2 stopped at different relative postion than history	Signal is valid	100 ms Goal: 18000	Type A. MIL Illumination.
MPS2_SENT_RECEIVE_ERROR	C2A1A	This monitor checks if: MPS2 Signal Failure	Monitor MPS2 sent data received from the SentSensor.	This failsafe detects when MPS2 sent data received from the SentSensor is out of the valid range.	MPS signal data is received.	5 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MPS_BIST_FAULT	C058A	This monitor checks if: MPS Built-in-Self-Test failure	Testing of this module should include running BIST at various MPS angles. The ECU performs an independent calculation parallel to internal MPU sensor BIST software. The fault will occur when the parallel calculations don't match.	The value calculated within the MPS does not equal the ECU calculated value.	BIST Inputs are not faulty.	30 msec	Type A. MIL Illumination.
MPS1_NOT_ALIVE_FAILURE	C058A	This monitor checks if: MPS1 Signal Failure	Any Condition	MPS == MPS_prev	MPS1 does not change for 5 consecutive readings.	100ms	Type A. MIL Illumination.
SYS_ASIC_VDBAT_RANGE_FAILURE	U3006	This monitor checks if: • VDBAT Voltage is outside the voltage range	• KL30_1 Supply voltage outside of the specified range • If the ASIC A/D value for VDBat is outside the acceptable range (VDBat < 6V or VDBat >25V) continuously for 100ms then the fault is set.	6V < KL30_1 Supply Voltage > 25V	• ASIC's VDBAT Voltage Result SPI field is outside the range of 6 and 25 volts for 100msec	100ms	Type C, No MIL, "Emissions Neutral Diagnostic "
SYS_ASIC_PDBAT_RANGE_FAILURE	U3007	This monitor checks if: • PDBAT Voltage is outside the voltage range	• KL30_2 Supply voltage outside of the specified range • If the ASIC A/D value for PDBat is outside the acceptable range (PDBat < 6V or PDBat >23V) continuously for 100ms then the fault is set.	6V < KL30_2 Supply Voltage > 23V	• ASIC's PDBAT Voltage Result SPI field is outside the range of 6 and 23 volts for 100msec	100ms	Type C, No MIL, "Emissions Neutral Diagnostic "
KL30_1_OPEN_OR_SHRTED_TO_GND	U3006	This monitor checks if: • Fuse blown (Open) • Short_to_Ground	A feedback ratio is calculated based on the KL30_1_Fdbk_A and KL30_2_Fdbk_B. • If the feedback ratio is lower than the valid lower threshold ratio, then KL30_1_Open_or_Shrted_to_Gnd fault is set	• Ratio = (KL30_1-KL30_2)/(KL30_1+KL30_2) • If PSSW1 AND PSSW2 are turned OFF OR at least one safety switch is turned ON • Fault is set if ratio is less than -30% • If PSSW1 AND/OR PSSW2 are turned ON and all safety switches are turned OFF, • Fault is set if ratio is less than -10%	• Power ON, Continuous Failsafing	75ms	Type 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
KL30_2_OPEN_OR_SHRTED_TO_GND	U3007	This monitor checks if: • Fuse blown (Open) • Short_to_Ground	A feedback ratio is calculated based on the KL30_1_Fdbk_A and KL30_2_Fdbk_B. • If this feedback ratio exceeds the valid upper threshold ratio, then KL30_2_Open_or_Shrted_to_Gnd fault is set. Note: Although the SW to tries to detect Fuse Blown/Shorted to ground with both switches on, fuse blown fault will not be detected due to the nature of the circuit and shorted to ground also may not be detected due to the damage that may be caused by this condition. Do not test this condition.	• Ratio = (KL30_1-KL30_2)/(KL30_1+KL30_2) • If PSSW1 AND PSSW2 are turned OFF OR at least one safety switch is turned ON, • Fault is set if ratio is greater than 30% • If PSSW1 AND/OR PSSW2 are turned ON and all safety switches are turned OFF, • Fault is set if ratio is greater than 10%	• Power ON, Continuous Failsafing	75ms	Type 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 "
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.	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_VOLTAGE_HIGH	P0563	This monitor checks if: • Voltage Supply is providing high voltage levels. • Defective printed circuit board.	System voltage is monitored continuously but the fault is not enabled during Engine crank. When the system voltage is continuously greater than 16.8V for more than 100 msec then the fault is set. When the system voltage is continuously less than 16.3V for more than 100 msec then the fault is cleared.	Filtered system voltage > 16.8 V	• Engine is not being cranked • System is not re-initializing or shutting down • System is not shutting down	100 ms	Type B. MIL Illumination.
SYSTEM_VOLTAGE_EXCESSIVE_HIGH	P0563	This monitor checks if: • Voltage Supply is providing excessively high voltage levels. • Defective printed circuit board.	System voltage is monitored continuously but the fault is not enabled during Engine crank. When the system voltage is continuously greater than 18.8V for more than 15 msec then the fault is set. When the system voltage is continuously less than 18.3V for more than 100 msec then the fault is cleared.	Filtered system voltage > 18.8V	• Engine is not being cranked • System is not re-initializing or shutting down • System is not shutting down	15 ms	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYSTEM_VOLTAGE_ECU_SELF_TEST_HOLD	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 "
SYSTEM_VOLTAGE_ERRATIC	P0562	This monitor checks if: • Voltage Supply is toggling between non-operational voltages and/or normal operating voltages • Defective cables. • Defective printed circuit board.	If the filtered System Voltage is above Excessive High Voltage threshold or below Low Voltage threshold, this fault counts toward failure and if the voltage is above Low Voltage and below Excessive High Voltage thresholds the fault counts toward passing. This fault is done this way to catch voltages jumping between non-operational voltages and/or normal operating voltages.	If (Filtered System Voltage > 18.8) || (Filtered System Voltage < 8.5) fail_counter += 15 else fail_counter -= 5 If fail_counter >= 900 set fault	• Engine is not being cranked • System is not re-initializing or shutting down • System is not shutting down	300ms minimum	Type C, No MIL, "Emissions Neutral Diagnostic "
PRIMARY_WAKEUP_LINE_STUCK_LOW	P2534	This monitor checks if: HW ignition line failure	The MCU compares the state of the Primary Wakeup Line with the 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 PPEI Engine General Status 1 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_PPEI_ENGINE_GENERAL_STATUS_1 fault is not latched)	2s	Type B. MIL Illumination.
PRIMARY_WAKEUP_LINE_STUCK_HIGH	P2535	This monitor checks if: HW ignition line failure	The MCU compares the state of the Primary Wakeup Line with theIgnition switch status signal from the ECM. If the Primary Wakeup Line is read as High but Ignition switch status signal indicates not Crank and not RUN 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 || RUN))	• Primary Wakeup COMMS Signal is Valid (Singal is Valid when MISSING_PPEI_ENGINE_GENERAL_STATUS_1 fault is not latched) •AND • Primary Wakeup Line is ON	2s	Type B. MIL Illumination.
INTERNAL_5V_SUPPLY_VOLT_ERRATIC	P0606	This monitor checks if: • Defective internal 5 V supply circuit • Defective printed circuit board • Defective microprocessor feedback input port • Defective Polaris ASIC feedback input port	If the filtered 5V supply toggles outside the allowed range but does not stay there long enough to mature the INTERNAL_5V_SUPPLY_VOLT_FAILURE then this fault is matured by an up/down counter on the condition	If the filtered System Voltage toggles as per the below range Filtered system voltage ? 4.75V Filtered system voltage ? 5.25 V	• Internal 5V supply is enabled •AND • None of the following are taking place: • System is initializing • System is re-initializing • Engine is being cranked • When requested by Diagnostic commands System is shutting down	800 counts/80ms minimum	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
ECU_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 not available. Note- Timeout fault is latched if system self-test doesn't finish within 2 seconds. This time doesn't include the on-hold time if the battery voltage is out of range.	None	Runs duting startup	5 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
PWR_PTS_MPS_SUP1_RANGE_LOW	C05D1	This monitor checks if: • Defective motor position sensor • Defective pedal travel sensor • Defective printed circuit board	The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS). The MCU monitors the feedbacks on these two voltage supplies. If either supply is continuously < 4.85V for 100ms then the respective supply fault is set.	if PWR<4.85for 100ms	• MPS1 sensor is enabled • PTS1 sensor is enabled AND • None of the following are taking place: • System is initializing • System is re-initializing • Engine is being cranked • When requested by Diagnostic commands System is shutting down	100ms	Type A. MIL Illumination.
PWR_PTS_MPS_SUP1_RANGE_HIGH	C05D1	This monitor checks if: • Defective motor position sensor • Defective pedal travel sensor • Defective printed circuit board	The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS). The MCU monitors the feedbacks on these two voltage supplies. If either supply is continuously > 5.15V for 100ms then the respective supply fault is set.	if PWR>5.15V for 100ms	• MPS1 is enabled • PTS1 is enabled AND • None of the following are taking place: • System is initializing • System is re-initializing • Engine is being cranked • When requested by Diagnostic commands System is shutting down	100ms	Type A. MIL Illumination.
PWR_PTS_MPS_SUP1_ERRATIC	C05D1	This monitor checks if: • Defective motor position sensor • Defective pedal travel sensor • Defective printed circuit board	The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS). The MCU monitors the feedbacks on these two voltage supplies. If a supply feedback is outside the acceptable range (< 4.85V or > 5.15V) then the respective erratic fault is matured at a weight of 50 toward a goal of 800 (fastest maturation = 80 msec). If the feedback voltage returns within the 4.85 - 5.15V range then the erratic fault is dematured at a weight of 1. Once the fault goal is reached then the fault is set and is ignition latched.	if PWR<4.85 or>5.15V	• MPS1 is enabled • PTS1 is enabled AND • None of the following are taking place: • System is initializing • System is re-initializing • Engine is being cranked • When requested by Diagnostic commands System is shutting down	80ms minimum	Type A, MIL Illumination.
PWR_PTS_MPS_SUP2_RANGE_LOW	C05BB	This monitor checks if: • Defective motor position sensor • Defective pedal travel sensor • Defective printed circuit board	The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS). The MCU monitors the feedbacks on these two voltage supplies. If either supply is continuously < 4.85V for 100ms then the respective supply fault is set.	if PWR<4.85 for 100ms	• MPS2 is enabled • PTS2 is enabled AND • None of the following are taking place: • System is initializing • System is re-initializing • Engine is being cranked • When requested by Diagnostic commands System is shutting down	100ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PWR_PTS_MPS_SUP2_RANGE_HIGH	C05BB	This monitor checks if: • Defective motor position sensor • Defective pedal travel sensor • Defective printed circuit board	The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS). The MCU monitors the feedbacks on these two voltage supplies. If either supply is continuously > 5.15V for 100ms then the respective supply fault is set.	if PWR>5.15V for 100ms	• MPS2 is enabled • PTS2 is enabled AND • None of the following are taking place: • System is initializing • System is re-initializing • Engine is being cranked • When requested by Diagnostic commands System is shutting down	100ms	Type A. MIL Illumination.
PWR_PTS_MPS_SUP2_ERRATIC	C05BB	This monitor checks if: • Defective motor position sensor • Defective pedal travel sensor • Defective printed circuit board	The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS). The MCU monitors the feedbacks on these two voltage supplies. If a supply feedback is outside the acceptable range (< 4.85V or > 5.15V) then the respective erratic fault is matured at a weight of 50 toward a goal of 800 (fastest maturation = 80 msec). If the feedback voltage returns within the 4.85 - 5.15V range then the erratic fault is dematured at a weight of 1. Once the fault goal is reached then the fault is set and is ignition latched.	if PWR<4.85 or>5.15V	• MPS2 is enabled • PTS2 is enabled AND • None of the following are taking place: • System is initializing • System is re-initializing • Engine is being cranked • When requested by Diagnostic commands System is shutting down	80ms minimum	Type A. MIL Illumination.
PWR_SW_COIL_SUP_OPEN	C053B	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30 supply inputs are switched on/off by the two Power Switches. The downstream KL30INT supplies the ABS Coils, the BB Coils and the Motor Driver. These three circuits are individually switched on/off by separate Safety Relays. When the Safety Relay is on the downstream voltage feedback is expected to be high. The MCU monitors the voltage feedback downstream from the ABS Coil Safety Relay. If the feedback voltage is less than 80% of KL30_INT for a continuous 50 msec then the fault is set.	If Feedback Voltage < 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.
PWR_SW_COIL_SUP_SHORT	C053B	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30 supply inputs are switched on/off by the two Power Switches. The downstream 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.
PWR_SW_BB_COIL_SUP_OPEN	C053B	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30 supply inputs are switched on/off by the two Power Switches. The downstream 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 BB Coil Safety Relay. If the feedback voltage is less than 80% of KL30_INT for a continuous 50 msec then the fault is set.	If Feedback Voltage < 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PWR_SW_BB_COIL_SUP_SHORT	C053B	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30 supply inputs are switched on/off by the two Power Switches. The downstream KL30 INT supplies the ABS Coils, the BB Coils and the Motor Driver. These three circuits are individually switched on/off by separate Safety Relays. When the Safety Relay is off the downstream voltage feedback is expected to be low. The MCU monitors the voltage feedback downstream from the BB Coil Safety Relay. If the feedback voltage is not less than 80% of KL30_INT for a continuous 50 msec then the fault is set.	If Feedback Voltage > 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.
PWR_SW_MOT_SUP_OPEN	C0595	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30 supply inputs are switched on/off by the two Power Switches. The downstream 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 Motor 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 < 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.
PWR_SW_MOT_SUP_SHORT	C0595	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30 supply inputs are switched on/off by the two Power Switches. The downstream 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 Motor Safety Relay. If the feedback voltage is not less than 80% of KL30 INT for a continuous 50 msec then the fault is set.	If Feedback Voltage > 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.
PWR_SW_PSSW1_SUP_OPEN	U3006	This monitor checks if: • Disconnected Switch • PCB Problem	This fault is not enabled is a Watchdog fault is already set. The KL30_1 and KL30_2 voltage supply inputs are individually switched on/off by separate Power Switch circuits. When either Switch is turned on then it's respective Power Switch Feedback is expected to be high. If the feedback voltage is less than 80% of it's respective KL30_x supply voltage for a continuous 50 msec then the fault is set	If Feedback Voltage < 80%of KL30_x	• Power ON, Continuous Failsafing	50 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
PWR_SW_PSSW1_SUP_SHORT	P0606	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30_1 and KL30_2 voltage supply inputs are individually switched on/off by separate Power Switch circuits. When both Switches are turned off then both Power Switch Feedbacks are expected to be low. If the feedback voltage is not less than 80% of it's respective KL30_x supply voltage for a continuous 50 msec then the fault is set.	If Feedback Voltage > 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PWR_SW_PSSW2_SUP_OPEN	U3007	This monitor checks if: • Disconnected Switch • PCB Problem	This fault is not enabled is a Watchdog fault is already set. The KL30_1 and KL30_2 voltage supply inputs are individually switched on/off by separate Power Switch circuits. When either Switch is turned on then it's respective Power Switch Feedback is expected to be high. If the feedback voltage is less than 80% of it's respective KL30_x supply voltage for a continuous 50 msec then the fault is set.	If Feedback Voltage < 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PWR_SW_PSSW2_SUP_SHORT	P0606	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30_1 and KL30_2 voltage supply inputs are individually switched on/off by separate Power Switch circuits. When both Switches are turned off then both Power Switch Feedbacks are expected to be low. If the feedback voltage is not less than 80% of it's respective KL30_x supply voltage for a continuous 50 msec then the fault is set.	If Feedback Voltage > 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.
SYS_ASIC_VCP12JJ1 2_VOLTAGE_LOW	P0606	This monitor checks if: Defective vehicle battery or Charging system Otherwise: -Defective system ASIC -Defective printed circuit board. • Defective system ASIC	The Polaris ASIC provides an internal VCP12 voltage regulator which is required to operate the I_SSR amplifier and to maintain regulation of the VA5pOregulators and the U3 and U1 linear regulators. If the VCP12 voltage is less that 7.25 V for 44 ?sec then the Polaris sets the VPC12 Low Voltage Warning SPI bit to True. Software monitors this SPI bit. If it is continuously True for more than 100 msec then the fault is set.	VCP12 voltage is less that 7.25 V for 44 ?sec	• Polaris is initialized	100 msec	Type A. MIL Illumination.
SYS_ASIC_CHARGE_PUMP_OVER_VOLT	P0606	This monitor checks if: • Defective system ASIC	The Polaris ASIC provides a two-stage charge pump to produce a voltage greater than the VCP12 voltage. If the charge pump voltage exceeds VCP12 voltage by more than 13V for 53 msec then the Polaris sets the Charge Pump Overvoltage Limit SPI bit to True. Software monitors this SPI bit. If it is continuously True for more than 100 msec then the fault is set,	charge pump voltage exceeds VCP12 voltage by more than 13V for 53 msec	• Polaris is initialized	100 msec (145.2 ms)	Type A. MIL Illumination.
SYS_ASIC_VDG_RANGE_FAULT	P0606	This monitor checks if: • Defective system ASIC	Verify that the KL30_1 Power Switch command is not stuck On. The ASIC VDG pin controls the KL30_1 Power Switch. While the Power Switch is commanded off, the SW reads the ASIC's VDG voltage feedback. When the VDG voltage is continuously >= 1.0V for more than 100 msec then the fault is set.	SSRON: VDBat+3V <= VDG <= VDBat+12V SSR OFF: 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_SW_OVERCURRENT	P0606	This monitor checks if: • Defective system ASIC	The Polaris ASIC provides an overcurrent protected VBAT_SW output used for powering sensors and external circuits. If the VBAT_SW current draw exceeds 150 mA for 800 ?sec then the Polaris sets the VBAT_SW Overcurrent SPI bit to True. Software monitors this SPI bit. If it is continuously True for more than 25 msec then the fault is set.	VBAT_SW Enable and VBAT_SW Over-Current SPI bits are both TRUE	• Polaris is initialized	25 msec	Type A. MIL Illumination.
SYS_ASIC_VBAT_SW_CORR	P0606	This monitor checks if: • Defective system ASIC	The MCU shall read the ASIC's VBAT_SW Voltage Result SPI field and perform a plausibility check against the measured U12 voltage from the Polaris. 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 • when the VBAT switch is commanded On	15 msec	Type A. MIL Illumination.
SYS_ASIC_VBAT_SW_DISABLE_CORR	P0606	This monitor checks if: • Defective wiring harness • Defective ASCI • Defective CPU • Defective circuit board	Check that the ASIC VBAT_SW output is not leaking or stuck On. The MCU shall read the ASIC's VBAT_SW Voltage Result SPI field when the commanded VBAT_SW state is Off. If the voltage is continuously > 1.5V for more than 25 msec then the fault is set.	voltage difference > 1.5 volts	-Polaris is initialized -Power Switch is OFF	25 msec	Type A. MIL Illumination.
SYS_ASIC_U5_FAILURE	P0606	This monitor checks if: • Defective system ASIC	The U5 power supply regulates battery voltage down to 5V to supply such circuits as network communication transceivers, internal sensors and ADC references. If U5 is outside the acceptable range (<4.75V or >5.1 V) continuously for 105 ?sec then the ASIC shall continue to attempt to regulate U5 and set the U5 Out of Range Warning SPI bit to True. Software monitors this SPI bit. If it becomes True then the fault is set immediately.	The MCU shall monitor the ASIC's U5 Out of Range Warning SPI bit. (<4.75V or >5.1V)	• Polaris is initialized	5 msec	Type A. MIL Illumination.
SYS_ASIC_CHARGE_PUMP_UNDER_VOLT	P0606	This monitor checks if: • Defective system ASIC	The Polaris ASIC provides a two-stage charge pump to produce a voltage greater than the VCP12 voltage. If the charge pump voltage exceeds VCP12 voltage by less than 9.5V for 5.5 msec then the Polaris sets the Charge Pump Undervoltage Limit SPI bit to True. Software monitors this SPI bit. If it is continuously True for more than 100 msec then the fault is set.	If the charge pump voltage exceeds VCP12 voltage by less than 9.5V for 5.5 msec	• Polaris is initialized	100 msec (105.5 ms)	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
U5_ASIC_ADC_REF_FAULT	P0606	This monitor checks if: • Defective system ASIC or circuit board	The 5V regulated supply is read at the ASIC. If it is not within the range, then the fault is set.	Asic U5 is not within the 4.75V and 5.25V	Polaris is initialized	80 msec	Type A. MIL Illumination.
SYS_ASIC_U3_UV_RESET_FAULT	P0606	This monitor checks if: • ASIC power supply block problem • Defective ASIC • PCB problem	• When the U5, U3, or U1 Undervoltage Diagnostic SPI bit is set, the ASIC shall raise the effective U5 out of range lower warning level, or the U3 or U1 undervoltage fault threshold above the maximum U5, U3, or U1 regulation voltage, thus forcing a U5 out of range warning or U3 or U1 undervoltage fault. • Periodically, the MCU shall store a flag in NVM indicating that it will perform a U5, U3 or U1 undervoltage diagnostic. The MCU shall then force one of the three test modes and start a timer.	The MCU shall detect a fault if it does not receive a reset within the expected time. If a reset occurs, the MCU shall check NVM and the ASIC's Reset Source SPI Register, and verify that the reset was due to a planned test.	• Runs during initialization	10 msec	Type A. MIL Illumination.
SYS_ASIC_U3_OV_RESET_FAULT	P0606	This monitor checks if: • ASIC power supply block problem • Defective ASIC • PCB problem	• When the U5, U3, U1 Overvoltage Diagnostic SPI bit is set, the ASIC shall lower the effective overvoltage fault threshold below the minimum U5, U3, or U1 regulation voltage, thus forcing a U5, U3, or U1 overvoltage fault. • Periodically (e.g. once per ignition cycle at shutdown), the MCU shall store a flag in NVM indicating that it will perform a U5, U3 or U1 overvoltage diagnostic. The MCU shall then force one of the three test modes and start a timer.	The MCU shall detect a fault if it does not receive a reset within the expected time. If a reset occurs, the MCU shall check NVM and the ASIC's Reset Source SPI Register, and verify that the reset was due to a planned test.	• Runs during initialization	10 msec	Type A. MIL Illumination.
SYS_ASIC_U5_OV_RESET_FAULT	P0606	This monitor checks if: • ASIC power supply block problem • Defective ASIC • PCB problem	• When the U5, U3, U1 Overvoltage Diagnostic SPI bit is set, the ASIC shall lower the effective overvoltage fault threshold below the minimum U5, U3, or U1 regulation voltage, thus forcing a U5, U3, or U1 overvoltage fault. • Periodically (e.g. once per ignition cycle at shutdown), the MCU shall store a flag in NVM indicating that it will perform a U5, U3 or U1 overvoltage diagnostic. The MCU shall then force one of the three test modes and start a timer.	The MCU shall detect a fault if it does not receive a reset within the expected time. If a reset occurs, the MCU shall check NVM and the ASIC's Reset Source SPI Register, and verify that the reset was due to a planned test.	• Runs during initialization	10 msec	Type A. MIL Illumination.
BOOSTED_BRAKE_SYSTEM_FAILED	C0021	This monitor checks if: Internal eBoost failure	Error Threshold (Y value) is a linear lookup table value which is a function of the Boost Pressure Target (X value). XO: 0 BAR , YO: 0 BAR X1 : 6 BAR , Y1 : 3 BAR X2 : 20 BAR , Y2 : 4 BAR X3 : 200 BAR , YO: 40 BAR When ABS is active the Y values are increased by 30% When the boost error exceeds this threshold the "error" signal is integrated each loop and when it exceeds 2000 Bar-msec the fault will set.	Derivative of the Boost pressure target > (-150 Bar/s) AND Derivative of Boost pressure < 200 Bar/s	The Measured Boost Pressure is compared against an "error" threshold and sets a fault when the difference is large enough to cause possible under braking of the vehicle. The difference or "error" threshold itself is a function of the Boost Pressure Target such that larger errors are accepted as the requested pressure increases (i.e. a request of 30 bar that results in a 10 bar pressure is considered more consequential than a 20 bar error at a pressure request of 180 bar). This error threshold gets desensitized when slip control is active to account for the more dynamic boost pressure response when individual wheel control is active. Right now this is a percentage of the base error threshold, but will need to be enhanced. When the measured pressure is less than the error target the fault maturity counter accumulates at a rate proportional to the error. When the counter reaches a maturation threshold the fault will get set and the system will enter Push Through mode.	5 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
BOOSTED_BRAKE_SYSTEM_FAILED_CRANK	P0562	This monitor checks if: Internal eBoost failure	Error Threshold (Y value) is a linear lookup table value which is a function of the Boost Pressure Target (X value). XO: 0 BAR , YO: 0 BAR X1 : 6 BAR , Y1 : 3 BAR X2 : 20 BAR , Y2 : 4 BAR X3 : 200 BAR , YO: 40 BAR When ABS is active the Y values are increased by 30% When the boost error exceeds this threshold the "error" signal is integrated each loop and when it exceeds 2000 Bar-msec the fault will set.	Derivative of the Boost pressure target > (-150 Bar/s) AND Derivative of Boost pressure < 200 Bar/s and CRANKING is present	The Measured Boost Pressure is compared against an "error" threshold and sets a fault when the difference is large enough to cause possible under braking of the vehicle. The difference or "error" threshold itself is a function of the Boost Pressure Target such that larger errors are accepted as the requested pressure increases (i.e. a request of 30 bar that results in a 10 bar pressure is considered more consequential than a 20 bar error at a pressure request of 180 bar). This error threshold gets desensitized when slip control is active to account for the more dynamic boost pressure response when individual wheel control is active. Right now this is a percentage of the base error threshold, but will need to be enhanced. When the measured pressure is less than the error target the fault maturity counter accumulates at a rate proportional to the error. When the counter reaches a maturation threshold the fault will get set and the system will enter Push Through mode.	5 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
BOOSTED_BRAKE_SYSTEM_DYNAMIC_LEAK	C05B0	This monitor checks if: Monitors for leaks in the braking system at the circuit level during braking events. This is different from the Static Leak check which looks for leaks at the channel level at shutdown.	The leak detection logic compares pressure gradient threshold against the measured pressure gradient. Once the error last longer than a time threshold, and the pressure error integral passes its threshold, leak is detected. The pressure gradient can be estimated from Dap flow rate and PV information; Similarly, pressure can be estimated from Dap volume and PV information. Here the worst case PV is taken	There are 12 calibrations associated with this failsafe so it is impossible to describe the interation of all of them in this document. Ulitimately when the pressure error integral exceeds 20 bar AND the pressure gradient error integral exceeds 3000 Bar/s the fault is set.	Boost control active Boost pressure > 2 Bar Advancing DAP (no replenishment mode) No slip control active Faded brakes have not been detected	5 msec	Type A. MIL Illumination.
BOOSTED_BRAKE_SYSTEM_LEAK_ISO_FAILED	C05B0	This monitor checks if: Set if the leakage circuit cannot be isolated successfully	Brake fluid leak on a channel or circuit without the ability to identify the location of the leak	BOOSTED_BRAKE_SYSTEM_DYNAMIC_LEAK AND Circuit cannot be isolated	BOOSTED_BRAKE_SYSTEM_DYNAMIC_LEAK already present.	230 msec	Type A. MIL Illumination.
BOOST_POWER_MANAGEMENT_ENABLED_WARNING	P0562	This monitor checks if: Low input voltage to the module	This fault sets due low voltage in order to disable features before affect boosted brakes operation.	Motor Voltage < 9.3 V	Propulsion System Active = TRUE or (System Power Mode = Run and vehicle speed > then 3 kph)	5 occurrences of dipping below 9.3 V within 2 minutes without stable voltage above 11.3V	Type C, No MIL, "Emissions Neutral Diagnostic "
BOOST_POWER_MANAGEMENT_ACTIVE_FAILURE	P0562	This monitor checks if: Low input voltage to the module	Did not detect BOOST_POWER_MANAGEMENT_ENABLED_WARNING Motor Voltage < 7 V (Need for quickly detecting to protect the DAP if for some reason the BOOST_POWER_MANAGEMENT_ENABLED_WARNING is not detected.)	Motor Voltage < 7V	Propulsion System Active = TRUE or (System Power Mode = Run and vehicle speed > 3 kph)	17.5 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
BOOSTED_BRAKE_SYSTEM_FAILED_WARNING	C0021	This monitor checks if: Internal eBoost failure	Error Threshold (Y value) is a linear lookup table value which is a function of the Boost Pressure Target (X value). XO: 0 BAR , YO: 0 BAR X1 : 6 BAR , Y1 : 3 BAR X2 : 20 BAR , Y2 : 11 BAR X3 : 200 BAR , YO: 155 BAR	Derivative of the Boost pressure target > (-150 Bar/s) AND Derivative of Boost pressure < 200 Bar/s	The Measured Boost Pressure is compared against an "error" threshold and sets a fault when the difference is large enough to cause possible under braking of the vehicle. The difference or "error" threshold itself is a function of the Boost Pressure Target such that larger errors are accepted as the requested pressure increases (i.e. a request of 30 bar that results in a 10 bar pressure is considered more consequential than a 20 bar error at a pressure request of 180 bar). This error threshold gets desensitized when slip control is active to account for the more dynamic boost pressure response when individual wheel control is active. Right now this is a percentage of the base error threshold, but will need to be enhanced. When the measured pressure is less than the error target the fault maturity counter accumulates at a rate proportional to the error. When the counter reaches a maturation threshold the fault will get set and the system will enter Push Through mode.	750 ms max (fault matures rate depends on the gradient of the boost error)	Type B. MIL Illumination.
PTU_ESTABLISH_HOME_POSITION	C0021	This monitor checks if: Set if motor could not find home position during startup	Motor could not find home position in 4sec. Motor gets stuck somewhere	Motor still moving to find home position for 4 sec	Cycle IGN or Clear Code	1 msec	Type B. MIL Illumination.
ACUNOTCONFIGURED	P0602	This monitor checks if: Set if EOL sensor Learn or Comp Port Learn has not done or failed	Read DID 46, if DID 46 == OF00, clear the fault, otherwise, set the fault	Read DID 46, if DID 46 == OF00, clear the fault, otherwise, set the fault	Learn all EOL sensor, and comp port learn again and clear code	5 msec	Type A. MIL Illumination.
BRAKE_BY_WIRE_H|GH_LEVEL_MON|TOR_FA|LURE	C0021	This monitor checks if: Base brake values are energized in a boosted brake mode, while there are any parts of the boost logic which indicate that boosted brakes should not be enabled.	The goal of this fault monitor is to look for conditions where the base brake values are energized in a boosted brake mode, while there are any parts of the boost logic which indicate that boosted brakes should not be enabled. The validity of the driver inputs, base brake mode, Actuator control mode, Boost/Brake Arbitrator states, and the Electric drive states must all agree that boosted brakes are allowed for the base brake valves to be in a boosted condition, Otherwise the fault will be matured.	• (Pedal Travel signal is not valid AND SCP is invalid) OR • Boost Arb targeted pressure is not available OR • BOOST System in INHIBITED OR • Electric Drive state is not active or not running OR • Actuator Control is not allowed	• Pedal travel sensor signal • SCP value • Boost Arb state • Electric drive status	200 msec	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
BRAKE_BY_WIRE_HIGH_LEVEL_MONITOR_FAILURE_CRANK	P0562	This monitor checks if: Base brake values are energized in a boosted brake mode, while there are any parts of the boost logic which indicate that boosted brakes should not be enabled.	The goal of this fault monitor is to look for conditions where the base brake values are energized in a boosted brake mode, while there are any parts of the boost logic which indicate that boosted brakes should not be enabled. The validity of the driver inputs, base brake mode, Actuator control mode, Boost/Brake Arbitrator states, and the Electric drive states must all agree that boosted brakes are allowed for the base brake valves to be in a boosted condition during CRANKING. Otherwise the fault will be matured.	• (Pedal Travel signal is not valid AND SCP is invalid) OR • Boost Arb targeted pressure is not available OR • BOOST System in INHIBITED OR • Electric Drive state is not active or not running OR • Actuator Control is not allowed OR	• Pedal travel sensor signal • SCP value • Boost Arb state • Electric drive status	200 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
STATIC_CIRCUITO_LEAK_DETECTED	C05B0	This monitor checks if: System Leak	Leak fault, commands each circuit to build 30 bar pressure and checks for a leak by holding for 1sec. If the pressure drops to 24 bar, this fault is set.	Checks every wheel if there is a leak during shutdown.	Runs During Shutdown	5 msec	Type A. MIL Illumination.
STATIC_CIRCUIT1_LEAK_DETECTED	C05B0	This monitor checks if: System Leak	Leak fault, commands each circuit to build 30 bar pressure and checks for a leak by holding for 1sec. If the pressure drops to 24 bar, this fault is set.	Checks every wheel if there is a leak during shutdown.	Runs During Shutdown	5 msec	Type A. MIL Illumination.
BRAKE_BLEED_NOT_COMPLETED	C15C7	This monitor checks if: DID NOT write DID B2	DIDB2 == 0	DID B2 == 0	Runs Continuous	5 msec	Type A. MIL Illumination.
BOOST_STARTUP_FAILURE	P0562	This monitor checks if:	After mode manger completes system self test the boost system looks to intialize the boost controller. If during this phase the conditions are not correct we will set a fault.	When boost control state is in initialze state a timer is incremented allowing a set time to initialize before a fault should be set.	Run during the power up initializtion of boost arbitration	4 seconds	Type 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_SWT_NODE_FAILURE	U1122	This monitor checks if: LIN cable not connected to switch (Wiring), EPB fuse, EPB faulted	This fault will be set when the connection to the EPB LIN Switch is disconnected. Increment a counter if the LIN cable is not connected to the switch, this fault will be set if no connection is detected.	No connection detected (Lost Communication)	• 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 • System Power Mode is in crank mode. • EPB channel failure is not set. • PB_WAKE_UP_LINE_VOLTAGE_FAULT is not set.	Goal = 3	Type C, No MIL, "Emissions Neutral Diagnostic "
EBCM_EPB_SWITCH_RSP_MSG_FAULT	U1122	This monitor checks if: Incoming message is not as expected	The incoming message on LIN is invalid then set this fault	Invalid message	• 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 • System Power Mode is in crank mode. • EPB channel, node failure is not set. • PB_WAKE_UP_LINE_VOLTAGE_FAULT is not set.	Time = 15 msec Goal = 3	Type C, No MIL, "Emissions Neutral Diagnostic "
CAN_OBUS_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.
PB_WAKE_UP_LINE_VOLTAGE_FAULT	C0616	This monitor checks if: • Transceiver faulty • PCB probelm	The Sw monitors the A2D feedback received from INH pin of LIN transceiver if this voltage drops below the threshold voltage for 60msec we set this fault indicating EPB wake up is not possible .	If the transceiver feedback drops below voltage 6v	• Power ON, Continuous Failsafing	30 msec	Type 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 provisional.	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 A. MIL Illumination.
SECURITY_PERIPHERAL_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 A. 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.
MISSING_MSG_STRG_WHL_INFO	U0131	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 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	100ms	Type C, No MIL, "Emissions Neutral Diagnostic "
STRG_WHL_INFO_ARC	U0420	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. • 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
SWIP_STRG_WHL_ANG_DUD	U0420	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 data mask bit will be checked immediately.	SAS Data Mask Failure indicated if data mask in message 0x1E5 is stuck off (equal to zero) for an extended period	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	5 seconds if vehicle has not yet reached 1.3 m/s, 50 msec otherwise	Type C, No MIL, "Emissions Neutral Diagnostic "
SWIP_STRG_WHL_ANG_CALIB_STS_FAULT	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 "
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_PSTN_OFST_FRM_TRM_3	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 "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PSTN_OFST_FRMJTRM_3_CHCKSUM	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 + CHKSUM != 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 "
PSTN OFST_FRM_TRM_3_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 "
MISSING_VEH_LVL_CTL_GEN_INFO_1	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 "
VEH_LVL_CTL_GENJNFO1ARC	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 "
VEH_LVL_CTL_GENJ NFO_1_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_ELEC_PWR_STRG_OVRLY	U0131	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 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_TORQUE_OVERLAY_DELIVERED_STATUS_FAULT	U0420	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	The Brake Control System shall set a code, if Torque Overlay Torque Delivered Status remains $0, Inactive for 250 ms after the brake control system made a steering torque request.	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	250 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_MSG_DAMPER_CTRL_INFO	U0139	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 "
DAMPER_CTRL_INFO_ARC	U043A	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 "
DAMPER_CTRL_INFO_PROT_FAULT	U043A	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_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: 9V <= V <= 16V • 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_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: 9V <= V <= 16V • 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: 9V <= V <= 16V • 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: 9V <= V <= 16V • 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_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: 9V <= V <= 16V • 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
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: 9V <= V <= 16V • 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: 9V <= V <= 16V • 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_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: 9V <= V <= 16V • 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: 9V <= V <= 16V • 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	100ms	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: 9V <= V <= 16V • 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: 9V <= V <= 16V • 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_VEH_ACCEL_DUD	U0452	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 IMU installed	• When the incoming message is unpacked, the data mask bit will be checked immediately.	IMU Data Mask Failure indicated if data mask in message 0x140 is stuck off (equal to zero) for an extended period	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	5 seconds if vehicle has not yet reached 1.3 m/s, 50 msec otherwise	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 "
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 "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
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 "
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 "
STRGWHLJNFOSECURITY	U0420	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the 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 "
MISSING_MSG_YAW_RATE	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	100ms	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_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 "
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_DUD	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 data mask 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 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	5 seconds if vehicle has not yet reached 1.3 m/s, 50 msec otherwise	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_GNRLJNFO1_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 "
ACC_GNRLJNFO1_ARC	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_MSG_APA_STS	U160C	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 "
APA_STS_SECURITY	U045A	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
APA_STS_ARC	U045A	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.
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_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.
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_DRVRJNTD_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.
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.

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

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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 "
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_ENG_SPD	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_GNRL_INFO1	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_INFO1_ARC	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.
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.

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

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	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.
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.
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.
TRNS_OIL_TMP_SIG_INVALID	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 Oil Temperature Invalid =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 • Vehicle is in logistic mode.	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_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_MTNJNFO_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.
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_WHL_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_BCM_GNRL_INFO1	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_GNRL_INFO1	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_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_GNRL_INFO2	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_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 "
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_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.
MISSING_NODESTATUS_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 "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
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.
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_INVALID	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_MICRO_IPC_FAULT	U3000	This monitor checks if: S12 micro or Champion micro arithmetic failure, S12 micro or Champion micro SPI failure, EMC	• This fault sets when the Champion micro detects an IPC failure with the s12 micro	EPB Micro IPC Counter Fault = TRUE OR EPB Micro IPC CRC Fault = TRUE OR EPB Micro not initializing (not alive)	Continuous	50 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
PBMICRORAMFAULT	P0604	This monitor checks if: S12 micro RAM failure	Each RAM cell is consecutively written with test patterns, read back and compared with the expected value. In case of a disagreement, the fault is set At startup, the complete RAM is checked this way, during cyclic operation the RAM is checked cell by cell in the idle loop (complete check « 1s in normal operation, 17 s in sleep mode)	Freescale Micro SW does an initial RAM check and a cyclical RAM check To perform a RAM test, a RAM area is written with a special pattern and read back to check its correctness	Continuous	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
PB_MICRO_ROM_FAULT	C0616	This monitor checks if: S12 micro ROM failure, S12 micro ALU/instruction set fault	S12 micro calculates a CCITT CRC16 checksum over the complete FLASH memory. If that does not match with the stored checksum, the fault is set The complete ROM is checked during startup, it is consecutively checked during normal operation (complete check takes 1.28 s) and in sleep mode (complete check takes approx. 60 seconds)	Each ROM section is checksummed byte by byte. Each byte will be added to the current checksum for a section. If the byte being checked is the last byte of a section, then the setion is verified for a correct checksum stored at the end of the section.	Continuous	10 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_MICRO_STACK_FAULT	U3000	This monitor checks if: S12 micro wrong program execution, instruction execution faults, addressing faults.	Below and above the RSTACK and CSTACK areas of memory, 16 bit RAM cells are written with a pattern. In case of a stack fault, this pattern will be overwritten and very likely changed by that. All patterns are periodically checked that they are not changed	To detect underflow and overflow of the system stacks, a word of RAM is reserved at the end of each of the system stacks. A word of RAM is also reserved at the upper-most address of the stack section. To detect cases where the application exception could be pushing a value onto the stack that matches the test value, the test value that is stored at these reserved addresses will be changed each update. Stacks checked are the: UNDEFINED_MODE_STACK, SUPERVISOR_MODE_STACK, FIQ_MODE_STACK. IRQ_MODE_STACK. If the reserved stack which contains a pattern is overwritten, a fault will be set	Continuous	10 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_MOTOR_SUPPLY_OC	C0616	This monitor checks if: • open supply	Precondition: no FC_A2D_REFERENCE_FAULT detected! When the measured Motor Supply Voltage is less than 2V the Fault is set.	Motor Supply Voltage < 2v	• No Actuation	160 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_MOTOR_SUPPLY_OC_RR	C0616	This monitor checks if: • open supply	Precondition: no FC_A2D_REFERENCE_FAULT detected! When the measured Motor Supply Voltage is less than 2V the Fault is set.	Motor Supply Voltage < 2v	• No Actuation	160 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_MICRO_ADC_REFERENCE_FAULT	C0616	This monitor checks if: ECU internal defect. Incorrect 5V supply from ASIC.	The conversion of all input voltages on the S12 micro is based on an ADC reference voltage. This fault indicates this voltage is outside of expected tolerance so none of the voltage readings can be considered accurate.	The EPB Micro fault flag PB_MICRO_ADC_REFERENCE_FAULT = True	Filtered system voltage >= 7.5V AND SYSTEM_VOLTAGE_EXCESSIVE_LOW fault not set.	50 msec	Type 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_MICRO_ADC_CAL_DATAJMPLAUSIBLE	C0616	This monitor checks if: Wrong calibration, ECU defect	Each S12 micro ADC input has calibration data saved in the EEPROM in Main micro, which is sent from the Main micro to the S12 micro at Initialization multiple times. If all "versions" of these calibrations do not match, the ADC calibration data is considered implausible.	Gain values and offset values are compared between the main micro and the EPB micro. If values disagree, fault is set.	• Periodic	10 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_MICRO_ADC_CAL_FAULT	C0616	This monitor checks if: Wrong calibration, ECU defect	This fault is set if valid ADC calibration data is never received by the S12 micro.	Periodic ADC calibration indicates that calibration data is invalid	• Periodic	1000 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_MICRO_ECC_FAILURE	U3000	This monitor checks if: S12 micro memory controller defect	The S12 micro's memory controller has a test mode in which a memory error can be injected when writing to memory. When reading from that faultily written memory cell and the ECC logic does not detect the fault as expected, the monitor fails	ECC failure detected at time ROM is read for use or when a background ROM check fails	• Periodic	10 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_MICRO_S12_IPC_FAULT	U3000	This monitor checks if: • Communication error • Crosstalk or arbitration problem	• This fault sets when the s12 micro detects an IPC failure with the Champion micro	• Set when the S12 detects an IPC failure: • ID • Rolling count • Checksum • Length	• EPB micro initialized	10 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_MICRO_SWITCH_DISCONNECTED_LIN	U1122	This monitor checks if: • Switch disconnected • Defective LIN transceiver • LIN communication error	The EPB switch pattern has to be stable in the state "DISCONNECTED" (LIN bus communication is disturbed). The stability check takes between 80ms and 150ms. Afterwards the fault qualification is started. The total fault detection-time is increased by the delay of the stability check.	Switch disconnected pattern observed	• continuous	1200 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
PB_MOTOR_MISSING_INITIALIZATION_ERROR	C0616	This monitor checks if: • Calibration values for EPB are missing or out of range	• During initialization, the Park Brake motor offset and gain values are read from NVRAM. If the values are not within an acceptable range, the SW will use default values from ROM.	Calibration values in NVRAM are missing or out of range	• Runs during initialization	10 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
PBC_LOGICAL_SEQ_MONITOR	C0616	This monitor checks if: Defective ECU	• Fault is detected by Mando PBC	Program Sequence Fault detected	Vehicle Power Mode: OFF, ACCESSORY, RUN Vehicle Operating Conditions: Dynamic or Static state Exceptions: none	See Detection Rules (fault is detected by Mando PBC)	Type C, No MIL, "Emissions Neutral Diagnostic "
PBC_RUN_IN_NOT_DONE	C0616	This monitor checks if: Assembly check has not been performed yet	• Fault is detected by Mando PBC	Assembly Test Not Done	Vehicle Power Mode: OFF, ACCESSORY, RUN, Cranking Vehicle Operating Conditions: Dynamic and Static state Exceptions: none	See Detection Rules (fault is detected by Mando PBC)	Type C, No MIL, "Emissions Neutral Diagnostic "
PBC_POWERDOWN_EEPROM_FAILED	C0616	This monitor checks if: Unexpected Powerdown, Invalid EE • brakestate data, Actuation interrupted and not resumed in time or aborted	• Fault is detected by Mando PBC	Actuator status is UNKNOWN due to unexpected power down or EEPROM failure	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 Mando PBC)	Type C, No MIL, "Emissions Neutral Diagnostic "
PBC_HOST_UNAVAILABLE	C0616	This monitor checks if: Host SW shutdown EPB actuation	• Fault is detected by Mando PBC	Host is not available	Vehicle Power Mode: OFF, ACCESSORY, RUN Vehicle Operating Conditions: Dynamic, static state Exceptions: Disabled by calibration, Non-operational mode	See Detection Rules (fault is detected by Mando 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_APPLY_ENABLE_WRONG_STATE	C0616	This monitor checks if: S12 micro/Zenon hardware fault. FET SC/OC.	Monitor routine calculates the expected apply enable state using the same algorithms and input parameters as S12 micro and compares the expected state to the real state of the related FET's enable line.	No successful FET activation	Continuous failsafing	40 s	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_APPLY_ENABLE_NO_CONTROL	C0616	This monitor checks if: S12 micro/Zenon hardware fault. FET SC/OC.	FET is requested to be activated, but the monitoring shows the FET as unactivated.	No successful FET activation	Continuous failsafing	10 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_RELEASE_ENABLE_WRONG_STATE	C0616	This monitor checks if: S12 micro/Zenon hardware fault. FET SC/OC.	Monitor routine calculates the expected apply enable state using the same algorithms and input parameters as S12 micro and compares the expected state to the real state of the related FET's line.	No successful FET activation	Continuous failsafing	40 s	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_RELEASE_ENABLE_NO_CONTROL	C0616	This monitor checks if: S12 micro/Zenon hardware fault. FET SC/OC.	FET is requested to be activated, but the monitoring shows the FET as unactivated.	No successful FET activation	Continuous failsafing	10 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
EPB_COMMAND_RANGE_ERROR	C0616	This monitor checks if: • EPB decel request out of range	• This failsafe monitors the decel request received from the EPB and checks to see if it is out of range	Decel Request from EPB is greater than 9.83 m/s	• Continuous failsafing	250 msec	Type 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_CRANKING_TIMEOUT	C0616	This monitor checks if: Power mode is Cranking	• When power mode is cranking, suspend actuation as long as it is cranking until timeout after 5 seconds	When Power Mode = Cranking, Then Suspend actuation as long as it is cranking and also provide the following options to Mando: 1. Timeout after 5 seconds and set the fault 2. Continue actuation	Power mode is Cranking	5 sec	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_HSB_INIT_FAULT	C0616	This monitor checks if: • Failure of the Host Safety Barrier to complete its normal initialization.	• The HSB self test is included in the system self test, and it is run to ensure that the HSB still has control over the apply/release enable lines. This fault also sets if indeterminate states of the enable lines are detected.	HSB Initialization Failed	Runs during system self test	10 ms	Type 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 "
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 "
PBC_HOSTJGNORED_COMMAND	C0616	This monitor checks if: Defective ECU, or wrong conditions when EPB actuation was requested	PBC detects this fault if "Motor Driver State" does not change to current value of "Motor Command" for over 100ms, PBC sets FaultStatus[33] as 'Failed' and cancel the current actuation request (MotorCommand = STOP and then NONE) (Refer VDA #R3.177)	"Motor Driver State" does not change to current value of "Motor Command" for over 100ms	Vehicle Power Mode: OFF, ACCESSORY, RUN Vehicle Operating Conditions: static state Exceptions: Disabled by calibration, Non-operational mode	100ms	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
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.
TASKOVERRUNCORE1	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.
TASKOVERRUNCORE2	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.
RUNNINGRESETFAILURE	P0562	This monitor checks if: • Keep Alive Voltage Regulator not functional. • Processor looses complete power (system voltage). • Processor is incorrectly reset.	• Two blocks in NVRAM are used to failsafe the systems mode manager's ability to control the system shutdown process. During system initialization (each new ignition cycle), the contents of these two blocks are compared. If a mismatch is found, it indicates that mode manager was unable to control the system shutdown process on the previous ignition cycle. • Counter: Count 1-up • Monitor Rate: 10ms Note- This fault also sets when there is a startup after an improper shutdown with the vehicle not in park AND with the drivers foot on the brake pedal.	System failed to finish NVRAM update on the last module shut-down (ex. Disconnect battery from module before shutdown)	• System is not re-initializing AND • System is not shutting down	5ms	Type C, No MIL, "Emissions Neutral Diagnostic "
MPU_FAULT_TRW_SCS_COREO	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_SCS_CORE1	P0606	This monitor checks if: Software Error Partial Microcontroller Failure	Memory Protection Unit (MPU) detects an attempted memory access where there is no defined address range providing the needed permission.	None	Always Enabled	10 ms	Type A. MIL Illumination.
MPU_FAULT_TRW_SCS_CORE2	P0606	This monitor checks if: Software Error Partial Microcontroller Failure	Memory Protection Unit (MPU) detects an attempted memory access where there is no defined address range providing the needed permission.	None	Always Enabled	10 ms	Type A. MIL Illumination.
ITBC_LSM_FAULT	P0606	This monitor checks if: If the ITBC tasks execute out of order, or if a task is skipped or if the tasks do not complete, then this fault is set.	Set this fault , if the order of execution of ITBC tasks is not correct. If the tasks skip or if some tasks are left incomplete	None	• LIN communication	10 msec	Type A. MIL Illumination.
ICC_FAILURE_CORE0	P0606	This monitor checks if: ICC send or receive have been skipped.	ICC failsafe mechanism determines if any ICC receives or sends were skipped. At the beginning of every 10ms slot, every core in the scheduler runs the failsafe that checks if any of the ICC sends or receives were skipped in the previous 10ms slot. In case it was skipped the failsafe matures the ICC fault. The failsafe also tries to get back the ICC receives and sends to work normally from the next 10ms Slot.	At the beginning of every 10ms slot, every core in the scheduler runs the failsafe that checks if any of the ICC sends or receives were skipped in the previous 10ms slot.	Always Enabled	60 msec	Type A. MIL Illumination.
ICCFAILURECORE1	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_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.
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.
Longitudinal Acceleration Sensor Performance	C0522	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 fail time, 50 millisecond update rate update raw longitudinal acceleration signal region 1 fail time, 50 millisecond update rate	> 0.2500 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 = 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 < 0.70 % > 80.0 Nm > 0.1500 g > 15.0 KPH < 200.0 KPH	raw longitudinal acceleration signal stability time > 10.0 seconds raw longitudinal acceleration signal fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate region 1 fail time > 75.0 seconds out of region 1 sample time > 120.0 seconds, 50 millisecond update rate	Type C, NoSVS "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 fail time, 50 millisecond update rate update raw longitudinal acceleration signal region 2 fail time, 50 millisecond update rate	> 0.0500 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 raw longitudinal acceleration signal fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate region 2 fail time > 75.0 seconds out of region 2 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		
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal fail time, 50 millisecond update rate update raw longitudinal acceleration signal region 3 fail time, 50 millisecond update rate	> 0.0500 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 raw longitudinal acceleration signal fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate region 3 fail time > 75.0 seconds out of region 3 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		
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal fail time, 50 millisecond update rate update raw longitudinal acceleration signal region 4 fail time, 50 millisecond update rate	> 0.0500 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 = 0 Boolean > 15.0 KPH < 0.5300 g = TRUE = TRUE = TRUE	raw lateral longitudinal acceleration signal stability time > 10.0 seconds raw longitudinal acceleration signal 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 U0073 fault active U0073 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 % < 80.0 Nm < 0.1500 g > 0.0 KPH < 0.0 KPH < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	region 4 fail time > 75.0 seconds out of region 4 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.
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	Type C, NoSVS "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	Type C, NoSVS "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	C124F	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a short to ground or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	< -3.8500 g > -3.8500 g (< 0.5 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	Type C, NoSVS "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	C1250	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a short to power or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	> 3.8500 g < 3.8500 g (< 0.5 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	Type C, NoSVS "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	C1251	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a signal value that is stuck in a valid range by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	ABS(raw lateral acceleration signal) AND ABS(raw lateral acceleration signal) update raw lateral acceleration signal fail, 50 millisecond update rate	> 0.5300 g < 3.8500 g	battery voltage run crank voltage diagnostic monitor enable update raw lateral acceleration signal stablity time: TOSS vehicle speed automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear ABS(raw lateral acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	> 11.00 volts > 11.00 volts = 1 Boolean > 15.0 KPH = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA	raw lateral acceleration signal stability time > 30.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	Type C, NoSVS "Emissions Neutral Diagnostic - Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Actuator Solenoid Circuit Open - Bank 1	PO010	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for an 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 open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 200 K Q impedance between signal and controller ground.	P0010 is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 > 11.00 Volts	20 failures out of 25 samples 250 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.
Intake Camshaft System Performance - Bank 1	PO011	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated.	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive.	(Intake cam Bank 1) Cam Position Error > (**P0011_CamPosErrorLimld**)deg	**Intake Cam Phsr Enable**	= TRUE	100.00 failures out of 300.00 samples 100 ms /sample	Type A, 1 Trips
					System Voltage	> 11.00 Volts		
					Engine Running	= TRUE		
					Power Take Off (PTO) active	= FALSE		
					Desired cam position	> 0 deg		
					Desired AND Measured cam position	> (**P001lCamPosErrorLimIc1**)deg AND < **(CalculatedPerfMaxId)** deg		
					Desired cam position variation	< 7.50 deg for (**P0011_P05CC_StablePositionTimeId**) seconds		
					No Active DTCs	P0010 P2088 P2089		

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 Sensor A	P0016	Detects cam to crank misalignment by monitoring if the cam sensor pulse for bank 1 sensor A occurs during the incorrect crank position, diagnostic passes when the cam sensor pulse is in the expected range	Out of range cam edge measurements in one engine cycle Out of range values are: cam edge measurement OR cam edge measurement from the expeced nominal cam position	>= 2 cam edges < -11.0 Crank Degrees >11.0 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser control indcates the phaser is 'parked' No Active DTCs: Time since last execution of a test IntCamECC_OilPresLow	Testis Enabled CrankSensor_FA P0340, P0341 > 1.0 sec = FALSE	4 cam edge measurements and 1 test sample per engine cycle Test failure is 4 fails in 5 samples Diagnostic failure is 2 failed tests out of 3 If the first test fails, the next test is delayed to confirm the phaser 'parked' This delay time is defined by **P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold** For mid-park phasers, an additional delay **P0016-0019 Mid-Park Phaser Delay** is applied	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bank 1 Sensor 1	P0030	Controller specific output driver circuit diagnoses the heater output 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.	> 200 K Q impedance between output and controller ground.	Diagnostic is Enabled Ignition Voltage Engine Speed	 = Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0031 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bankl Sensori	P0031	Controller specific output driver circuit diagnoses the heater output 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.	< 0.5 Q impedance between output and controller ground.	Diagnostic is Enabled Ignition Voltage Engine Speed	 = Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0030 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bankl Sensori	P0032	Controller specific output driver circuit diagnoses the heater output 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.	< 0.5 Q impedance between output and controller power.	Diagnostic is Enabled Ignition Voltage Engine Speed	 = Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 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.
Turbo/Super Charger Bypass Valve A Control Circuit Low	P0034	Controller specific output driver circuit diagnostic, diagnosing the 'compressor recirculation valve 'A' actuator' 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. In series application, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	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. In certain controllers this diagnosis runs only when the HWIO-output is driven by the application S/W.	< 0.5 Q impedance between output and controller ground	Diagnostic Enabled ***************************** Powertrain relay voltage ***************************** Engine does not crank Diagnostic system not disabled	True ***************************** >=11.0 Volts *****************************	80 failures out of 100 samples PWM CRV: 100ms / sample eCRV: 12.5ms / sample	Type A, 1 Trips Note: In certain controllers P0033 may also set turbo/ super charger bypass balve control circuit

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbo/Super Charger Bypass Valve A Control Circuit High	P0035	Controller specific output driver circuit diagnostic, diagnosing the 'compressor recirculation valve 'A' actuator' 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. In series application, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	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. In certain controllers this diagnosis runs only when the HWIO-output is driven by the application S/W.	< 0.5 Q impedance between output and controller power.	Diagnostic enabled ***************************** Powertrain relay voltage ***************************** Engine does not crank Diagnostic system not disabled	True ***************************** >=11.0 Volts *****************************	80 failures out of 100 samples PWM CRV: 100ms / sample eCRV: 12.5ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bank 1 Sensor 2	P0036	Controller specific output driver circuit diagnoses the heater output 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.	> 200 K Q impedance between output and controller ground.	Diagnostic is Enabled Ignition Voltage Engine Speed	 = Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0037 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bankl Sensor2	P0037	Controller specific output driver circuit diagnoses the heater output 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.	< 0.5 Q impedance between output and controller ground.	Diagnostic is Enabled Ignition Voltage Engine Speed	 = Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0036 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bankl Sensor2	P0038	Controller specific output driver circuit diagnoses the heater output 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.	< 0.5 Q impedance between output and controller power.	Diagnostic is Enabled Ignition Voltage Engine Speed	 = Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 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.
Turbocharger/ Supercharger Bypass Valve "A" default position not reached	P0039	This DTC indicates the failure "CRV Default position not reached". When the CRV is switched off, the valve position should move to the default position within a reasonable time. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Absolute Value of : Actual raw position - Safe Position(100.00%) for at least	> 10.00 % >= 1.00 s	Diagnostic enabled ***************************** Powertrain relay voltage ***************************** No active DTCs: ***************************** Valve State is 'OFF' for at least ***************************** Engine does not crank Diagnostic system not disabled	True ***************************** >=11.0 Volts ***************************** CRAR_b_PstnSnsrFA ***************************** >= 1.00 s *****************************	10 failures out of 14 samples 6.25ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bank 2 Sensor 1	P0050	Controller specific output driver circuit diagnoses the heater output 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.	> 200 K Q impedance between output and controller ground.	Diagnostic is Enabled Ignition Voltage Engine Speed	 = Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0051 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bank2 Sensori	P0051	Controller specific output driver circuit diagnoses the heater output 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.	< 0.5 Q impedance between output and controller ground.	Diagnostic is Enabled Ignition Voltage Engine Speed	= Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0050 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bank2 Sensori	P0052	Controller specific output driver circuit diagnoses the heater output 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.	< 0.5 Q impedance between output and controller power.	Diagnostic is Enabled Ignition Voltage Engine Speed	 = Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 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.
HO2S Heater Resistance Bank 1 Sensor 2) (For Dual Bank Exhaust Only	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value. This test calculates the heater's resistance (using voltage and current) at engine start after a soak condition and compares it to the expected values for the released sensor. This fault is set if the heater resistance is outside the expected range.	Heater Resistance outside of the expected range of	3.0 < ohms <8.3	Diagnostic is Disabled No Active DTC's Coolant - IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	 ECT_Sensor_FA P262B IAT_SensorFA < 8.0 °C >28,800 seconds > -30.0 °C < 32.0 volts < 0.04 seconds	Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bank 2 Sensor 2	P0056	Controller specific output driver circuit diagnoses the heater output 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.	> 200 K Q impedance between output and controller ground.	Diagnostic is Enabled Ignition Voltage Engine Speed	 = Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0057 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bank2 Sensor2	P0057	Controller specific output driver circuit diagnoses the heater output 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.	< 0.5 Q impedance between output and controller ground.	Diagnostic is Enabled Ignition Voltage Engine Speed	 = Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0056 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bank2 Sensor2	P0058	Controller specific output driver circuit diagnoses the heater output 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.	< 0.5 Q impedance between output and controller power.	Diagnostic is Enabled Ignition Voltage Engine Speed	 = Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 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.
HO2S Heater Resistance Bank 2 Sensor 2	P0060	Detects an oxygen sensor heater having an incorrect or out of range resistance value. This test calculates the heater's resistance (using voltage and current) at engine start after a soak condition and compares it to the expected values for the released sensor. This fault is set if the heater resistance is outside the expected range.	Heater Resistance outside of the expected range of	3.4 < ohms < 8.6	Diagnostic is Enabled No Active DTC's Coolant - IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	 ECT_Sensor_FA P262B IAT_SensorFA <8.0 °C >28,800 seconds > -30.0 °C < 32.0 volts <0.09 seconds	Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
MAP / MAF / Throttle Position Correlation	P0068	Detect when MAP and MAF do not match estimated engine airflow as established by the TPS	Difference between MAP and estimated MAP exceeds threshold (kPa), or P0651 (5 Volt Ref), or P0107 (MAP circuit low), or P0108 (MAP circuit high) have failed this key cycle, then MAP portion of diagnostic fails Absolute difference between MAF and estimated MAF exceed threshold (grams/sec), or P0102 (MAF circuit low), or P0103 (MAF circuit hi) have failed this key cycle, or maximum MAF versus RPM (Table) is greater than or equal to maximum MAF versus battery voltage, then MAF portion of diagnostic fails	Table, f(TPS). See supporting tables: **P0068_Delta MAP Threshold f(TPS)** Table, f(TPS). See supporting tables: **P0068_Delta MAF Threshold f(TPS)** Table, f(RPM). See supporting tables: **P0068_Maximum MAF f(RPM)** Table, f(Volts). See supporting tables: **P0068_Maximum MAF f(Volts)**	Engine Speed Run/Crank voltage	> 800 RPM > 6.41 Volts	Continuously fail MAP and MAF portions of diagnostic for 0.1875s Continuous 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.
Outside Air Temperature (OAT) Sensor Circuit Performance	P0071	Detects an Outside Air Temperature (OAT) sensor that 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>** 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	> 15.0 deg C > 15.0 deg C <= 15.0 deg C <= 15.0 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Engine is not running Vehicle Speed Coolant Temperature - IAT IAT - Coolant Temperature 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. 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:	>= 28,800.0 seconds >= 15.5 MPH < 15.0 deg C < 15.0 deg C >= 300.0 counts VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA	Executed every 100 msec until a pass or fail decision is made	Type B, 2 Trips

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	> 15.0 deg C > 15.0 deg C <= 15.0 deg C <= 15.0 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Engine is running Vehicle Speed Engine air flow 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:	>= 28,800.0 seconds >= 15.5 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 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 Intermittent In-Range	P0074	Detects a noisy or erratic signal in the 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.
Internal Control Module SIDI High Pressure Pump min/ max authority	P0089	This DTC determines when the high pressure pump control has reached to its max or min authority	High Pressure Fuel Pump Delivery Angle OR High Pressure Fuel Pump Delivery Angle	>= 130° <= 0°	High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Barometric Pressure Inlet Air Temp Fuel Temp Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In	True >=11 Volts > 0.275 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking >= 70.0 KPA >= -20.0 degC -12 <= Temp degC <= 132	Windup High/ Low 10.00 seconds failures out of 12.50 Seconds samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true andManufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
High Pressure Pump Control Solenoid Enable Low Side Open Circuit	P0090	Controller specific output driver circuit diagnoses High Pressure pump Control Solenoid 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.	>= 200 KOhms impedance between signal and controller ground	Engine Speed Battery Voltage	>= 50 RPM >=11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 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.
High Pressure Pump Control Solenoid Enable Low Side Short to Ground	P0091	Controller specific output driver circuit diagnoses High Pressure pump Control Solenoid 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.	<= 0.1 Amps between signal and controller ground	Engine Speed Battery Voltage	>=50 RPM >=11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 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.
High Pressure Pump Cntrl Solenoid Enable Low Side Short to Power	P0092	Controller specific output driver circuit diagnoses diagnoses High Pressure pump Control Solenoid 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.	<= 1.1 or 15 Amps selectable thershold based on High pressure Pump .	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 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.
Intake Air Temperature Sensor 2 Circuit Performance (applications with humidity sensor and manifold temperature sensor)	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	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 2 Intermittent In-Range (applications with humidity)	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 IAT 2 reading - IAT 2 reading from 100 milliseconds previous)	> 100.00 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.
High Pressure Start Diagnostic	P00C6	The DTC Diagnoses the high side fuel pressure during engine cranking.	The ECM detects that the fuel pressure is not rising or has fallen beyond acceptable limits during engine cranking Pressure Rise Test: Sensed High Pressure Fuel Rail Pressure value Pressure Fall Test: Sensed High Pressure Fuel Rail Pressure value	< **P00C6 - Minimum pressure in MPa that will exit High Pressure Start mode and allow fuel delivery** (see Supporting Table) <= **P00C6 - Minimum acceptable value of fuel rail pressure after High Pressure Start** (see Supporting Table)	High Pressure Rise Diagnostic During Start High Pressure Fall Diagnostic During Start Low side feed fuel pressure Engine Run Time Run/Crank Voltage Engine Coolant For each engine start, only 1 diagnostic is performed. The pressure rise test will run if High side fuel pressure is less than KtFHPC_p_HighPressStart, otherwise, the pressure fall diagnostic will run The pressure fall runs when the engine is cranking.	Enabled Disabled >= 0 KPA < = 0 sec > 8 Volts -100 <= °C <= 132 All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT, IAT2 and ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control	Pressure Rise Test: Crank Time >= **P00C6 - High Pressure Pump Control Mode timeout** (see Supporting Table) 6.25 ms per sample Pressure Fall Test: Injected cylinder events >= **P00C6 - maximum acceptable counts of fuel rail pressure below KtFHPD_p_HPS_PressFallLoThrsh after High Pressure Start** (see Supporting Table) 8 samples per engine rotation	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 Inlet Air Temp	commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true and Manufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active >= 70.0 KPA >= -20.0 DegC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Pressure Measurement System - Multiple Sensor Correlation (supercharged)	P00C7	Detects an inconsistency between pressure sensors in the induction system in which a particular sensor cannot be identified as the failed sensor. If the engine has been off for a sufficient amount of time, the pressure values in the induction system will have equalized. The Manifold Pressure (MAP), Supercharger Inlet Pressure (SCIAP) and Barometric Pressure (BARO) sensors values are checked to see if they are within the normal expected atmospheric pressure range. If one of the sensors is outside the normal expected atmospheric pressure range, this monitor will fail. Otherwise, MAP, SCIAP and BARO are compared to see if their values are similar. If two of these three sensors have similar values, but the third does not, then this monitor will fail. This monitor will also fail if there is no combination	ABS(Manifold Pressure - Baro Pressure) AND ABS(Supercharger Inlet Pressure - Manifold Pressure) AND ABS(Supercharger Inlet Pressure - Baro Pressure) OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Supercharger Inlet Pressure - Manifold Pressure) AND ABS(Supercharger Inlet Pressure - Baro Pressure) OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Supercharger Inlet Pressure - Manifold Pressure) AND ABS(Supercharger Inlet Pressure - Baro Pressure) OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Supercharger Inlet Pressure - Manifold Pressure)	> 10.0 kPa <= 10.0 kPa <= 10.0 kPa <= 10.0 kPa > 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 Supercharger Inlet Pressure Supercharger Inlet Pressure No Active DTCs: No Pending DTCs: Diagnostic is Enabled LIN communications established with MAF	> 5.0 seconds >= 50.0 kPa <= 115.0 kPa >= 50.0 kPa <= 115.0 kPa >= 50.0 kPa <= 115.0 kPa EngineModeNotRunTimer Error MAP_SensorFA SCIAP_SensorFA AAP2_SnsrFA AAP_LIN1_SnsrCktFA MAP_SensorCircuitFP SCIAP_SensorCircuitFP AAP2_SnsrCktFP AAP_LIN1_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec for applications without LIN MAF 1 sample every 25 msec for applications with LIN MAF	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		of two of these three sensors reporting similar values and the failed sensor cannot be uniquely identified.	AND ABS(Supercharger Inlet Pressure - Baro Pressure)	> 10.0 kPa				
			Manifold Pressure OR Manifold Pressure OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Supercharger Inlet Pressure - Manifold Pressure) AND ABS(Supercharger Inlet Pressure - Baro Pressure)	< 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: Diagnostic is Enabled LIN communications established with MAF	> 5.0 seconds EngineModeNotRunTimer Error MAP_SensorFA SCIAP_SensorFA AAP2_SnsrFA AAP_LIN1_SnsrCktFA MAP_SensorCircuitFP SCIAP_SensorCircuitFP AAP2_SnsrCktFP AAP_LIN1_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec for applications without LIN MAF 1 sample every 25 msec for applications with LIN MAF	
			Supercharger Inlet Pressure OR Supercharger Inlet Pressure OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Supercharger Inlet Pressure - Manifold KFfi sure)	< 50.0 kPa > 115.0 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:	> 5.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA SCIAP_SensorCircuitFA AAP2_SnsrCktFA AAP_LIN1_SnsrCktFA	4 failures out of 5 samples 1 sample every 12.5 msec for applications without LIN MAF 1 sample every 25 msec for applications with LIN MAF	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			ABS(Supercharger Inlet Pressure - Baro Pressure)	<= 10.0 kPa	No Pending DTCs: Diagnostic is Enabled LIN communications established with MAF	MAP_SensorCircuitFP SCIAP_SensorCircuitFP AAP2_SnsrCktFP AAP_LIN1_SnsrCktFP		
			Barometric Pressure OR Barometric Pressure OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Supercharger Inlet Pressure - Manifold Pressure) AND ABS(Supercharger Inlet Pressure - Baro Pressure)	< 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: Diagnostic is Enabled LIN communications established with MAF	> 5.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA SCIAP_SensorCircuitFA AAP2_SnsrCktFA AAP_LIN1_SnsrCktFA MAP_SensorCircuitFP SCIAP_SensorCircuitFP AAP2_SnsrCktFP AAP_LIN1_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec for applications without LIN MAF 1 sample every 25 msec for applications with LIN MAF	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Press Regulator Solenoid Supply Voltage Control High Side Circuit Short to ground	P00C9	Controller specific output driver circuit diagnoses High Pressure pump Control Solenoid high sided driver for a short to ground 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.	<= 1.1 or 15 Amps selectable thershold based on High pressure Pump.	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 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.
Fuel Press Regulator Solenoid Supply Voltage Control High Side Circuit Short to power	POOCA	Controller specific output driver circuit diagnoses High Pressure pump Control Solenoid high sided driver for a short to power 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 power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.1 Amps between signal and controller power	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 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.
Intake Air Temperature Sensor 3 Circuit Performance (applications with humidity sensor and manifold temperature sensor)	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 A, 1 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			
			<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 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 (applications with manifold temperature and humidity)	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	< 56.50 Ohms (-150 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.
Intake Air Temperature Sensor Circuit 3 High (applications with manifold temperature and humidity)	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	> 162,528 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.
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 "Diff" calculated over And where: "Diff" = ABS(current IAT 3 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 A, 1 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 A, No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Mass Air Flow System Performance (supercharg ed)	P0101	Detects a performance failure in the Mass Air Flow (MAF) sensor, such as when a MAF value is stuck in range. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Manifold Pressure (MAP) sensor, Supercharger Inlet Pressure (SCIAP) sensor and Throttle Position sensor (TPS). These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the MAF sensor. In this case, the MAF Performance diagnostic	See table **P0101, P0106, P0121, P012B, P1101: Supercharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. TPS model fails when Filtered Throttle Model Error MAF model fails when ABS(Measured Flow - Modeled Air Flow) Filtered MAPI model fails when ABS(Measured MAP - MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP - MAP Model 2) Filtered SCIAP1 model fails when ABS(Measured SCIAP - SCIAP Model 1) Filtered SCIAP2 model fails when ABS(Measured SCIAP - SCIAP Model 2) Filtered	> 500 kPa*(g/s) > 30.0 grams/sec > 25.0 kPa > 25.0 kPa > 25.0 kPa > 25.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,200 RPM >= -9 Deg C = TRUE) <= 130 Deg C = FALSE) >= -20 Deg C <= 129 Deg C >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM** and	Continuous Calculation are performed 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.
		will fail.				P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost MAP Model 2 Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM and P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost Filtered Throttle Model Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM SCIAP Model 1 Error multiplied by P0101, P0106, P0121, P012B, P1101:SCIAP1 Residual Weight Factor based on RPM and P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost SCIAP Model 2 Error multiplied by P0101, P0106, P0121, P012B, P1101: SCIAP2 Residual Weight Factor based on RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						and **P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost**		
					No Active DTCs:	MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA SCIAP_SensorCircuitFA AmbientAirDefault CRAR_b_CRV_CktFA CRAR_b_PstnSnsrFA CRAR_b_PstnSnsrOfstFA CRAR_b_ObstructionFA		
					No Pending DTCs:	EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP SCIAP_SensorCircuitFP		
					Diagnostic is Enabled			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Mass Air Flow Sensor Circuit Low Frequency (all MAF suppliers except for Continental)	P0102	Detects a continuous short to ground in the MAF sensor circuit or a MAF sensor that is outputting a frequency that is too low. The diagnostic monitors the MAF sensor frequency output and fails the diagnostic when the MAF frequency is too low. A low MAF frequency is associated with a low engine air flow. The MAF sensor monitors the temperature of a circuit in the air flow of the engine. The temperature of this circuit is related to the mass air flow across the sensor. The mass air flow value is converted by the sensor to a frequency value in Hertz. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the frequency of the square wave signal and converts that frequency to a mass air flow value in grams/second through a transfer function.	MAF Output	<= 1,550 Hertz (<= 0.51 gm/sec)	Engine Run Time Engine Speed Powertrain Relay Voltage Above criteria present for a period of time Diagnostic is Enabled	> 0.0 seconds >= 300 RPM >= 9.1 Volts >= 1.0 seconds	400 failures out of 500 samples 1 sample every cylinder firing event	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 Sensor Circuit High Frequency (all MAF suppliers except for Continental)	P0103	Detects a MAF sensor that is outputting a frequency signal that is too high. The diagnostic monitors the MAF sensor frequency output and fails the diagnostic when the MAF frequency is too high. A high MAF frequency is associated with a high engine air flow. The MAF sensor monitors the temperature of a circuit in the air flow of the engine. The temperature of this circuit is related to the mass air flow across the sensor. The mass air flow value is converted by the sensor to a frequency value in Hertz. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the frequency of the square wave signal and converts that frequency to a mass air flow value in grams/second through a transfer function.	MAF Output	>= 6,450 Hertz (>= 950.8 gm/sec)	Engine Run Time Engine Speed Powertrain Relay Voltage Above criteria present for a period of time Diagnostic is Enabled	> 0.0 seconds >= 300 RPM >= 9.1 Volts >= 1.0 seconds	400 failures out of 500 samples 1 sample every cylinder firing event	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Regulred	MIL Ilium.
Manifold Absolute Pressure Sensor Performance (supercharged)	P0106	This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Mass Air Flow (MAF) sensor, Supercharger Inlet Pressure (SCIAP) sensor and Throttle Position sensor (TPS). These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the MAP sensor. In this case, the MAP Performance diagnostic will fail.	**<u>Engine Running:</u>** See table **P0101, P0106, P0121, P012B, P1101: Supercharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. TPS model fails when Filtered Throttle Model Error MAF model fails when ABS(Measured Flow-Modeled Air Flow) Filtered MAPI model fails when ABS(Measured MAP - MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP - MAP Model 2) Filtered SCIAP1 model fails when ABS(Measured SCIAP - SCIAP Model 1) Filtered SCIAP2 model fails when ABS(Measured SCIAP - SCIAP Model 2) Filtered	> 500 kPa*(g/s) > 30.0 grams/sec > 25.0 kPa > 25.0 kPa > 25.0 kPa > 25.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,200 RPM >= -9 Deg C = TRUE) <= 130 Deg C = FALSE) >= -20 Deg C <= 129 Deg C >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM** and	Continuous Calculation are performed 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.
						P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost MAP Model 2 Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM and P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost Filtered Throttle Model Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM SCIAP Model 1 Error multiplied by P0101, P0106, P0121, P012B, P1101:SCIAP1 Residual Weight Factor based on RPM and P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost SCIAP Model 2 Error multiplied by P0101, P0106, P0121, P012B, P1101:SCIAP2 Residual Weight Factor based on RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						and **P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost**		
					No Active DTCs:	MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA SCIAP_SensorCircuitFA AmbientAirDefault CRAR_b_CRV_CktFA CRAR_b_PstnSnsrFA CRAR_b_PstnSnsrOfstFA CRAR_b_ObstructionFA		
					No Pending DTCs:	EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP SCIAP_SensorCircuitFP		
					Diagnostic is Enabled			

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	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	< 3.0 % of 5 Volt Range (This is equal to -11.3 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	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 350.0 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 humidity sensor and manifold temperature sensor)	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.	**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 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 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 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 Temp Sensor Circuit Low (Non-ATM)	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_NollseAssgnmnt Temperature Sensor 2: CeEECR_e_NollseAssgnmnt Temperature Sensor 3: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 4: CeEECR_e_NollseAssgnmnt Temperature Sensor 5: CeEECR_e_Nol)seAssgnmnt	< X Ohms X is equal to: Temp Sensor 1: 55 Ohms Temp Sensor 2: 55.0 Ohms Temp Sensor 3: 55.0 Ohms Temp Sensor 4: 55.0 Ohms Temp Sensor 5: 55.0 Ohms	Diagnostic is Enabled		5 seconds out of a 6 seconds window Continuously sampled	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 Temp Sensor Circuit High (Non-ATM)	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: EngCoolantTempSnsrI Temperature Sensor 1: CeEECR_e_NoUseAssgnmnt Temperature Sensor 2: CeEECR_e_NoUseAssgnmnt Temperature Sensor 3: CeEECR_e_EngCoolantTempSnsrI Temperature Sensor 4: CeEECR_e_NoUseAssgnmnt Temperature Sensor 5: CeEECR_e_NoUseAssgnmnt	> X Ohms X is equal to: Temp Sensor 1: 175,000 Ohms Temp Sensor 2: 175,000 Ohms Temp Sensor 3: 175,000 Ohms Temp Sensor 4: 175,000 Ohms Temp Sensor 5: 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 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 (ECT) Sensor Circuit Intermittent (Non-ATM)	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_NoUseAssgnmnt Temperature Sensor 2: CeEECR_e_NoUseAssgnmnt Temperature Sensor 3: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 4: CeEECR_e_NollseAssgnmnt Temperature Sensor 5: CeEECR_e_Nol)seAssgnmnt The calculated high and low limits for the next reading use the following calibrations:		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 B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 1: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 2: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 3: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 4: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 5: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** 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	 7.4 seconds -60.0 °C 200.0 °C 7.4 seconds -60.0 °C 200.0 °C 7.4 seconds -60.0 °C 200.0 °C 7.4 seconds -60.0 °C 200.0 °C 7.4 seconds -60.0 °C 200.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			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.
Throttle Position Sensor Performance (supercharg ed)	P0121	Detects a performance failure in the Throttle Position sensor (TPS) sensor, such as when a TPS value is stuck in range. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Manifold Pressure (MAP) sensor, Supercharger Inlet Pressure (SCIAP) sensor and Mass Air Flow (MAF) sensor. These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the TPS sensor. In this case, the TPS	See table **P0101, P0106, P0121, P012B, P1101: Supercharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. TPS model fails when Filtered Throttle Model Error MAF model fails when ABS(Measured Flow - Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP - MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP - MAP Model 2) Filtered SCIAP1 model fails when ABS(Measured SCIAP - SCIAP Model 1) Filtered SCIAP2 model fails when ABS(Measured SCIAP - SCIAP Model 2) Filtered	> 500 kPa*(g/s) > 30.0 grams/sec > 25.0 kPa > 25.0 kPa > 25.0 kPa > 25.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,200 RPM >= -9 Deg C = TRUE) <= 130 Deg C = FALSE) >= -20 Deg C <= 129 Deg C >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM** and	Continuous Calculation are performed every 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.
		Performance diagnostic will fail.				**P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** and **P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost** Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** SCIAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P1101:SCIAP1 Residual Weight Factor based on RPM** and **P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost** SCIAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P1101:SCIAP2 Residual Weight Factor based on RPM**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						and **P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost**		
					No Active DTCs:	MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA SCIAP_SensorCircuitFA AmbientAirDefault CRAR_b_CRV_CktFA CRAR_b_PstnSnsrFA CRAR_b_PstnSnsrOfstFA CRAR_b_ObstructionFA		
					No Pending DTCs:	EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP SCIAP_SensorCircuitFP		
					Diagnostic is Enabled			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
TPS1 Circuit Low	P0122	Detects a continuous or intermittent short low or open in TPS1 circuit by monitoring the TPS 1 sensor percent Vref and failing the diagnostic when the TPS percent Vref is too low. This diagnostic only runs when battery voltage is high enough.	TPS1 % Vref <	0.3250 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	79/159 counts; 57 counts continuous; 3.125 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.
TPS1 Circuit High	P0123	Detects a continuous or intermittent short high in TPS1 circuit by monitoring the TPS 1 sensor percent Vref and failing the diagnostic when the TPS percent Vref is too high. This diagnostic only runs when battery voltage is high enough.	TPS1 % Vref >	4.750 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	79/159 counts; 57 counts continuous; 3.125 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.
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 58.9 °C **Range 2 (Secondary):** Ambient air temperature is between -9.0 and 10.0 ^{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 11.1°	**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 30.0 - 1,470.0 seconds < 39.5 °C < 39.5 °C < 39.5 °C 8,200 rpm 5.0 seconds > 1.2 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 -9.0 and -9.0 °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 11.1° 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	>5.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Reguired	MIL Ilium.
Supercharge r Inlet Absolute Pressure (SCIAP) Sensor Performance	P012B	Detects a performance failure in the Supercharger Inlet Absolute Pressure (SCIAP) sensor, such as when a SCIAP value is stuck in range. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Mass Air Flow (MAF) sensor, Manifold Pressure (MAP) sensor and Throttle Position sensor (TPS). These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the SCIAP sensor. In this case, the SCIAP	**<u>Engine Running:</u>** See table **P0101, P0106, P0121, P012B, P1101: Supercharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. TPS model fails when Filtered Throttle Model Error MAF model fails when ABS(Measured Flow - Modeled Air Flow) Filtered MAPI model fails when ABS(Measured MAP - MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP - MAP Model 2) Filtered SCIAP1 model fails when ABS(Measured SCIAP - SCIAP Model 1) Filtered SCIAP2 model fails when ABS(Measured SCIAP - SCIAP Model 2) Filtered	> 500 kPa*(g/s) > 30.0 grams/sec > 25.0 kPa > 25.0 kPa > 25.0 kPa > 25.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,200 RPM >= -9 Deg C = TRUE) <= 130 Deg C = FALSE) >= -20 Deg C <= 129 Deg C >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM** MAP Model 2 Error	Continuous Calculation are performed 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.
		Performance diagnostic will fail.				multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP Model 3 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM** TIAP Model 1 Error multiplied by **P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM** Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM**		
					No Active DTCs:	MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA SCIAP_SensorCircuitFA AmbientAirDefault CRAR_b_CRV_CktFA CRAR_b_PstnSnsrFA CRAR_b_PstnSnsrOfstFA CRAR_b_ObstructionFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No Pending DTCs:	EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP SCIAP_SensorCircuitFP		
					Diagnostic is	Enabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Supercharger Inlet Absolute Pressure (SCIAP) Sensor Circuit Low	P012C	Detects a continuous short to ground in the Supercharger Inlet Absolute Pressure (SCIAP) signal circuit by monitoring the SCIAP sensor output voltage and failing the diagnostic when the SCIAP voltage is too low. The SCIAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	SCIAP Voltage	< 3.0 % of 5 Volt Range (This is equal to 6.1 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.
Supercharger Inlet Absolute Pressure (SCIAP) Sensor Circuit High	P012D	Detects a continuous short to power or open circuit in the Supercharger Inlet Absolute Pressure (SCIAP) signal circuit by monitoring the SCIAP sensor output voltage and failing the diagnostic when the SCIAP voltage is too high. The SCIAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	SCIAP Voltage	> 97.0 % of 5 Volt Range (This is equal to 124.0 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.
O2S Circuit Low Voltage Bank 1 Sensor 1 (For use with WRAF - Gen4 ECM	P0131	This DTC determines if the WRAF 02 sensor signal circuit is shorted low. This DTC will detect a short to ground fault to the Pump Current, Reference Cell Voltage, Reference Ground and Trim circuits. When enabled, the diagnostic monitors the three different failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC). The individual diagnostic failure counters are incremented based on the message received from the ASIC. The DTC is set based on any of the three individual fail and sample counters.	B1S1 WRAF ASIC indicates a ground short to any of the following WRAF signals: A) Pump Current - short to ground fail counts are accumulated to determine fault status. B) Reference Cell Voltage - short to ground fail counts are accumulated to determine fault status. C) Reference Ground - short to ground fail counts are accumulated to determine fault status. D) Trim circuit - short to ground fail counts are accumulated to determine fault status. <u>Note:</u> This ASIC is referred to as ATIC142 (Continental). <u>Note:</u> A ground short on the Pump Current or Reference Voltage signal may also set a P223C DTC.	The ASIC provides a fault indication when the pump current, reference cell or reference ground pin is < 150mV. Note: the faults must exist for previous 100 milli - seconds to qualify for a fail flag. The four fault signals have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set.	Diagnostic is Enabled B1S1 DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete). **************************	 P0135, P0030, P0031 or P0032 = Valid = Ready = True = Complete > 15.0 seconds	Signal A: 20 failures out of 24 samples OR Signal B: 20 failures out of 24 samples OR Signal C: 20 failures out of 24 samples OR Signal D: 20 failures out of 24 samples Continuous in 25 milli - second loop	Type B, 2 Trips
			B1S1 WRAF ASIC indicates a ground short to any of the following WRAF signals:	The ASIC provides a fault indication when the pump current, reference cell, reference ground or	Diagnostic is Enabled B1S1 DTC's Not active this key cycle	 P0135, P0030, P0031 or P0032	Signal A: 20 failures out of 24 samples OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			A) Pump Current - short to ground fail counts are accumulated to determine fault status. B) Reference Cell Voltage - short to ground fail counts are accumulated to determine fault status. C) Reference Ground - short to ground fail counts are accumulated to determine fault status. D) Trim circuit - short to ground fail counts are accumulated to determine fault status. Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch).	trim circuit fails the following criteria; |Nernst signal - 0.45| >1.0 volts OR |Voltage drop over Rgnd - (internal current source *Rgnd)| > 0.5 volts OR CJ136 H/W detection Note: the faults must exist for previous 10 milli - seconds to qualify for a fail flag. The four fault signals have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set.	Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) **************************	= Valid = Ready = True = Complete > 15.0 seconds	Signal B: 20 failures out of 24 samples OR Signal C: 20 failures out of 24 samples OR Signal D: 20 failures out of 24 samples Continuous in 25 milli - second loop	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit High Voltage Bank 1 Sensor 1 (For use with WRAF - Gen4 ECM	P0132	This DTC determines if the WRAF 02 sensor signal circuit is shorted high. This DTC will detect a short to power fault to the Pump Current, Reference Cell Voltage, Reference Ground and Trim circuit. When enabled, the diagnostic monitors the three different failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC). The individual diagnostic failure counters are incremented based on the message received from the ASIC. The DTC is set based on any of the three individual fail and sample counters.	B1S1 WRAF ASIC indicates a short to power on any of the following WRAF signals: A) Pump Current - short to power fail counts are accumulated to determine fault status. B) Reference Cell Voltage - short to power fail counts are accumulated to determine fault status. C) Reference Ground - short to power fail counts are accumulated to determine fault status. D) Trim Circuit - short to power fail counts are accumulated to determine fault status Note: This ASIC is referred to as ATIC142 (Continental)..	The ASIC provides a fault indication when the pump current, reference cell, reference ground or trim circuit pin is > 5.2V. Note: the faults must exist for more than 100 msec to qualify for a fail flag. The four fault signals have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set.	Diagnostic is Enabled B1S1 DTC's Not active this key cycle Measure Valid Status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete). **************************	 P0135, P0030, P0031 or P0032 = Valid = Ready = True = Complete > 15.0 seconds	Signal A: 20 failures out of 24 samples OR Signal B: 20 failures out of 24 samples OR Signal C: 20 failures out of 24 samples OR Signal D: 20 failures out of 24 samples Frequency: Continuous in 25 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			B1S1 WRAF ASIC indicates a short to power on any of the following WRAF signals: A) Pump Current - short to power fail counts are accumulated to determine fault status. B) Reference Cell Voltage - short to power fail counts are accumulated to determine fault status. C) Reference Ground - short to power fail counts are accumulated to determine fault status. D) Trim Circuit - short to power fail counts are accumulated to determine fault status Note: This ASIC is referred to as CJ136 (next Gen of CJ135 from Bosch).	The ASIC provides a fault indication when the pump current, reference cell, reference ground or trim circuit pin fail the following criteria; CJ136 H/W detection Note: the faults must exist for more than 10 msec to qualify for a fail flag. The four fault signals have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set.	Diagnostic is Enabled B1S1 DTC's Not active this key cycle Measure Valid Status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) **************************	 P0135, P0030, P0031 or P0032 = Valid = Ready = True = Complete > 15.0 seconds	Signal A: 20 failures out of 24 samples OR Signal B: 20 failures out of 24 samples OR Signal C: 20 failures out of 24 samples OR Signal D: 20 failures out of 24 samples Frequency: Continuous in 25 milli - second loop	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Performance Bank 1 Sensor 1	P0135	This DTC determines if the 02 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor. The diagnostic failure counter is incremented if the heater current is outside the expected range. This DTC is set based on the fail and sample counters.	Heater Current outside of the expected range of	0.3 < Amps < 7.0	Diagnostic is Enabled No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle All of the above met for	 ECT_Sensor_FA >11.0 Volts = Complete = Not active > zero > 120 seconds	7 failures out of 9 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit Low Voltage Bank 1 Sensor 2) (For Dual Bank Exhaust Only	P0137	This DTC determines if the 02 sensor signal circuit is shorted low. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold. The diagnostic failure counter is incremented if the 02S signal is below the threshold value. This DTC is set based on the fail and sample counters.	Oxygen Sensor Signal	< 50 mvolts	Diagnostic is Enabled No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault Commanded Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active	 TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active = Not active 11.0 < Volts = Not active = Not active = Not active = Not active = False = False 0.992 < ratio <1.014 150 < mgrams < 800 = Closed Loop = TRUE (Please see **"Closed Loop Enable**	400 failures out of 500 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					All Fuel Injectors for active Cylinders Fuel Condition Ethanol Estimation in Progress Fuel State All of the above met for	**Clarification"** in Supporting Tables). Enabled (On) Ethanol < 87 % = Not Active (Please see **"Ethanol Estimation in Progress"** in Supporting Tables). DFCO not active >5.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit High Voltage Bank 1 Sensor 2) (For Dual Bank Exhaust Only	P0138	This DTC determines if the 02 sensor signal circuit is shorted high or open. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold. The diagnostic failure counter is incremented if the 02S signal is above the threshold value. This DTC is set based on the fail and sample counters.	Oxygen Sensor Signal	> 1,050 mvolts	Diagnostic is Enabled No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Low Fuel Condition Only when FuelLevelDataFault ********************** Secondary delay after above conditions are complete (cold start condition) Secondary delay after above conditions are complete (not cold start condition) Commanded Equivalence Ratio ********************** All of the above met for	 TPS_ThrottleAuthorityDefaulted MAF_SensorFA MAP_SensorFA EvapExcessPurgePsbl_FA FuelInjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA 11.0 < Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds = False = False ********************** > 10.0 seconds when engine soak time > 28,800 seconds > 5.0 seconds when engine soak time < 28,800 seconds < 1.014 EQR ********************** > 2.0 seconds	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Slow Response Rich to Lean Bank 1 Sensor 2	P013A	The P013A diagnostic is the third in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, & P013B. This DTC determines if the secondary 02 sensor has an slow response to an A/F change from Rich to Lean and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow. Note: The Primary method is used when the secondary 02 sensor signal transitions from above the upper threshold to below the lower threshold, otherwise the Secondary method is used. <u>Primary method</u>: The P013A diagnostic measures the secondary 02 sensor voltage response rate	Primary Method: The EWMA of the Post 02 sensor normalized integral value. The EWMA repass limit is The EWMA calculation uses a 0.25 coefficient. OR Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.0 units < 7.5 units > 70.0 grams (upper voltage threshold is 450 mvolts and lower voltage threshold is 150 mvolts)	Diagnostic is Enabled No Active DTCs B1S2 DTCs Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	 TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_ 1_TFTKO O2S_Bank_2_TFTKO P013B, P013E, P013F, P2270 or P2271 >11.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs") = Not Valid, Green O2S condition is considered valid until the accumulated airflow is greater than **Multiple DTC Use Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab. Airflow accumulation is	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		between an upper and lower voltage threshold. The response rate is then normalized to mass air flow rate and scaled resulting in a normalized intregral value. The normalized integral is fed into a 1st order lag filter to update the final EWMA result. DTC P013A is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. Secondary method:			 Low Fuel Condition Only when FuelLevelDataFault Post fuel cell Crankshaft Torque DTC's Passed =================== After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).	only enabled when airflow is above 22.0 grams/sec. = False = False = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. < 125.0 Nm P2270 (and P2272 if applicable) P013E (and P014A if applicable) ==================		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		This fault is set if the secondary 02 sensor does not achieve the required lower voltage threshold before the accumulated mass air flow threshold is reached.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Slow Response Lean to Rich Bank 1 Sensor 2	P013B	The P013B diagnostic is the sixth in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, & P013B. This DTC determines if the secondary 02 sensor has an slow response to an A/F change from Lean to Rich and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow. Note: The Primary method is used when the secondary 02 sensor signal transitions from below the lower threshold to above the upper threshold, otherwise the Secondary method is used. <u>Primary method</u>: The P013B diagnostic measures the secondary 02 sensor voltage response rate	Primary Method: The EWMA of the Post 02 sensor normalized integral value. The EWMA repass limit is The EWMA calculation uses a 0.25 coefficient. OR Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.0 units < 7.5 units >400 grams (lower voltage threshold is 350 mvolts and upper voltage threshold is 650 mvolts)	Diagnostic is Enabled No Active DTCs B1S2 DTCs Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_ 1_TFTKO O2S_Bank_2_TFTKO P013A, P013E, P013F, P2270 or P2271 >11.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs") = Not Valid, Green O2S condition is considered valid until the accumulated airflow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab.	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		between an lower and upper voltage threshold. The response rate is then normalized to mass air flow rate and scaled resulting in a normalized intregral value. The normalized integral is fed into a 1st order lag filter to update the final EWMA result. DTC P013B is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller’s non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. Secondary method:				Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.		
					Green Cat System Condition	= Not Valid, Green Cat System condition is considered valid until accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 22.0 grams/ sec. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).		
					Low Fuel Condition	= False		
					Only when FuelLevelDataFault	= False		
					Post fuel cell	= Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.		
					DTC's Passed	P2270 P013E P013A P2271 P013F		
					=================== After above conditions are met: Fuel Enrich mode continued.	==================		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		This fault is set if the secondary 02 sensor does not achieve the required upper voltage threshold before the accumulated mass air flow threshold is reached.			================= During this test the following must stay TRUE or the test will abort: 0.951 < Base Commanded EQR < 1.100 ================ During this test: Engine Airflow must stay below: and the delta Engine Airflow over 12.5msec must be :	================== ================== 400 gps < 100.0 gps		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Slow Response Rich to Lean Bank 2 Sensor 2	P013C	The P013C diagnostic is the third in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, & P013D. This DTC determines if the secondary 02 sensor has an slow response to an A/F change from Rich to Lean and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow. Note: The Primary method is used when the secondary 02 sensor signal transitions from above the upper threshold to below the lower threshold, otherwise the Secondary method is used. <u>Primary method</u>: The P013C diagnostic measures the secondary 02 sensor voltage response rate	Primary Method: The EWMA of the Post 02 sensor normalized integral value. The EWMA repass limit is The EWMA calculation uses a 0.25 coefficient. OR Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.0 units < 7.5 units > 70.0 grams (upper voltage threshold is 450 mvolts and lower voltage threshold is 150 mvolts)	Diagnostic is Enabled No Active DTCs B2S2 DTCs Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_ 1_TFTKO O2S_Bank_2_TFTKO P013D, P014A, P014B, P2272 or P2273 >11.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs") = Not Valid, Green O2S condition is considered valid until the accumulated airflow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 in Supporting Tables tab.	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		between an upper and lower voltage threshold. The response rate is then normalized to mass air flow rate and scaled resulting in a normalized intregral value. The normalized integral is fed into a 1st order lag filter to update the final EWMA result. DTC P013C is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. Secondary method:			 Low Fuel Condition Only when FuelLevelDataFault Post fuel cell Crankshaft Torque DTC's Passed ================== After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).	Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. = False = False = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. < 125.0 Nm P2272 P014A ==================		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		This fault is set if the secondary 02 sensor does not achieve the required lower voltage threshold before the accumulated mass air flow threshold is reached.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Slow Response Lean to Rich Bank 2 Sensor 2	P013D	The P013D diagnostic is the sixth in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, & P013D. This DTC determines if the secondary 02 sensor has an slow response to an A/F change from Lean to Rich and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow. Note: The Primary method is used when the secondary 02 sensor signal transitions from below the lower threshold to above the upper threshold, otherwise the Secondary method is used. <u>Primary method</u>: The P013D diagnostic measures the secondary 02 sensor voltage response rate	Primary Method: The EWMA of the Post 02 sensor normalized integral value. The EWMA repass limit is The EWMA calculation uses a 0.25 coefficient. OR Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.0 units < 7.5 units >400 grams (lower voltage threshold is 350 mvolts and upper voltage threshold is 650 mvolts)	Diagnostic is Enabled No Active DTCs B2S2 DTCs Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	 TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_1_TFTKO O2S_Bank_2_TFTKO P013C, P014A, P014B, P2272 or P2273 >11.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs") = Not Valid, Green O2S condition is considered valid until the accumulated airflow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 in Supporting Tables tab.	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		between an lower and upper voltage threshold. The response rate is then normalized to mass air flow rate and scaled resulting in a normalized intregral value. The normalized integral is fed into a 1st order lag filter to update the final EWMA result. DTC P013D is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. Secondary method:			 Green Cat System Condition Low Fuel Condition Only when FuelLevelDataFault Post fuel cell DTC's Passed =================== After above conditions are met: Fuel Enrich mode continued.	Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. = Not Valid, Green Cat System condition is considered valid until accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 22.0 grams/sec. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service). = False = False = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. P2272 P014A P013C P2273 P014B ==================		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		This fault is set if the secondary 02 sensor does not achieve the required upper voltage threshold before the accumulated mass air flow threshold is reached.			================= During this test the following must stay TRUE or the test will abort: 0.951 < Base Commanded EQR < 1.100 ================ During this test: Engine Airflow must stay below: and the delta Engine Airflow over 12.5msec must be :	================== ================== 400 gps < 100.0 gps		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Delayed Response Rich to Lean Bank 1 Sensor 2	P013E	The P013E diagnostic is the second in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, & P013B. This DTC determines if the secondary 02 sensor has an initial delayed response to an A/F change from Rich to Lean and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary 02 sensor does not achieve the required voltage before the accumulated mass air flow threshold is reached.	Post 02 sensor voltage AND The Accumulated mass airflow monitored during the Delayed Response Test under DFCO DFCO begins after: 1) Catalyst has been rich for a minimum of AND 2) Catalyst Rich Accumulation Air Flow is	>450 mvolts >70 grams > 1 secs > 20.0 grams	Diagnostic is Enabled No Active DTCs B1S2 DTCs Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_ 1_TFTKO O2S_Bank_2_TFTKO P013A, P013B, P013F, P2270 or P2271 >11.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs") = Not Valid, Green O2S condition is considered valid until the accumulated airflow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab.	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.		
					Low Fuel Condition Only when FuelLevelDataFault	= False = False		
					Post fuel cell	= Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.		
					Crankshaft Torque	< 125.0 Nm		
					DTC's Passed	P2270		
					Number of fueled cylinders	< 7 cylinders		
					===================	==================		
					After above conditions are met: DFCO mode entered (wo driver initiated pedal input).			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Delayed Response Lean to Rich Bank 1 Sensor 2	P013F	The P013F diagnostic is the fifth in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, & P013B. This DTC determines if the secondary 02 sensor has an initial delayed response to an A/F change from Lean to Rich and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary 02 sensor does not achieve the required voltage before the accumulated mass air flow threshold is reached.	Post 02 sensor voltage AND The Accumulated mass airflow monitored during the Delayed Response Test	< 350 mvolts >400 grams	Diagnostic is Enabled No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage Learned heater resistance Green 02S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_ 1_TFTK0 O2S_Bank_2_TFTKO P013A, P013B, P013E, P2270 or P2271 >11.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid, Green O2S condition is considered valid until the accumulated airflow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab.	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.		
					Green Cat System Condition	= Not Valid, Green Cat System condition is considered valid until accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 22.0 grams/ sec. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).		
					Low Fuel Condition	= False		
					Only when FuelLevelDataFault	= False		
					Post fuel cell	= Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.		
					DTC's Passed	P2270 P013E P013A P2271		
					Number of fueled cylinders	> 1 cylinders		
					=================== After above conditions are met: Fuel Enrich mode	==================		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					entered. ================= During this test the following must stay TRUE or the test will abort: 0.951 < Base Commanded EQR < 1.100 ================= During this test: Engine Airflow must stay below: and the delta Engine Airflow over 12.5msec must be :	================== ================ 400 gps < 100.0 gps		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Performance Bank 1 Sensor 2) (For Dual Bank Exhaust Only	P0141	This DTC determines if the 02 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor. The diagnostic failure counter is incremented if the heater current is outside the expected range. This DTC is set based on the fail and sample counters.	Heater Current outside of the expected range of	0.3 > amps > 2.9	Diagnostic is Enabled No Active DTC's System Voltage Heater Warm-up delay 02S Heater device control B1S1 02S Heater Duty Cycle All of the above met for	 ECT_Sensor_FA >11.0 Volts = Complete = Not active > zero > 120 seconds	7 failures out of 9 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Delayed Response Rich to Lean Bank 2 Sensor 2	P014A	The P014A diagnostic is the second in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, & P013D. This DTC determines if the secondary 02 sensor has an initial delayed response to an A/F change from Rich to Lean and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary 02 sensor does not achieve the required voltage before the accumulated mass air flow threshold is reached.	Post 02 sensor voltage AND The Accumulated mass airflow monitored during the Delayed Response Test under DFCO DFCO begins after: 1) Catalyst has been rich for a minimum of AND 2) Catalyst Rich Accumulation Air Flow is	>450 mvolts >70 grams > 1 secs > 20.0 grams	Diagnostic is Enabled No Active DTCs B2S2 DTCs Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_1_TFTKO O2S_Bank_2_TFTKO P013C, P013D, P014B, P2272 or P2273 >11.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs") = Not Valid, Green O2S condition is considered valid until the accumulated airflow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 in Supporting Tables tab.	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.		
					Low Fuel Condition	= False		
					Only when FuelLevelDataFault	= False		
					Post fuel cell	= Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.		
					Crankshaft Torque	< 125.0 Nm		
					DTC's Passed	P2272		
					Number of fueled cylinders	< 7 cylinders		
					After above conditions are met: DFCO mode entered (wo driver initiated pedal input).			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Delayed Response Lean to Rich Bank 2 Sensor 2	P014B	The P014B diagnostic is the fifth in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, & P013D. This DTC determines if the secondary 02 sensor has an initial delayed response to an A/F change from Lean to Rich and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary 02 sensor does not achieve the required voltage before the accumulated mass air flow threshold is reached.	Post 02 sensor AND The Accumulated mass airflow monitored during the Delayed Response Test	< 350mvolts > 400 grams.	Diagnostic is Enabled No Active DTC's B2S2 DTC's Not Active this key cycle System Voltage Learned heater resistance Green 02S Condition	 TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_1_TFTK0 O2S_Bank_2_TFTKO P013C, P013D, P014A, P2272 or P2273 >11.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid, Green 02S condition is considered valid until the accumulated airflow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 in Supporting Tables tab.	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.		
					Green Cat System Condition	= Not Valid, Green Cat System condition is considered valid until accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 22.0 grams/sec. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).		
					Low Fuel Condition	= False		
					Only when FuelLevelDataFault	= False		
					Post fuel cell	= Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.		
					DTC's Passed	P2272 P014A P013C P2273		
					Number of fueled cylinders	> 1 cylinders		
					=================== After above conditions are met: Fuel Enrich mode	==================		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					entered. ================= During this test the following must stay TRUE or the test will abort: 0.951 < Base Commanded EQR < 1.100 ================= During this test: Engine Airflow must stay below: and the delta Engine Airflow over 12.5msec must be :	 ================== ================== 400 gps < 100.0 gps		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit Low Voltage Bank 2 Sensor 1	P0151	This DTC determines if the 02 sensor signal circuit is shorted low. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold. The diagnostic failure counter is incremented if the 02S signal is below the threshold value. This DTC is set based on the fail and sample counters.	Oxygen Sensor Signal	< 40mvolts	Diagnostic is Enabled No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault Commanded Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active	 TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active = Not active 11.0 < Volts = Not active = Not active = Not active = Not active = False = False 0.992 < ratio < 1.014 150 <APC < 800 mgrams = Closed Loop = TRUE	400 failures out of 500 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					    All Fuel Injectors for active Cylinders Fuel Condition Ethanol Estimation in Progress Fuel State All of the above met for	(Please see **“Closed Loop Enable Clarification”** in Supporting Tables). Enabled (On) < 87 % Ethanol = Not Active (Please see **“Ethanol Estimation in Progress”** in Supporting Tables). DFCO not active > 5.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit High Voltage Bank 2 Sensor 1	P0152	This DTC determines if the 02 sensor signal circuit is shorted high or open. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold. The diagnostic failure counter is incremented if the 02S signal is above the threshold value. This DTC is set based on the fail and sample counters.	Oxygen Sensor Signal	> 1,050 mvolts	Diagnostic is Enabled No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Low Fuel Condition Only when FuelLevelDataFault *********************** Secondary delay after above conditions are complete (cold start condition) Secondary delay after above conditions are complete (not cold start condition) Commanded Equivalence Ratio *********************** All of the above met for	 TPS_ThrottleAuthorityDefaulted MAF_SensorFA MAP_SensorFA EvapExcessPurgePsbl_FA FuelInjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA 11.0 < Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds = False = False *********************** > 15.0 seconds when engine soak time > 28,800 seconds > 8.0 seconds when engine soak time < 28,800 seconds < 1.014 EQR *********************** > 2 seconds	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Performance Bank 2 Sensor 1	P0155	This DTC determines if the 02 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor. The diagnostic failure counter is incremented if the heater current is outside the expected range. This DTC is set based on the fail and sample counters.	Heater Current outside of the expected range of	0.3 > amps > 7.0	Diagnostic is Enabled No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle All of the above met for	ECT_Sensor_FA >11.0 Volts = Complete = Not active > zero > 120 seconds	7 failures out of 9 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit Low Voltage Bank 2 Sensor 2	P0157	This DTC determines if the 02 sensor signal circuit is shorted low. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold. The diagnostic failure counter is incremented if the 02S signal is below the threshold value. This DTC is set based on the fail and sample counters.	Oxygen Sensor Signal	< 50 mvolts	Diagnostic is Enabled No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault Commanded Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active	 TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active = Not active 11.0 < Volts = Not active = Not active = Not active = Not active = False = False 0.992 < ratio < 1.014 150 < mgrams < 800 = Closed Loop = TRUE (Please see **“Closed Loop Enable**	400 failures out of 500 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					  All Fuel Injectors for active Cylinders Fuel Condition Ethanol Estimation in Progress Fuel State All of the above met for	**Clarification"** in Supporting Tables). Enabled (On) < 87 % Ethanol = Not Active (Please see **"Ethanol Estimation in Progress"** in Supporting Tables). DFCO not active > 5.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit High Voltage Bank 2 Sensor 2	P0158	This DTC determines if the 02 sensor signal circuit is shorted high or open. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold. The diagnostic failure counter is incremented if the 02S signal is above the threshold value. This DTC is set based on the fail and sample counters.	Oxygen Sensor Signal	> 1,050 mvolts	Diagnostic is Enabled No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Low Fuel Condition Only when FuelLevelDataFault ********************** Secondary delay after above conditions are complete (cold start condition) Secondary delay after above conditions are complete (not cold start condition) Commanded Equivalence Ratio ********************** All of the above met for	 TPS_ThrottleAuthorityDefaulted MAF_SensorFA MAP_SensorFA EvapExcessPurgePsbl_FA FuelInjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA 11.0 < Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds = False = False ********************** > 15.0 seconds when engine soak time > 28,800 seconds > 8.0 seconds when engine soak time < 28,800 seconds < 1.014 EQR ********************** > 2 seconds	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Delayed Response Rich to Lean Bank 1 Sensor 1) (For use with WRAF	P015A	DTC P015A detects that the primary WRAF oxygen sensor for Bank 1 has delayed response when the air fuel ratio transitions from rich to lean condition. This diagnostic runs simultaneously with the intrusive secondary 02 monitor rich to lean tests (P013E / P013A / P2271), which commands fuel cut off. Note: The Primary method is used when the primary WRAF 02 sensor signal transitions from above to below the 02 measured EQR threshold, otherwise the Secondary method is used. <u>Primary method:</u> The P015A diagnostic measures the primary WRAF 02 sensor response time between a rich condition above a starting measured EQR threshold and a lower measured EQR threshold. The response time is then scaled and normalized to mass airflow rate, engine speed, Baro,	Primary method: The EWMA of the Pre 02 sensor normalized R2L time delay value. The EWMA repass limit is The EWMA calculation uses a 0.25 coefficient. This method calculates the result when the WRAF 02 sensor measured EQR is OR Secondary Method: The Accumulated time monitored during the R2L Delayed Response Test. AND Pre WRAF 02 sensor measured EQR is	> 0.78 EWMA (sec) < 0.68 EWMA (sec) < 0.900 EQR > 3.5 Seconds > 0.400 EQR	Diagnostic is Enabled No Active DTC's System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA WRAF_Bank_1_FA P0131, P0132, P013A, P013B, P013E, P013F, P2270, P2271 >11.0 Volts = Not active = Not active = Not active = Not active = False = False	Frequency: Once per trip Note: if NaESPD_b_FastInitResplsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponselsActive = TRUE, multiple tests per trip are allowed	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		and intake air temperature resulting in a normalized delay value. The normalized delay is fed into a 1st order lag filter to update the final EWMA result. DTC P015A is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. <u>Secondary method:</u> This fault is set if the primary WRAF 02 sensor does not achieve the required lower measured EQR			Green 02S Condition 02 Heater (pre sensor) on for Engine Coolant (Or OBD Coolant Enable Criteria IAT Engine run Accum Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled) Closed loop integral Closed Loop Active	= Not Valid, Green 02S condition is considered valid until the accumulated air flow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. > 40 seconds > 50°C = TRUE) > -40°C > 30 seconds 800 < RPM < 2,500 750 < RPM < 2,550 4.0 < gps < 30.0 39.8 < MPH < 74.6 37.3 < MPH < 77.7 0.74 < C/L Int < 1.08 = TRUE (Please see **"Closed Loop Enable**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		threshold before a delay time threshold is reached.			Evap Ethanol Estimation in Progress Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Predicted Catalyst temp Fuel State	**Clarification"** in Supporting Tables), not in control of purge = Not Active (Please see **"Ethanol Estimation in Progress"** in Supporting Tables). > 70 kpa = enabled = not active = not active > 60.0 sec 550 < °C < 900 = DFCO possible		
					All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested.			
					Pre O2S EQR B1S1 at end of Cat Rich stage Fuel State Number of fueled cylinders	> 1.150 EQR = DFCO active < 7 cylinders		
					After above conditions are met: DFCO Mode is entered (wo driver initiated pedal input).			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Delayed Response Lean to Rich Bank 1 Sensor 1) (For use with WRAF	P015B	DTC P015B detects that the primary WRAF oxygen sensor for Bank 1 has delayed response when the air fuel ratio transitions from lean to rich condition. This diagnostic runs simultaneously with the intrusive secondary 02 monitor lean to rich tests (P013F / P013B), which commands fuel enrichment. Note: The Primary method is used when the primary WRAF 02 sensor signal transitions from lean condition to above the 02 measured EQR threshold, otherwise the Secondary method is used. <u>Primary method:</u> The P015B diagnostic measures the primary WRAF 02 sensor response time between a lean condition and a higher measured EQR threshold. The response time is then scaled and normalized to mass airflow rate, engine speed, Baro, and intake air temperature resulting in	Primary method: The EWMA of the Pre 02 sensor normalized L2R time delay value. The EWMA repass limit is The EWMA calculation uses a 0.25 coefficient. OR Secondary method: The Accumulated time monitored during the L2R Delayed Response Test. AND Pre WRAF 02 sensor measured EQR is OR At end of Cat Rich stage the Pre WRAF 02 sensor measured EQR is	> 0.82 EWMA (sec) < 0.72 EWMA (sec) > 2.5 Seconds < 0.900 EQR < 1.150EQR	Diagnostic is Enabled No Active DTC's P015A test is complete and System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA WRAF_Bank_1_FA P0131, P0132, P013A, P013B, P013E, P013F, P015A, P2270, P2271 = Passed >11.0 Volts = Not active = Not active = Not active = Not active = False	Frequency: Once per trip Note: if NaESPD_b_FastInitResplsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		a normalized delay value. The normalized delay is fed into a 1st order lag filter to update the final EWMA result. DTC P015B is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. <u>Secondary method:</u> This fault is set if the primary WRAF 02 sensor does not achieve the required higher measured EQR threshold before a delay time threshold is			Only when FuelLevelDataFault Green 02S Condition 02 Heater (pre sensor) on for Engine Coolant (Or OBD Coolant Enable Criteria IAT Engine run Accum Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled)	= False = Not Valid, Green 02S condition is considered valid until the accumulated air flow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. > 40 seconds > 50 °C = TRUE) > -40 °C > 30 seconds 800 < RPM < 2,500 750 < RPM < 2,550 4.0 < gps < 30.0 39.8 < MPH < 74.6 37.3 < MPH < 77.7		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		reached.			Closed loop integral Closed Loop Active	0.74 < C/L Int < 1.08 = TRUE (Please see **“Closed Loop Enable Clarification”** in Supporting Tables).		
					Evap	not in control of purge		
					Ethanol Estimation in Progress	= Not Active (Please see **“Ethanol Estimation in Progress”** in Supporting Tables).		
					Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on time	> 70 kpa = enabled = not active = not active > 60.0 sec		
					Predicted Catalyst temp Fuel State Number of fueled cylinders	550 < °C < 900 = DFCO inhibit > 1 cylinders		
					When above conditions are met: Fuel Enrich mode is entered.			
					During this test: Engine Airflow must stay between: and the delta Engine Airflow over 12.5msec must be :	4 < gps < 300 < 100.0 gps		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Delayed Response Rich to Lean Bank 2 Sensor 1) (For use with WRAF	P015C	DTC P015C detects that the primary WRAF oxygen sensor for Bank 2 has delayed response when the air fuel ratio transitions from rich to lean condition. This diagnostic runs simultaneously with the intrusive secondary 02 monitor rich to lean tests (P014A/P013C/ P2273), which commands fuel cut off. Note: The Primary method is used when the WRAF 02 sensor signal transitions from above to below the 02 measured EQR threshold, otherwise the Secondary method is used. Primary method: The P015C diagnostic measures the primary WRAF 02 sensor response time between a rich condition above a starting measured EQR threshold and a lower measured EQR threshold. The response time is then scaled and normalized to mass air flow rate, engine speed, Baro, and intake air	Primary method: The EWMA of the Pre 02 sensor normalized R2L time delay value. The EWMA repass limit is The EWMA calculation uses a 0.25 coefficient. This method calculates the result when the WRAF 02 sensor measured EQR is OR Secondary method: The Accumulated time monitored during the R2L Delayed Response Test. AND Pre WRAF 02 sensor measured EQR is above	> 0.78 EWMA (sec) < 0.68 EWMA (sec) < 0.9 EQR > 3.5 Seconds > 0.400 EQR	Diagnostic is Enabled No Active DTC's System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA WRAF_Bank_2_FA P0151, P0152, P013C, P013D, P014A, P014B, P2272, P2273 >11.0 Volts = Not active = Not active = Not active = Not active = False = False	Frequency: Once per trip Note: if NaESPD_b_FastInitRespIsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		temperature resulting in a normalized delay value. The normalized delay is fed into a 1st order lag filter to update the final EWMA result. DTC P015C is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. <u>Secondary method:</u> This fault is set if the primary WRAF 02 sensor does not achieve the required lower measured EQR threshold before a			Green 02S Condition 02 Heater (pre sensor) on for Engine Coolant (Or OBD Coolant Enable Criteria IAT Engine run Accum Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled) Closed loop integral Closed Loop Active	= Not Valid, Green 02S condition is considered valid until the accumulated air flow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. > 40 seconds > 50 °C = TRUE) > -40 °C >30 seconds 800 < RPM < 2,500 750 < RPM < 2,550 4.0 < gps < 30.0 39.8 < MPH < 74.6 37.3 < MPH < 77.7 0.74 < C/L Int < 1.08 = TRUE (Please see **"Closed**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		delay time threshold is reached.				**Loop Enable Clarification"** in Supporting Tables).		
					Evap	not in control of purge		
					Ethanol Estimation in Progress	= Not Active (Please see **"Ethanol Estimation in Progress"** in Supporting Tables).		
					Baro	> 70 kpa		
					Post fuel cell	= enabled		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater (post sensor) on Time	> 60.0 sec		
					Predicted Catalyst temp	550 < °C < 900		
					Fuel State	= DFCO possible		
					All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested.			
					Pre O2S EQR B1S1 at end of Cat Rich stage	> 1.150 EQR		
					Fuel State	= DFCO active		
					Number of fueled cylinders	< 7 cylinders		
					After above conditions are met: DFCO Mode is entered (wo driver initiated pedal input).			

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Delayed Response Lean to Rich Bank 2 Sensor 1) (For use with WRAF	P015D	DTC P015D detects that the primary WRAF oxygen sensor for Bank 2 has delayed response when the air fuel ratio transitions from lean to rich condition. This diagnostic runs simultaneously with the intrusive secondary 02 monitor lean to rich tests (P014B / P013D), which commands fuel enrichment. Note: The Primary method is used when the primary WRAF 02 sensor signal transitions from lean condition to above the 02 measured EQR threshold, otherwise the Secondary method is used. <u>Primary method:</u> The P015D diagnostic measures the primary WRAF 02 sensor response time between a lean condition and a higher measured EQR threshold. The response time is then scaled and normalized to mass air flow rate, engine speed, Baro, and intake air temperature resulting in	Primary method: The EWMA of the Pre 02 sensor normalized L2R time delay value. The EWMA repass limit is The EWMA calculation uses a 0.25 coefficient. OR Secondary method: The Accumulated time monitored during the L2R Delayed Response Test. AND Pre WRAF 02 sensor measured EQR is OR At end of Cat Rich stage the Pre WRAF 02 sensor measured EQR is	> 0.82 EWMA (sec) < 0.72 EWMA (sec) > 2.5 Seconds <0.900 EQR < 1.150EQR	Diagnostic is Enabled No Active DTC's P015C test is complete and System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA WRAF_Bank_2_FA P0151, P0152, P013C, P013D, P014A, P014B, P015C, P2272, P2273 = Passed >11.0 Volts = Not active = Not active = Not active = Not active = False	Frequency: Once per trip Note: if NaESPD_b_FastInitRespIsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		a normalized delay value. The normalized delay is fed into a 1st order lag filter to update the final EWMA result. DTC P015D is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. <u>Secondary method:</u> This fault is set if the primary WRAF 02 sensor does not achieve the required higher measured EQR threshold before a delay time threshold is			Only when FuelLevelDataFault Green 02S Condition 02 Heater (pre sensor) on for Engine Coolant (Or OBD Coolant Enable Criteria IAT Engine run Accum Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled) Closed loop integral	= False = Not Valid, Green 02S condition is considered valid until the accumulated air flow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. > 40 seconds > 50 °C = TRUE) > -40 °C > 30 seconds 800 < RPM < 2,500 750 < RPM < 2,550 4.0 < gps < 30.0 39.8 < MPH < 74.6 37.3 < MPH < 77.7 0.74 < C/L Int < 1.08		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		reached.			Closed Loop Active Evap Ethanol Estimation in Progress Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Predicted Catalyst temp Fuel State Number of fueled cylinders	= TRUE (Please see **“Closed Loop Enable Clarification”** in Supporting Tables). not in control of purge = Not Active (Please see **“Ethanol Estimation in Progress”** in Supporting Tables). > 70 kpa = enabled = not active = not active > 60.0 sec 550 < °C < 900 = DFCO inhibit > 1 cylinders		
					When above conditions are met: Fuel Enrich mode is entered.			
					During this test: Engine Airflow must stay between: and the delta Engine Airflow over 12.5msec must be :	4 < gps < 300 < 100.0 gps		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Performance Bank 2 Sensor 2	P0161	This DTC determines if the 02 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor. The diagnostic failure counter is incremented if the heater current is outside the expected range. This DTC is set based on the fail and sample counters.	Heater Current outside of the expected range of	0.3 > amps > 2.9	Diagnostic is Enabled No Active DTC's System Voltage Heater Warm-up delay 02S Heater device control B1S1 02S Heater Duty Cycle All of the above met for	 ECT_Sensor_FA >11.0 Volts = Complete = Not active > zero > 120 seconds	7 failures out of 9 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel System Too Lean Bank 1	P0171	Determines if the primary fuel control system for Bank 1 is in a lean condition, based on the filtered long-term and short-term fuel trim. A normally operating system operates centered around long-term fuel trim metric of 1.0. For lean conditions extra fuel trim is required therefor values > 1.0 indicate a Lean condition. A fault is determined, when the long term fuel metric exceeds the threshold value. In addition to the long-term fuel trim limit, the short-term fuel trim metric can be monitored and the fault sets once both threshold values are exceeded. The short-term fuel trim metric is only monitored on programs that have acceptable emissions when the long-term fuel metric reaches its full authority.	The filtered long-term fuel trim metric AND The filtered short-term fuel trim metric (Note: any value below 0.95 effectively nullifies the short-term fuel trim criteria)	>= 1.310 >= 0.100 If a fault has been detected the long-term fuel trim metric must be < 1.250 and the short-term fuel trim metric must be < 2.000 to repass the diagnostic.	The primary fuel trim diagnostic is enabled Engine speed BARO Coolant Temp Coolant Temp MAP Inlet Air Temp MAF Fuel Level Long Term Fuel Trim data accumulation: Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control and/or diagnosis	400 <rpm< 6,400 > 70 kPa >-20 °C (or OBD Coolant Enable Criteria = TRUE) < 135 °C 10 <kPa< 255 -20 <°C< 150 1 <g/s< 1,000 > 10 % or if fuel sender is faulty the diagnostic will bypass the fuel level criteria. > 20.00 seconds of data must accumulate on each trip, with at least 10.00 seconds of data in the current fuel trim cell before a pass or fail decision can be made. Additional time can be required for cold ambient starts to accommodate larger minimum LTM's for startability reasons. See **Startup Engine Coolant adjusment to Minimum accumulation time** . (Please see **P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage** in Supporting Tables for a list of cells utilized for diagnosis)	Frequency: 100 ms Continuous Loop	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 Long Term FT	Enabled Enabled (Please see **"Closed Loop Enable Clarification"** and **"Long Term FT Enable Criteria"** in Supporting Tables.)		
					EGR Diag. Catalyst Diag. Post 02 Diag. Device Control EVAP Diag.	Intrusive Test Not Active Intrusive Test Not Active Intrusive Test Not Active Not Active Large Leak Diagnostic (P0455) Not Active		
					Delay during GPF Regeneration Standard startup delays are re-initialized following completion of GPF Regen to allow system stabilization. (See "Long Term Fuel Trim data accumulation" above.)	No Delay		
					No active DTC:	IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapExcessPurgePsbl_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbPresDfltdStatus TCJBoostPresSnsrFA O2S_Bank_1_Sensor_1_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel System Too Rich Bank 1	P0172	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric.A normally operating system operates centered around long-term fuel trim metric of 1.0. For rich conditions less fuel trim is required therefor values <1.0 indicate a rich condition. There are two methods to determine a Rich fault. They are Passive and Intrusive. A Passive Test decision can be made up until the time that purge is first enabled. From that point forward, rich faults can only be detected by turning purge off intrusively. If during this period of time the filtered long-term fuel trim metric exceeds the threshold a fault will be set. In addition to the long-term fuel trim limit, the short-term fuel trim metric can be monitored and the fault sets once both threshold values are exceeded. The short-	**Passive Test:** The filtered Non-Purge Long Term Fuel Trim metric AND The filtered Short Term Fuel Trim metric (Note: any value above 1.05 effectively nullifies the short-term fuel trim criteria)	<= 0.730 <= 2.000		Secondary Parameters and Enable Conditions are identical to those for P0171, with the exception that fuel level is not considered.	Frequency: 100 ms Continuous Loop	Type B, 2 Trips
			******************************	**************************	******************************	******************************	*******************	
			Intrusive Test: For 3 out of 5 intrusive segments The filtered Purge Long Term Fuel Trim metric AND The filtered Non-Purge Long Term Fuel Trim metric AND The filtered Short Term Fuel Trim metric (Note: any value above 1.05 effectively nullifies the short-term fuel trim criteria)	<= 0.740 <= 0.730 <= 2.000 If a fault has been detected (by the passive or intrusive test) the long-term fuel trim metric must be > 0.745 and the short-	Purge Vapor Fuel	<= 18.00% Intrusive Test is inhibited when Purge Vapor percentage is greater than this threshold. (Note: values greater than 50% indicate the Purge Vapor Fuel requirement is not being used) A minimum number of accumlated Fuel Trim Data samples are required to adequately learn a correct Purge Vapor Fuel value. See the table **Minimum Non-Purge Samples for Purge (Vapor Fuel)** for the Purge Off cells used to validate the Purge Vapor Fuel parameter.	**Segment Definition:** Segments can last up to 30 seconds and are separated by the lesser of 30.00 seconds of purge-on time or enough time to purge 15 grams of vapor. A maximum of 5 completed segments or 20 attempts are allowed for each intrusive test. After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		term fuel trim metric is only monitored on programs that have acceptable emissions when the long-term fuel metric reaches its full authority. Once purge is enabled if the filtered Purge Long Term Fuel Trim metric > 0.740 , the test passes without intrusively checking the filtered Non-Purge Long Term Fuel Trim metric. However if the filtered Purge Long Term Fuel Trim metric is <= 0.740 , the Intrusive test is invoked. The purge is ramped off to determine if excess purge vapor is the cause of the rich condition. If during 3 out of 5 intrusive segments, the filtered Purge Long Term Fuel Trim metric <= 0.730 the fault will set. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics. This is why the intrusive test is operated over several		term fuel trim metric must be > 0.000 to repass the diagnostic. The intrusive test will be enabled at long-term fuel metric values < 0.75 until the diagnostic repasses after a failure.		If the accumulated purge volume is > 3,500.0 grams, the intrusive test will not be inhibited even if Purge Vapor Fuel is > 18.0%.	time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge Long Term Fuel Trim metric > 0.740 for at least 200.00 seconds, indicating that the canister has been purged.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		segments allowing Purge to renable between segments. Likewise, for these reasons, if after the 5 intrusive segments the diagnostic continues to pass, there is a delay period of 300 seconds to allow sufficient time to purge excess vapors from the canister, before re-evaluating a Rich condition if it still exists.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel System Too Lean Bank 2	P0174	Determines if the primary fuel control system for Bank 2 is in a lean condition, based on the filtered long-term and short-term fuel trim. A normally operating system operates centered around long-term fuel trim metric of 1.0. For lean conditions extra fuel trim is required therefor values > 1.0 indicate a Lean condition. A fault is determined, when the long term fuel metric exceeds the threshold value. In addition to the long-term fuel trim limit, the short-term fuel trim metric can be monitored and the fault sets once both threshold values are exceeded. The short-term fuel trim metric is only monitored on programs that have acceptable emissions when the long-term fuel metric reaches its full authority.	The filtered long-term fuel trim metric AND The filtered short-term fuel trim metric (Note: any value below 0.95 effectively nullifies the short-term fuel trim criteria)	>= 1.310 >= 0.100 If a fault has been detected the long-term fuel trim metric must be < 1.250 and the short-term fuel trim metric must be < 2.000 to repass the diagnostic.	The primary fuel trim diagnostic is enabled Engine speed BARO Coolant Temp Coolant Temp MAP Inlet Air Temp MAF Fuel Level Long Term Fuel Trim data accumulation: Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control and/or diagnosis	 400 <rpm< 6,400 > 70 kPa >-20 °C (or OBD Coolant Enable Criteria = TRUE) < 135 °C 10 <kPa< 255 -20 <°C< 150 1 <g/s< 1,000 > 10 % or if fuel sender is faulty the diagnostic will bypass the fuel level criteria. > 20.00 seconds of data must accumulate on each trip, with at least 10.00 seconds of data in the current fuel trim cell before a pass or fail decision can be made.Additional time can be required for cold ambient starts to accommodate larger minimum LTM's for startability reasons. See **Startup Engine Coolant adjusment to Minimum accumulation time** . (Please see **P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage** in Supporting Tables for a list of cells utilized for diagnosis)	Frequency: 100 ms Continuous Loop	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 Long Term FT	Enabled Enabled (Please see **"Closed Loop Enable Clarification"** and **"Long Term FT Enable Criteria"** in Supporting Tables.)		
					EGR Diag. Catalyst Diag. Post 02 Diag. Device Control EVAP Diag.	Intrusive Test Not Active Intrusive Test Not Active Intrusive Test Not Active Not Active Large Leak Diagnostic (P0455) Not Active		
					Delay during GPF Regeneration Standard startup delays are re-initialized following completion of GPF Regen to allow system stabilization. (See "Long Term Fuel Trim data accumulation" above.)	No Delay		
					No active DTC:	AC_SystemRPM FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapExcessPurgePsbl_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbPresDfltdStatus TCJBoostPresSnsrFA O2S_Bank_2_Sensor_1_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel System Too Rich Bank 2	P0175	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric.A normally operating system operates centered around long-term fuel trim metric of 1.0. For rich conditions less fuel trim is required therefor values <1.0 indicate a rich condition. There are two methods to determine a Rich fault. They are Passive and Intrusive. A Passive Test decision can be made up until the time that purge is first enabled. From that point forward, rich faults can only be detected by turning purge off intrusively. If during this period of time the filtered long-term fuel trim metric exceeds the threshold a fault will be set. In addition to the long-term fuel trim limit, the short-term fuel trim metric can be monitored and the fault sets once both threshold values are exceeded. The short-	**Passive Test:** The filtered Non-Purge Long Term Fuel Trim metric AND The filtered Short Term Fuel Trim metric (Note: any value above 1.05 effectively nullifies the short-term fuel trim criteria) ****************************** **Intrusive Test:** For 3 out of 5 intrusive segments, the filtered Purge Long Term Fuel Trim metric AND The filtered Non-Purge Long Term Fuel Trim metric AND The filtered Short Term Fuel Trim metric (Note: any value above1.05 effectively nullifies the short-term fuel trim criteria)	<= 0.730 <= 2.000 *************************** <= 0.740 <= 0.730 <= 2.000 If a fault has been detected (by the passive or intrusive test) the long-term fuel trim metric must be >	****************************** Purge Vapor Fuel	Secondary Parameters and Enable Conditions are identical to those for P0174, with the exception that fuel level is not considered. ****************************** <= 18.00% Intrusive Test is inhibited when Purge Vapor percentage is greater than this threshold. (Note: values greater than 50% indicate the Purge Vapor Fuel requirement is not being used) A minimum number of accumlated Fuel Trim Data samples are required to adequately learn a correct Purge Vapor Fuel value. See the table **Minimum Non-Purge Samples for Purge (Vapor Fuel)** for the Purge Off cells used to validate the Purge Vapor Fuel parameter. If the accumulated purge volume is > 3,500.0	Frequency: 100 ms Continuous Loop ******************* **Segment Definition:** Segments can last up to 30 seconds and are separated by the lesser of 30.00 seconds of purge-on time or enough time to purge 15 grams of vapor. A maximum of 5 completed segments or 20 attempts are allowed for each intrusive test. After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient time to	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		term fuel trim metric is only monitored on programs that have acceptable emissions when the long-term fuel metric reaches its full authority. Once purge is enabled if the filtered Purge Long Term Fuel Trim metric > 0.740 , the test passes without intrusively checking the filtered Non-Purge Long Term Fuel Trim metric. However if the filtered Purge Long Term Fuel Trim metric is <= 0.740 , the Intrusive test is invoked. The purge is ramped off to determine if excess purge vapor is the cause of the rich condition. If during 3 out of 5 intrusive segments, the filtered Purge Long Term Fuel Trim metric <= 0.730 the fault will set. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics. This is why the intrusive test is operated over several		0.745 and the short-term fuel trim metric must be > 0.000 to repass the diagnostic. The intrusive test will be enabled at long-term fuel metric values < 0.75 until the diagnostic repasses after a failure.		grams, the intrusive test will not be inhibited even if Purge Vapor Fuel is > 18.0%. (Note: values greater than 50% indicate the Purge Vapor Fuel requirement is not being used)	purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge Long Term Fuel Trim metric > 0.740 for at least 200.00 seconds, indicating that the canister has been purged.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		segments allowing Purge to renable between segments. Likewise, for these reasons, if after the 5 intrusive segments the diagnostic continues to pass, there is a delay period of 300 seconds to allow sufficient time to purge excess vapors from the canister, before re-evaluating a Rich condition if it still exists.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Temperature Sensor 1 Circuit Low Fault	P0182	This DTC diagnose SENT fuel rail temperature sensor 1 that is too low out of range. If the sensor digital value (represnting the refernce voltage) is below the lower digital threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the low sample counter reaches its threshold.	Fuel Temperature Sensor 1 SENT digital read value	< 145	Fuel Temperature Out of Range Diagnoistic Enabled	True	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips
						Enabled when a code clear is not active or not exiting device control		
					No Fault Active on	SENT Communication Fault Active (U0625, U101B, U0670, U0671) SENT Intenal Error Fault Active (P126E) Fuel Temperature Sensor SENT Message Error Fault Active (P128C)		
					No Fault Pending on	SENT Intenal Error Fault Pending (P126E) Fuel Temperature Sensor SENT Message Error Fault Pending (P128C)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Temperature Sensor 1 Circuit High Fault	P0183	This DTC diagnose SENT fuel rail temperature sensor 1 that is too high out of range. If the sensor digital value (represnting the refernce voltage) is above the upper digital threshold, the high fail counter then increments. If the high fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the high sample counter reaches its threshold.	Fuel Temperature Sensor 1 SENT digital read value	> 1,865	Fuel Temperature Out of Range Diagnoistic Enabled	True	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips
						Enabled when a code clear is not active or not exiting device control		
					No Fault Active on	SENT Communication Fault Active (U0625, U101B, U0670, U0671) SENT Intenal Error Fault Active (P126E) Fuel Temperature Sensor SENT Message Error Fault Active (P128C)		
					No Fault Pending	SENT Intenal Error Fault Pending (P126E) Fuel Temperature Sensor SENT Message Error Fault Pending (P128C)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Temperature Sensor 2 Circuit Low Fault	P0187	This DTC diagnose SENT fuel rail temperature sensor 2 that is too low out of range. If the sensor digital value (represnting the refernce voltage) is below the lower digital read threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the low sample counter reaches its threshold.	Fuel Temperature Sensor 1 SENT digital read value	< 145.00	Fuel Temperature Out of Range Diagnoistic Enabled No Fault Active on No Fault Pending	True Enabled when a code clear is not active or not exiting device control SENT Communication Fault Active (U0625, LI101B, U0670, U0671) SENT Intenal Error Fault Active (P126F) Fuel Temperature Sensor SENT Message Error Fault Active (P128D) SENT Intenal Error Fault Pending (P126F) Fuel Temperature Sensor SENT Message Error Fault Pending (P128D)	50.00 failures out of 62.00 samples 100 ms per 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.
SENT Fuel Rail Temperature Sensor 2 Circuit High Fault	P0188	This DTC diagnose SENT fuel rail temperature sensor 2 that is too high out of range. If the sensor digital value (represnting the refernce voltage) is above the upper digital read threshold, the high fail counter then increments. If the high fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the high sample counter reaches its threshold.	Fuel Temperature Sensor 1 SENT digital read value	> 1,865.00	Fuel Temperature Out of Range Diagnoistic Enabled	True	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips
						Enabled when a code clear is not active or not exiting device control		
					No Fault Active on	SENT Communication Fault Active (U0625, U101B, U0670, U0671) SENT Intenal Error Fault Active (P126F) Fuel Temperature Sensor SENT Message Error Fault Active (P128D)		
					No Fault Pending	SENT Intenal Error Fault Pending (P126F) Fuel Temperature Sensor SENT Message Error Fault Pending (P128D)		

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]	>= 30.00 kPa	a) Diagnostic is .. b) Timer Engine Running c1) Fuel Flow Rate Valid c2) Fault bundle FDB_FuelPresSnsrCktFA c3) Reference Voltage Fault Status [DTC P0641] c4) Fault bundle 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 [DTC P129F] c8) CAN Sensor Bus message $0C3 Comm Fault [DTC P165C] c9) CAN Sensor Bus Fuel Pmp Speed Command ARC and Checksum Comm Fault Code [DTC U18A7] c10) Fuel Pump Duty Cycle Fault Active c11) Sensor Configuration [Wired to FTZM?] c12) Sensor Bus Relay On d) Emissions Fuel Level Low [Message $3FB] e) Fuel Control Enable f) Fuel Pump Control State g) Instantaneous Fuel	a) ENABLED b) >= 5.00 seconds c1)== TRUE c2) == False c3) == False c4] == False c5) == False c6) == False c7) == False c8) == False c9] == False c10) == False c11) == CeFDBR_e_WiredTo_FTZM c12) == TRUE d) == False e) == TRUE f) == Normal Control OR == Fuel Pres Sensor Stuck Control g) >= 0.05 gm/sec	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.
					Flow h) Diagnostic System Disabled j1) Fuel Pmp Speed Command Alive Rolling Count and Checksum Error [CAN Bus B $0CE][DTC U18A7] j2) CAN Sensor Bus message $0C3_Available j3) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B $0C3][DTC U18A7]	h) == False j1) == False j2) == TRUE j3) == False		

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 is .. b) Run_Crank Active c) Diagnostic System Disabled d) Pressure Sensor Configuration	a) ENABLED b) == TRUE c) == False d) If calibration value CeFDBR_e_WiredTo_FTZM == WiredTo ECM Else 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 is .. b) Run_Crank Active c) Diagnostic System Disabled d1) Pressure Sensor Configuration d2) Sensor Bus Relay On d3) CAN Sensor Bus message $0C3 Available d4) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B $0C3] [Infol]	a) ENABLED b) == TRUE c) == False d1) If calibration value CeFDBR_e_WiredTo_FTZM == WiredTo FTZM Else see Casel d2)==TRUE d3)==TRUE d4) == False	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.
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 is .. b) Run_Crank Active c) Diagnostic System Disabled d) Pressure Sensor Configuration	a) ENABLED b) ==TRUE c) == False d) If calibration value CeFDBR_e_WiredTo_FTZM == WiredTo ECM Else 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 is .. b) Run_Crank Active c) Diagnostic System Disabled d1) Pressure Sensor Configuration d2) Sensor Bus Relay On d3) CAN Sensor Bus message $0C3 Available d4) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B $0C3][Info1]	a) ENABLED b) ==TRUE c) == False d1) If calibration value CeFDBR_e_WiredTo_FTZM == WiredTo FTZM Else See Case 1 d2)== TRUE d3)==TRUE d4) == False	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.
SENTSIDI High Pressure Sensor Performance	P0191	The DTC determines if there is a skewed control fuel rail sensor (Sensori) via a comparison to diagnostic sensor (sensor2) continuously when the engine is running and the commanded pressure is steady.	Primary sensor (P1) vs. Secondary sensor (P2) performance rationality ((Low Limit fail Filtered Fuel Control Error) OR (High Limit Fail: Filtered Fuel Control Error)) AND (Filtered Absolute delta between sensori and sensor2	<= **P0191 - Low fail limit of fuel control due to pressure sensor skewed low** (See supporting table) >= **P0191 - High fail limit of fuel control due to high pressure sensor skewed High** (see Supporting table) >= 1.00 mpa Note: fuel control error is calcuated based on the squreroot of senorl divided by sensor2, this value is filter to ensure proper failure detection. Absolute delta between sensori and sensor2 value is filter to ensure proper failure detection.	Commanded Pressure rate of change (increasing or dercresing) for a period of time	<0.70 mpa >= 1.25 seconds Enabled when a code clear is not active or not exiting device control	Filter Fuel Control Error term and Absolute delta between sensori and sensor2 exceed Low or High Fail limit for a duration >= 1.50 seconds This is diagnostic runs Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Pressure Sensor 1 Out of Range	P0192	This DTC diagnose SENT high pressure sensor 1 that is too low out of range. If the sensor digital value (represnting the refernce voltage) is below the lower digital threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the low sample counter reaches its threshold.	High Pressure Rail Sensor 1 SENT digital read value	=< 94			Time Based: 400 Failuerout of 500 Samples 6.25 ms per 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.
Engine Oil Temperature (EOT) Sensor Performance	P0196	Determines if the engine oil temperature (EOT) sensor is stuck or biased in range. Three independent tests can be used.1) Cold Start Test Compares EOT to ECT and IAT at powerup after a long soak (Fast and regular tests). 2) Warm Up Test Compares EOT to a target EOT after a large enough accumulated airflow has occurred. 3) Continuous Test Compares the measured EOT to modeled EOT on a continuous basis on a warm engine.	**Fast Cold Start Test** To indicate an fast fail: Absolute value of Powerup EOT - Powerup ECT AND Absolute value of Powerup IAT - Powerup ECT To indicate a fast pass: Absolute value of Powerup EOT - Powerup ECT AND Absolute value of Powerup EOT - Powerup IAT	EOT Temp Diff > **FastFailTempDiff** (See P0196 details on Supporting Tables Tab) AND < 16 degrees C < 16 degrees C AND < 16 degrees C	EOT Diagnostic main Status AND Engine Running Cold Start Specific EOT Test Conditions: Use Cold Start Diagnostic Engine Off Time Engine Off Timer Validity No active DTC's	Enabled = True Enabled > 540 Seconds = True Fault bundles: IgnitionOffTimer_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngOilTempSensorCircuitFA	Cold Start Fast Test - one failure out of one sample - test performed once per second	Type B, 2 Trips
			Cold Start Test Pass Condition 1: Absolute value of Powerup EOT - Powerup ECT AND Absolute value of Powerup EOT - minIAT OR Pass Condition 2: Absolute value of Powerup EOT - Powerup ECT	<= 16 Deg C <= 16 Deg C OR > 16 Deg C	All three tests (Cold/ Warm/Continuous) EOT Diagnostic main enable AND Engine Running Cold Start Specific EOT Test Conditions: Use Cold Start Diagnostic Engine Off Time Engine Off Timer Validity	Enabled = True Enabled > 540 Seconds = True	Cold Start Regular Test - one failure out of one sample - test performed once per second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			AND	AND				
			(IAT minimum observed with Block Heater	> -7 Deg C	Time above Minimum Vehicle Speed	> 9MPH for > 400 seconds		
			or					
			(IAT minimum observed and	> -10 Deg C	Time less than Vehicle speed resets above timer	< 15.0 for > 20.0 seconds		
			Absolute value of power up IAT - min. observed IAT))	<= 5 Deg C	No active DTC's	Fault bundles: IgnitionOffTimer_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngOilTempSensorCircuit FA		
			AND	AND				
			Absolute value of Powerup EOT - Powerup IAT	<= 16 Deg C				
			AND					
			Absolute value of Powerup EOT - minIAT	<= 16 Deg C				
			<u>Fail Condition:</u>					
			Absolute value of Powerup EOT - Powerup ECT	>16 Deg C				
			AND	AND				
			(IAT minimum observed with Block Heater	> -7 Deg C				
			or					
			(IAT minimum observed and	> -10 Deg C				
			Absolute value of power up IAT - min. observed IAT))	<= 5 Deg C				
			AND	AND				
			(Absolute value of Powerup EOT - Powerup IAT	> 16 Deg C				
			or					
			Absolute value of Powerup EOT - minIAT)	> 16 Deg C				
			AND	AND				
			Absolute value of Powerup ECT - Powerup IAT	<=16 Deg C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			AND Absolute value of Powerup ECT - minIAT	AND <= 16 Deg C				
			Warmup Test <u>Warm Up Fail Condition:</u> EOT <u>Warm Up Test Pass Condition:</u> EOT	 < 70 Deg C => 70 Deg C	EOT Diagnostic main enable Engine Running Warm Up EOT Test Specific Conditions: Use Warm Up EOT Diagnostic Power up ECT Power up ECT Total accumulated engine airflow since engine start DISABLE CONDITIONS (for all three tests)No active DTC's	Enabled = True Disabled > 200 degrees C < 200 degrees C >= **P0196_TotalAccumulatedFlow** (See P0196 details on Supporting Tables Tab) Fault bundles: IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngOilTempSensorCircuitFA	Warm up Tests - one failure out of one sample - test performed once per second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Continuous Test Pass Condition: (Measured Oil Temperature - Modeled Oil Temperature) OR Absolute value of (Measured Oil Temperature - Modeled Oil Temperature) Fail Condition: (Measured Oil Temperature - Modeled Oil Temperature) AND Absolute value of (Measured Oil Temperature - Modeled Oil Temperature)	>= 0 and <= 40.0 OR >= 0 and <= 40.0 > 40.0 AND > 40.0	EOT Diagnostic main enable Engine Running Continuous EOT Test Specific Conditions: Use Continuous Diagnostic Power up ECT and ECT All of three criteria above AND EOT Model Oil Temperature reach Equilibrium OR Use quick transition to equilibrium state and ECT DISABLE CONDITIONS (for all three tests)No active DTC's	Enabled = True Enabled >= -7 and <= 105DegC >= 45 and <= 105 Deg C >= 93 Deg C Enabled and >= ECT from 5 sec previous Fault bundles: IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngOilTempSensorCircuitFA IAT_SensorCircuitFA EngOilModeledTempValid	Continuous Test 70 failures out of 100 samples performed once per second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Temperature (EOT) Circuit Low	P0197	Controller specific output driver circuit diagnoses the Engine Oil Temperature (EOT) Sensor 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.	Engine Oil Temperature Sensor (EOT) Circuit Resistance	< 25 ohms	Diagnostic Status	Enabled	4 failures out of 5 samples Sampled every 1 second	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Temperature (EOT) Circuit High	P0198	Controller specific output driver circuit diagnoses the Engine Oil Temperature (EOT) Sensor 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.	Engine Oil Temperature Sensor (EOT) Circuit Resistance	> 450,000 ohms	Diagnostic Status Engine Run Time OR ECT	Enabled > 20.0 seconds >= -20 Deg C	4 failures out of 5 samples Sampled every 1 second	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Temperature Sensor (EOT) Circuit Intermittent	P0199	Determines if an intermittent fault exists on the engine oil temperature sensor circuit. This diagnostic compares each temperature sample to the previous sample and measures cumulative error over a sample period.	**Continuous Test** <u>Pass/Fail Condition:</u> Temperature signal string length, cumulative sum of absolute value of (Oil Temperature - Previous Oil Temperature)	String Length >= 20.00 °C	None	Enabled	4 failures out of 5 samples, sampled every 2 seconds	Type B, 2 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	< 54.9 Deg C	Diagnostic is Enabled		30 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	> 0.0 seconds		
					Distance traveled this key cycle	> 1.2 km		
					Ambient air pressure	> 55.0 kPa		
					Ambient air temperature	> -9.0 Deg C		
					**************************			
					Engine coolant temperature At least once during the key cycle	> 58.9 Deg C		
					**************************			
					Heat to coolant	≥ **P01F0 - Heat To Coolant Min 2D**		
					DFCO time	< 10.0 seconds		
					Thermostat duty cycle	< 100.0%		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					RPM Active Fuel Management is not in	< 8,200 Half Cylinder Mode		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 Open Circuit - (SIDI)	P0201	Controller specific output driver circuit diagnoses Injector 1 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injector 1 high sided driver for an 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 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. Or Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >= 0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 - (SIDI)	P0202	Controller specific output driver circuit diagnoses Injector 2 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injector 2 high sided driver for an 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 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. Or Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >= 0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 3 Open Circuit - (SIDI)	P0203	Controller specific output driver circuit diagnoses Injector 3 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injector 3 high sided driver for an 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 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. Or Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >= 0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 - (SIDI)	P0204	Controller specific output driver circuit diagnoses Injector 4 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injector 4 high sided driver for an 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 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. Or Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 5 Open Circuit - (SIDI)	P0205	Controller specific output driver circuit diagnoses Injector 5 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injector 5 high sided driver for an 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 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. Or Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Sec P062B not FAorTFTK	10.00 failures out of 20.00 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 - (SIDI)	P0206	Controller specific output driver circuit diagnoses Injector 6 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injector 6 high sided driver for an 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 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. Or Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 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 - (SIDI)	P0207	Controller specific output driver circuit diagnoses Injector 7 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injector 7 high sided driver for an 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 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. Or Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 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 8 Open Circuit - (SIDI)	P0208	Controller specific output driver circuit diagnoses Injector 7 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injector 7 high sided driver for an 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 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. Or Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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.
TPS2 Circuit Low	P0222	Detects a continuous or intermittent short low or open in TPS2 circuit by monitoring the TPS 2 sensor percent Vref and failing the diagnostic when the TPS percent Vref is too low. This diagnostic only runs when battery voltage is high enough.	TPS2 % Vref <	0.250 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	79/159 counts; 57 counts continuous; 3.125 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.
TPS2 Circuit High	P0223	Detects a continuous or intermittent short high in TPS2 circuit by monitoring the TPS 2 sensor percent Vref and failing the diagnostic when the TPS percent Vref is too high. This diagnostic only runs when battery voltage is high enough.	TPS2 % Vref >	4.590 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	79/159 counts; 57 counts continuous; 3.125 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.
Injector 1 Low side circuit shorted to ground (SIDI)	P0261	Controller specific output driver circuit diagnoses Injector 1 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.	 <= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 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 Low side circuit shorted to power (SIDI)	P0262	Controller specific output driver circuit diagnoses Injector 1 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.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 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 Low side circuit shorted to ground (SIDI)	P0264	Controller specific output driver circuit diagnoses Injector 2 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.	<= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 Low side circuit shorted to power (SIDI)	P0265	Controller specific output driver circuit diagnoses Injector 2 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.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 3 Low side circuit shorted to ground (SIDI)	P0267	Controller specific output driver circuit diagnoses Injector 3 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.	<= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 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 3 Low side circuit shorted to power (SIDI)	P0268	Controller specific output driver circuit diagnoses Injector 3 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.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 Coolant Pump Performance	P026E	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	> 7.00 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 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	[illegible] [illegible] ***************************** > [illegible] ***************************** = [illegible] ***************************** > [illegible] [illegible] > -39. [illegible] = TRU [illegible] [illegible] [illegible] *****************************	5 failures out of 8 samples 1000ms / sample	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 Low side circuit shorted to ground (SIDI)	P0270	Controller specific output driver circuit diagnoses Injector 4 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.	<= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 Low side circuit shorted to power (SIDI)	P0271	Controller specific output driver circuit diagnoses Injector 4 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.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 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 5 Low side circuit shorted to ground (SIDI)	P0273	Controller specific output driver circuit diagnoses Injector 5 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.	 <= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 5 Low side circuit shorted to power (SIDI)	P0274	Controller specific output driver circuit diagnoses Injector 5 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.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 Low side circuit shorted to ground (SIDI)	P0276	Controller specific output driver circuit diagnoses Injector 6 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.	<= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 Low side circuit shorted to power (SIDI)	P0277	Controller specific output driver circuit diagnoses Injector 6 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.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 Low side circuit shorted to ground (SIDI)	P0279	Controller specific output driver circuit diagnoses Injector 7 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.	 <= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 Low side circuit shorted to power (SIDI)	P0280	Controller specific output driver circuit diagnoses Injector 7 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.	 25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 8 Low side circuit shorted to ground (SIDI)	P0282	Controller specific output driver circuit diagnoses Injector 8 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.	<= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 8 Low side circuit shorted to power (SIDI)	P0283	Controller specific output driver circuit diagnoses Injector 8 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.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 to 20.00 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 Injector Circuit Range/ Performance	P02EE	Diagnostic to determine if Cylinder 1 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit	Injector voltage feedback is not able to detect an opening magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Injector voltage feedback is not able to detect a closing time OR Measured Voltage feedback converted to Injector closing time OR Measured Voltage	=< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude** (See supporting table) >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude** (See supporting table) =< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time** (See supporting table) >=	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below) Injection Pulse Width	= True >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width**	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			feedback converted to Injector closing time	**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Injector Circuit Range/ Performance	P02EF	Diagnostic to determine if Cylinder 2 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit	Injector voltage feedback is not able to detect an opening magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Injector voltage feedback is not able to detect a closing time OR Measured Voltage feedback converted to Injector closing time OR Measured Voltage	=< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude** (See supporting table) >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude** (See supporting table) =< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time** (See supporting table) >=	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below) Injection Pulse Width	= True >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width**	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			feedback converted to Injector closing time	**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Injector Circuit Range/ Performance	P02F0	Diagnostic to determine if Cylinder 3 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit	Injector voltage feedback is not able to detect an opening magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Injector voltage feedback is not able to detect a closing time OR Measured Voltage feedback converted to Injector closing time OR Measured Voltage	 =< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude** (See supporting table) >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude** (See supporting table) =< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time** (See supporting table) >=	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below) Injection Pulse Width	= True >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width**	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			feedback converted to Injector closing time	**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Injector Circuit Range/ Performance	P02F1	Diagnostic to determine if Cylinder 4 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit	Injector voltage feedback is not able to detect an opening magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Injector voltage feedback is not able to detect a closing time OR Measured Voltage feedback converted to Injector closing time OR Measured Voltage	=< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude** (See supporting table) >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude** (See supporting table) =< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time** (See supporting table) >=	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below) Injection Pulse Width	= True >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width**	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			feedback converted to Injector closing time	**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Injector Circuit Range/ Performance	P02F2	Diagnostic to determine if Cylinder 5 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit	Injector voltage feedback is not able to detect an opening magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Injector voltage feedback is not able to detect a closing time OR Measured Voltage feedback converted to Injector closing time OR Measured Voltage	=< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude** (See supporting table) >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude** (See supporting table) =< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time** (See supporting table) >=	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below) Injection Pulse Width	= True >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width**	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			feedback converted to Injector closing time	**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Injector Circuit Range/ Performance	P02F3	Diagnostic to determine if Cylinder 6 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit	Injector voltage feedback is not able to detect an opening magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Injector voltage feedback is not able to detect a closing time OR Measured Voltage feedback converted to Injector closing time OR Measured Voltage	=< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude** (See supporting table) >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude** (See supporting table) =< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time** (See supporting table) >=	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below) Injection Pulse Width	= True >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width**	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			feedback converted to Injector closing time	**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 Injector Circuit Range/ Performance	P02F4	Diagnostic to determine if Cylinder 7 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit	Injector voltage feedback is not able to detect an opening magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Injector voltage feedback is not able to detect a closing time OR Measured Voltage feedback converted to Injector closing time OR Measured Voltage	=< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude** (See supporting table) >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude** (See supporting table) =< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time** (See supporting table) >=	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below) Injection Pulse Width	= True >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width**	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			feedback converted to Injector closing time	**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 Injector Circuit Range/ Performance	P02F5	Diagnostic to determine if Cylinder 8 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit	Injector voltage feedback is not able to detect an opening magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Injector voltage feedback is not able to detect a closing time OR Measured Voltage feedback converted to Injector closing time OR Measured Voltage	=< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude** (See supporting table) >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude** (See supporting table) =< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time** (See supporting table) >=	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below) Injection Pulse Width	= True >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width**	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			feedback converted to Injector closing time	**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected Cylinder 5 Misfire Detected Cylinder 6 Misfire Detected Cylinder 7 Misfire Detected Cylinder 8 Misfire Detected	P0300 P0301 P0302 P0303 P0304 P0305 P0306 P0307 P0308	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 (MedresJDecel Medres_Jerk OR (LoresJDecel LoresJerk OR (LoresJDecel LoresJerk OR RevBalanceTime)	- see details of thresholds on Supporting Tables Tab **> RufSCD_Decel** AND **> RufSCD_Jerk)** **> SCDJJecel** 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 < 130 °C < -9 °C If OBD Max Coolant Achieved = FALSE 21 °C < ECT If OBD Max Coolant Achieved = TRUE 21 °C < ECT < 130 °C 9.00 < volts < 32.00 < 95.00 % per 25 ms < 95.00 % per 25 ms Not Enabled	Emission Exceedence = any (5) failed 200 rev blocks out of (16) 200 rev block tests Failure reported for (1) 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 not used on Gasoline 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 not used on Gasoline 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 (LoresJDecel AND Lores_Jerk)	> CylModeDecel * RandomCylModDecel > CylModeJerk * RandomCylModJerk				
			OR RevBalanceTime	> RevModeJDecel * 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 (LoresJDecel AND Lores_Jerk)	> RufCyl_Decel * PairCylModeDecel > RufCyl_Jerk * PairCylModeJerk				
			OR (LoresJDecel 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				
			(MedresJDecel AND Medres_Jerk)	**> RufSCD_Decel * Bank_SCD_Decel** **> RufSCD_Jerk * Bank_SCD_Jerk**				
			OR (Medres_Decel AND Medres_Jerk)	**> SCD_Decel * Bank_SCD_Decel** **> SCD_Jerk * Bank_SCD_Jerk**				
			OR (Lores_Decel AND Lores_Jerk)	**> RufCyl_Decel * BankCylModeDecel** **> RufCyl_Jerk * BankCylModeJerk**				
			OR (LoresJDecel AND Lores_Jerk)	**> CylModeDecel * BankCylModeDecel** **> 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: (MedresJDecel AND Medres_Jerk) OR (Medres_Decel AND Medres_Jerk) OR (LoresJDecel AND Lores_Jerk) OR (LoresJDecel AND Lores_Jerk)	**> RufSCDJDecel * ConsecSCDJDecel** **> 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 (CylAfterDeacCylJDecel AND CylAfterDeacCyl_Jerk) OR (CylBeforeDeacCylDecel AND CylBeforeDeacCyl_Jerk) AFM: RANDOM MISFIRE Use random misfire thresholds If no misfire for (CylAfterDeacCylJDecel AND CylAfterDeacCyl_Jerk) (CylBeforeDeacCylDecel AND	**> CylModeDecel * ClyAfterAFM_Decel** **> CylModeJerk * CylAfterAFM_Jerk** **> CylModeDecel * CylBeforeAFMDecel** **> CylModeJerk * ClyBeforeAFMJerk** > 3 Engine Cycles **> CylModeDecel * ClyAfterAFMJDecel * RandomAFM_Decl** **> CylModeJerk * CylAfterAFM Jerk * RandomAFM_Jerk** **> CylModeDecel * CylBeforeAFMDecel * RandomAFMJDecl**				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CylBeforeDeacCyl_Jerk)	**> CylModeJerk * ClyBeforeAFM J erk * RandomAFM_Jerk**				
			OR IF option Crank based IMEP estimate is Enabled and CrankBasedJMEP is	Not Enabled < **Misfire_IMEP_Thresh _vs_BinlD** (Note: Thresholds uses following tables to pick threshold vs BinlD. See supporting tables for more information on how BinlD works to select appropriate calibration threshold) **Misfire_IMEP_BinlD_ vs_RPM_Load Misfire_IMEP_BinlD_ RPM_Axis Misfire_IMEP_BinlD_ Load_Axis** - see details on Supporting Tables Tab				
			Misfire Percent Emission Failure Threshold	> 2.19% P0300				
			Misfire Percent Catalyst	>				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Damage When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	**Catalyst_Damage_Misfire_Percentage** in Supporting Tables whenever secondary conditions are met. < 1,500 FTP rpm AND < 15 FTP % load	(at low speed/loads, one cylinder may not cause cat damage) Engine Speed Engine Load Misfire counts	> 1,500 rpm AND > 15 % load AND < 180 counts on one cylinder		
					Engine Speed	425 < rpm < ((Engine Over Speed Limit) - 400) OR 8,191) 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	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						CamLctnExhFA CamSensorAnyLctnTFTK0 AnyCamPhaser_FA AnyCamPhaser_TFTKO AmbPresDfltdStatus		
					P0315 & engine speed	> 1,000 rpm	4 cycle delay	
					Fuel Level Low	LowFuelConditionDiagnostic	500 cycle delay	
					Cam and Crank Sensors	in sync with each other	4 cycle delay	
					Misfire requests TCC unlock	Not honored because Transmission in hot mode or POPD intrusive diagnostic running	4 cycle delay	
					Fuel System Status	# Fuel Cut	4 cycle delay	
					Active FuelManagement	Transition in progress	0 cycle delay	
					Undetectable engine speed and engine load region	***Undetectable region*** from Malfunction Criteria	4 cycle delay	
					Abusive Engine Over Speed	> 8,192 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	**< ZeroTorqueEngLoad** or **<ZeroTorqueAFM** if AFM is active in Supporting Tables	4 cycle delay	
					Below zero torque: TPS Vehicle Speed	< 0.8 % (< 0.8 % in AFM) > 30 mph (> 30 mph AFM)	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					NEGATIVE TORQ AFM If deactivated cylinders appear to make power, torque is negative: DeactivatedCyl_Decel AND DeactivatedCyl_Jerk AND # of Deact Cyls Inverted	 **<DeacCylInversionDecel** **<DeacCylInversionJerk** > 4 cylinders	 0 cycle delay	
					Manual Trans	Clutch shift	4 cycle delay	
					Accel Pedal Position AND Automatic transmission shift	> 95.00 %	7 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 not used on Gasoline engines**	******************************	*******************	
					Combustion Mode	**= InfrequentRegen** value in Supporting Tables	0 cycle delay	

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	IF TRUE	**WaitToStart** cycle delay	
					Brake Torque ******************************	> 199.99 % Max Torque ******************************	0 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:	**> "Ring Filter"** # of engine cycles after misfire in Supporting Tables		
					Stop filter early:	**> "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	> 3 %		
					Engine Speed	> 900 rpm		
					Veh Speed	> 3 mph		
					Auto Transmission	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	Enabled		
					Pattern Recog Enabled:	Not Enabled		
					Pattern Recog Enabled during Cylinder Deac	Enabled		
					Pattern Recog Enabled consecutive cyl pattrn	475 < rpm < 3,000		
					Engine Speed	> 5.0 mph		
					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	> Misfire_ decel * **1st_FireAftrMisfr_Acel**		
					AND			
					CylAfter_Jerk)	> Misfire_Jerk * **1st_FireAftrMisfr_Jerk**		
						Or if AFM mode is active: > Misfire_ decel * **IstFireAftrMisAcelAFM** > Misfire_Jerk * **1stFireAfterMisJerkAFM**		
					Addtionally, the crankhaft is checked again a small			

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.			
					Num of Cylinders after misfire to start check of crankshaft snap	3 Cylinders		
					"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.			
					Ratio of Unrecog/Recog	>0.60	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	Disabled CeRRDR_e_None		
					******************************	******************************	*******************	
					IF Rough Road Source = WheelSpeedInECM (Wheel speed noise GRABS = OR Traction = OR Vehicle Stability) = AND No Emission Neutral Default Action DTCs	**> WSSRoughRoadThres** active active active ABS Failed Vehicle Dynamics Control System Status Driven Wheel Rotation Status Non Driven Wheel Rotation Status	discard 100 engine cycle test	
					******************************	******************************	*******************	
					IF Rough Road Source = "FromABS" (RoughRoad = ORABS = OR Traction = OR Vehicle Stability) = AND No Emission Neutral Default Action DTCs	detected active active active ABS Failed Vehicle Dynamics Control System Status	discard 100 engine cycle test	
					******************************	******************************	*******************	
					IF Rough Road Source = "TOSS" TOSS dispersion	**>TOSSRoughRoadThres** in supporting tables Transmission Output Shaft Angular Velocity Validity	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 P030x TFTKO	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 Difference 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.
Knock Sensor (KS) Performance Per Cylinder	P0324	This diagnostic checks for knock sensor performance out of the normal expected range on a per cylinder basis due to Excessive Knock (either real or false knock). In the knock detection algorithm, the term “Knock Intensity” (KI) is used to define the relative size of a knock event, and is calculated as (KI = current knock event - knock threshold). This results in a KI amplitude that is proportional to the size of the knock event (as seen by the knock sensor). In addition, Knock Intensity cannot be less than zero as it is forced/limited to be = 0 with no knock detected (i.e. whenever the current knock event < knock threshold, KI = 0). This diagnostic calculates a first-order lag filter version of the Knock Intensity and sets a fault when: (Filtered KI) > (Excessive Knock Diagnostic Threshold)	Filtered Knock Intensity (where 'Knock Intensity' = 0 with no knock; and > 0 & proportional to knock magnitude with knock)	**> P0324_PerCyl_ExcessiveKnock_Threshold** (no units)	Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow Engine Coolant Temperature or OBD Coolant Enable Criteria Inlet Air Temperature Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	Yes > 2.0 seconds > 1,500 RPM AND < 7,200 RPM >70 mg/cylinder AND < 2,000 mg/cylinder > -40 deg's C = TRUE > -40 deg's C > 1,200 revs	First Order Lag Filters with Weight Coefficient = 0.0270 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Circuit Bank 1	P0325	This diagnostic checks for an open in the knock sensor circuit Sensor 1/Bank 1. There are two possible methods used: **1. 20 kHz Method:** This method injects a 20 kHz signal (internal to the ECU) onto one of the Knock Sensor inputs. For a normal/ good circuit the 20 kHz signal will propogate through the Knock sensor and back to the ECU through the sensor return circuit. The 20 kHz signal is processed through the Fast Fourier Transform (FFT) and then filtered with a first-order lag filter. Since the Knock Detection algorithm uses a Differential Op-Amp to compare the input from the two knock sensor wires, the FFT 20 kHz diagnostic signal will have either: A. Low output with a good circuit (because the 20 kHz injected signal is detected on both of the sensor inputs) or B, High output for an Open Circuit (because	Open Circuit Method chosen (2 possible methods: 20 kHz or Normal Noise): Filtered FFT Output Filtered FFT Output	= **P0325_P0330_OpenMethod_2** **<u>Case 1 (20 kHz Method):</u>** **> P0325_P0330_OpenCktThrshMin (20 kHz) AND < P0325_P0330_OpenCktThrshMax (20 kHz)** **<u>Case 2 (Normal Noise Method):</u>** **> P0325_P0330_OpenCktThrshMin (Normal Noise) AND < P0325_P0330_OpenCktThrshMax (Normal Noise)**	Diagnostic Enabled? Engine Run Time Engine Speed Cumulative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow Engine Coolant Temperature or OBD Coolant Enable Criteria Inlet Air Temperature	Yes > 2.0 seconds > 475 RPM and < 5,000 RPM > 250 revs > 70 mg/cylinder and < 2,000 mg/cylinder > -40 deg's C = TRUE > -40 deg's C	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0050 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		the 20 kHz injected signal is detected only on one of the sensor inputs). The 20 kHz method is typically used for the entire operating region of the engine. However, some engines may not have adequate separation between good and bad circuits at high engine speed. In these cases the 20 kHz method is used at low and medium engine speeds, and the "Normal Noise" method is used at high engine speed only. 2. **Normal Noise:** The Normal Noise method monitors the background engine noise level for a selected frequency range output of the knock detection FFT. The background noise (i.e. Normal Noise) is filtered with a first-order lag filter. A good circuit is determined when the filtered Normal Noise signal is greater than the threshold. See Supporting Tables for method definition: **P0325_P0330_OpenM**						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		ethod defines which of the two diagnostic methods is used as a fucntion of engine speed (RPM). Typical implementations: A. Use 20 kHz method at allengine RPM (used when acceptable separation achieved at all RPM) or B. Use 20 kHz method at low/medium RPM and Normal Noise at high RPM						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Performance Bank 1	P0326	This diagnostic checks for knock sensor performance out of the normal expected range, on a per sensor basis. This diagnostic is specifically designed to identify the fault condition where the knock sensor is properly attached electrically, but produces an abnormally low output due to being unattached (or loosely attached) with the mounting bolt (and thus unable to properly transfer the engine vibration energy from the engine block to the knock sensor). The term "Abnormal (engine) Noise" is used to define this diagnostic method. A fault condition is identified when a first-order lag filtered version of the Abnormal Noise signal falls below the diagnostic threshold.	Filtered FFT Intensity (where 'FFT Intensity' = Non-knocking, background engine noise for a selected frequency) Filtered FFT Intensity	**Case 1: Engine not in AFM mode** < **P0326_P0331_AbnormalNoise_Threshold** (Supporting Table) OR **Case 2: Engine is in AFM mode** < **P0326_P0331_AbnormalNoise_Thresh_AFM** (Supporting Table; Engine is in AFM mode)	Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow Engine Coolant Temperature or OBD Coolant Enable Criteria Inlet Air Temperature Individual Cylinders enabled for Abnormal Noise Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	Yes > 2.0 seconds > 2,100 RPM (notin AFM mode) OR > 2,100 (in AFM mode) AND < 8,500 RPM > 240 mg/cylinder AND < 2,000 mg/cylinder > -40 deg's C = TRUE > -40 deg's C **P0326_P0331_AbnormalNoiseCylsEnabled** (Supporting Table) > 250 Revs	First Order Lag Filters with Weight Coefficient = 0.0200 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Circuit Low Bank 1	P0327	This diagnostic checks for an out of range low knock sensor signal. A 3-resistor bias network at each sensor input to the ECM provides a DC diagnostic voltage that will remain within a normal range when the external knock sensor circuit is free of short circuit faults. The diagnostic output is reported as a percentage (0 to 100%) when compared to the 5.0 volt reference voltage.	Sensor Input or Return Signal Line	< 8.0 Percent (of 5.0 Volt reference)	Diagnostic Enabled? Engine Speed	Yes > 400 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Circuit High Bank 1	P0328	This diagnostic checks for an out of range high knock sensor signal. A 3-resistor bias network at each sensor input to the ECM provides a DC diagnostic voltage that will remain within a normal range when the external knock sensor circuit is free of short circuit faults. The diagnostic output is reported as a percentage (0 to 100%) when compared to the 5.0 volt reference voltage.	Sensor Input or Return Signal Line	> 39.0 Percent (of 5 Volt Reference)	Diagnostic Enabled? Engine Speed	Yes > 400 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Circuit Bank 2	P0330	This diagnostic checks for an open in the knock sensor circuit Sensor 2/Bank 2 There are two possible methods used: 1. **20 kHz Method:** This method injects a 20 kHz signal (internal to the ECU) onto one of the Knock Sensor inputs. For a normal/ good circuit the 20 kHz signal will propogate through the Knock sensor and back to the ECU through the sensor return circuit. The 20 kHz signal is processed through the Fast Fourier Transform (FFT) and then filtered with a first-order lag filter. Since the Knock Detection algorithm uses a Differential Op-Amp to compare the input from the two knock sensor wires, the FFT 20 kHz diagnostic signal will have either: A. Low output with a good circuit (because the 20 kHz injected signal is detected on both of the sensor inputs) or B, High output for an	**Individual Sensor Thresholds Enabled?** **Open Circuit Method chosen** (2 possible methods: 20 kHz or Normal Noise): Filtered FFT Output Filtered FFT Output	= 0, Use Case 1 and 2 = **P0325_P0330_OpenMethod_2** (supporting table) **<u>Case 1 (20 kHz Method):</u>** **>** **P0325_P0330_OpenCktThrshMin (20 kHz)** **AND** **<** **P0325_P0330_OpenCktThrshMax (20 kHz)** **<u>Case 2 (Normal Noise Method):</u>** **>** **P0325_P0330_OpenCktThrshMin (Normal Noise)** **AND** **<** **P0325_P0330_OpenCktThrshMax (Normal Noise)** **Case 3 (20 kHz Method):**	Diagnostic Enabled? Engine Run Time Engine Speed Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow Engine Coolant Temperature or OBD Coolant Enable Criteria Inlet Air Temperature	Yes > 2.0 seconds > 475 RPM and < 5,000 RPM ≥250 revs > 70 mg/cylinder and < 2,000 mg/cylinder > -40 deg's C = TRUE > -40 deg's C	First Order Lag Filter with Weight Coefficient **Case 1 & 2:** Weight Coefficient = 0.0050 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Open Circuit (because the 20 kHz injected signal is detected only on one of the sensor inputs). The 20 kHz method is typically used for the entire operating region of the engine. However, some engines may not have adequate separation between good and bad circuits at high engine speed. In these cases the 20 kHz method is used at low and medium engine speeds, and the "Normal Noise" method is used at high engine speed only. 2. **Normal Noise:** The Normal Noise method monitors the background engine noise level for a selected frequency range output of the knock detection FFT. The background noise (i.e. Normal Noise) is filtered with a first-order lag filter. A good circuit is determined when the filtered Normal Noise signal is greater than the threshold. See Supporting Tables	Filtered FFT Output Filtered FFT Output	> **P0330_OpenCktThrshMin2 (20 kHz)** AND < **P0330_OpenCktThrshMax2 (20kHz)** **Case 4 (Normal Noise Method):** > **P0330_OpenCktThrshMin2 (NN)** AND < **P0330_OpenCktThrshMax2 (NN)**			**Case 3 & 4** Weight Coefficient = 0.01 Updated each engine event	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		for method definition: **P0325_P0330_OpenMethod** defines which of the two diagnostic methods is used as a fucntion of engine speed (RPM). Typical implementations: A. Use 20 kHz method at allengine RPM (used when acceptable separation achieved at all RPM) or B. Use 20 kHz method at low/medium RPM and Normal Noise at high RPM For each method the failure thresholds can be the same for both sensors (in a 2 sensor application), or the failure thresholds can be unique to each sensor.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Performance Bank 2	P0331	This diagnostic checks for knock sensor performance out of the normal expected range, on a per sensor basis. This diagnostic is specifically designed to identify the fault condition where the knock sensor is properly attached electrically, but produces an Abnormally low output due to being unattached (or loosely attached) with the the mounting bolt (and thus unable to properly transfer the engine vibration energy from the engine block to the knock sensor). The term "Abnormal (engine) Noise" is used to define this diagnostic method. A fault condition is identified when a first-order lag filtered version of the Abnormal Noise signal falls below the diagnostic threshold. The failure thresholds can be the same for both sensors (in a 2 sensor application), or the failure thresholds can be unique to each sensor.	Individual Sensor Thresholds Enabled? Filtered FFT Intensity (where 'FFT Intensity' = Non-knocking, background engine noise) Filtered FFT Intensity	= 0, Use Case 1 and 2 **Case 1: Engine <u>not</u> in AFM mode** < **P0326_P0331_AbnormalNoise_Threshold** (Supporting Table) OR **Case 2: Engine <u>is</u> in AFM mode** < **P0326_P0331_AbnormalNoise_Thresh_AFM** (Supporting Table) **Case 3: Engine not in AFM mode** < **P0331_AbnormalLo2** (Supporting Table) OR **Case 4: Engine is in AFM mode** < **P0331_AbnormalLoAFM_2** (Supporting Table)	Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow Engine Coolant Temperature or OBD Coolant Enable Criteria Inlet Air Temperature Individual Cylinders enabled for Abnormal Noise Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	Yes > 2.0 seconds > 2,100 RPM (notin AFM mode) OR > 2,100 (in AFM mode) AND < 8,500 RPM > 240 mg/cylinder AND < 2,000 mg/cylinder > -40 deg's C = TRUE > -40 deg's C **P0326_P0331_AbnormalNoiseCylsEnabled** (Supporting Table) > 250 Revs	First Order Lag Filter with Weight Coefficient **Case 1 & 2:** Weight Coefficient = 0.0050 Updated each engine event **Case 3 & 4:** Weight Coefficient = 0.01 Updated each engine eventFirst	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Circuit Low Bank 2	P0332	This diagnostic checks for an out of range low knock sensor signal. A 3-resistor bias network at each sensor input to the ECM provides a DC diagnostic voltage that will remain within a normal range when the external knock sensor circuit is free of short circuit faults. The diagnostic output is reported as a percentage (0 to 100%) when compared to the 5.0 volt reference voltage.	Sensor Input or Return Signal Line	< 8.0 Percent (of 5 Volt Reference)	Diagnostic Enabled? Engine Speed	Yes > 400 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Circuit High Bank 2	P0333	This diagnostic checks for an out of range high knock sensor signal. A 3-resistor bias network at each sensor input to the ECM provides a DC diagnostic voltage that will remain within a normal range when the external knock sensor circuit is free of short circuit faults. The diagnostic output is reported as a percentage (0 to 100%) when compared to the 5.0 volt reference voltage.	Sensor Input or Return Signal Line	> 39.00 Percent (of 5 Volt Reference)	Diagnostic Enabled? Engine Speed	Yes > 400 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	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) Sensor A Circuit	P0335	Diagnostic will fail if a crank sensor pulse was not received during a period of time; if crank sensor pulses are received the diagnostic will pass.	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	Testis Enabled = FALSE > 3.0 grams/second))	Continuous every 100 msec	Type B, 2 Trips
			No crankshaft pulses received	>= 0.3 seconds	Engine is Running Starter is not engaged	Testis Enabled	Continuous every 12.5 msec	
			No crankshaft pulses received		Engine is Running OR Starter is engaged No DTC Active:	Testis Enabled 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) Sensor A Performance	P0336	1. Fail counts will occur if the engine goes out of synchronization repeatedly over a period of time and will pass if the engine stays in synchronization. 2. Diagnostic will fail if synchronization gap is not found in a specified period of time and will pass if the synchronization gap is found. 3. Diagnostic will fail if the incorrect number of crank sensor teeth are detected in-between detecting the synchronization gap and will pass if the correct number of teeth are seen.	Time in which 10 or more crank re-synchronizations occur	< 10.0 seconds	Engine Air Flow Cam-based engine speed No DTC Active:	Testis Enabled >= 3.0 grams/second > 450 RPM P0335	Continuous every 250 msec	Type B, 2 Trips
			No crankshaft synchronization gap found	>= 0.4 seconds	Engine is Running Starter is not engaged	Testis Enabled	Continuous every 12.5 msec	
			Time since starter engaged without detecting crankshaft synchronization gap	>= 3.3 seconds	Starter engaged AND (cam pulses being received OR (MAF_SensorFA AND Engine Air Flow	Testis Enabled = FALSE > 3.0 grams/second))	Continuous every 100 msec	
			Crank pulses received in one engine revolution OR Crank pulses received in one engine revolution	< 1 pulses > 65,535 pulses	Engine is Running OR Starter is engaged No DTC Active:	Testis Enabled 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	Diagnostic will fail if a cam sensor pulse was not received during a period of time; if cam sensor pulses are received the diagnostic will pass.	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	Testis Enabled = FALSE > 3.0 grams/second))	Continuous every 100 msec	Type B, 2 Trips
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged	Testis Enabled	Continuous every 100 msec	
			No camshaft pulses received during 24 MEDRES events (There are 24 MEDRES events per engine cycle) Test begins when MEDRES region AND accumulated number of MEDRES events	= region 5 >= 0 counts	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:	Testis Enabled CrankSensor_FA	Continuous, every MEDRES event unitl test completes, one test at every start attempt	
			The number of camshaft pulses received during 100 engine cycles	= 0 pulses	Crankshaft is synchronized No DTC Active:	Test is Enabled 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 Sensor A	P0341	Diagnostic will fail if an incorrect number of cam sensor pulses are detected over a number of engine cycles and will pass if the number of cam pulses is correct.	The number of camshaft pulses received during 24 MEDRES events is OR (There are 24 MEDRES events per engine cycle) Test begins when MEDRES region AND accumulated number of MEDRES events	< 4 pulses > 8 pulses = region 5 >= 0 counts	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:	Testis Enabled CrankSensor_FA	Continuous, every MEDRES event unitl test completes, one test at every start attempt	Type B, 2 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 pulses > 402 pulses	Crankshaft is synchronized No DTC Active:	Test is Enabled 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.
IGNITION CONTROL #1 CIRCUIT	P0351	Diagnoses Cylinder #1 Ignition Control (EST) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the 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.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #2 CIRCUIT	P0352	Diagnoses Cylinder #2 Ignition Control (EST) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the 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.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #3 CIRCUIT	P0353	Diagnoses Cylinder #3 Ignition Control (EST) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the 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.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	>11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #4 CIRCUIT	P0354	Diagnoses Cylinder #4 Ignition Control (EST) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the 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.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	>11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #5 CIRCUIT	P0355	Diagnoses Cylinder #5 Ignition Control (EST) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the 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.	> 30 kΩ impedance between signal and controller ground	Engine running Ignition Voltage	>11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #6 CIRCUIT	P0356	Diagnoses Cylinder #6 Ignition Control (EST) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the 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.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	>11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #7 CIRCUIT	P0357	Diagnoses Cylinder #7 Ignition Control (EST) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the 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.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	>11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #8 CIRCUIT	P0358	Diagnoses Cylinder #8 Ignition Control (EST) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the 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.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	 >11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Catalyst System Low Efficiency Bank 1	P0420	NOTE: The information below applies to applications that use the Decel Catalyst Monitor Algorithm Oxygen Storage. The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and 02 during lean A/F excursions to store the excess oxygen (Le. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Rich (intrusive rich) and Lean (decel fuel cutoff) A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat 02 Resp time - pre cat 02 Resp time) 2. BestFailing OSC value from a calibration	Normalized Ratio OSC Value The EWMA calculation uses a 0.16 coefficient.	< 0.35	Diagnostic is Enabled All enable criteria associated with P0420 can be found under P2270 - (02 Sensor Signal Stuck Lean Bank 1 Sensor 2) Rapid Step Response (RSR) feature will initiate multiple tests: If the difference between current EWMA value and the current OSC Normalized Ratio value is and the current OSC Normalized Ratio value is Maximum number of RSR tests to detect failure when RSR is enabled. MAF Predicted catalyst temperature Front 02 Sensor or Front WRAF Rear 02 Sensor General Enable Criteria In addition to the p-codes	>0.50 <0.13 9 > 2.00 g/s < 20.00 g/s <900 °C >700.00 mV or >1.10EQR >800.00 mV	1 test attempted per valid decel period Minimum of 1 test per trip Maximum of 3 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 12.5ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		table (based on temp and exhaust gas flow) 3. WorstPassing OSC value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2) / (3-2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part. Refer to the **P0420_WorstPassing OSCTableBI** and **P0420_BestFailingOS CTableBI** in Supporting Tables tab for details The Catalyst Monitoring Test is completed during a decel fuel cutoff event. This fuel cutoff event occurs following a rich instrusive fueling event initiated by the 02 Sensor Signal Stuck Lean Bank 1 Sensor 2 test (P2270). Several conditions must be met in order to execute this test. Additional conditions and their related values			listed under P2270, the following DTC's shall also not be set: For switching 02 sensors: For WRAF 02 sensors:	 02S_Bank_1_Sensor_1_ FA 02S_Bank_1_Sensor_2_ FA 02S_Bank_2_Sensor_1_ FA O2S_Bank_2_Sensor_2_ FA WRAF_Bank_1_FA WRAF_Bank_2_FA **P0420_WorstPassingOS CTableBI** **P0420_BestFailingOSCT ableBI**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		are listed in the "Secondary Parameters" and "Enable Conditions" section of this document for P2270 (02 Sensor Signal Stuck Lean Bank 1 Sensor 2)						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Catalyst System Low Efficiency Bank 2	P0430	Note: The information below applies to applications that use the Decel Catalyst Monitor Algorithm Oxygen Storage. The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and 02 during lean A/F excursions to store the excess oxygen (Le. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Rich (intrusive rich) and Lean (decel fuel cutoff) A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat 02 Resp time - pre cat 02 Resp time) 2. BestFailing OSC value from a calibration	Normalized Ratio OSC Value The EWMA calculation uses a 0.16 coefficient.	< 0.35	Diagnostic is Enabled All enable criteria associated with P0430 can be found under P2272 - (02 Sensor Signal Stuck Lean Bank 2 Sensor 2) Rapid Step Response (RSR) feature will initiate multiple tests: If the difference between current EWMA value and the current OSC Normalized Ratio value is and the current OSC Normalized Ratio value is Maximum number of RSR tests to detect failure when RSR is enabled. MAF Predicted catalyst temperature Front 02 Sensor or Front WRAP Rear 02 Sensor General Enable Criteria In addition to the p-codes	>0.50 <0.13 9 > 2.00 g/s < 20.00 g/s <900 °C >700.00 mV or >1.10EQR > 800.00 mV	1 test attempted per valid decel period Minimum of 1 test per trip Maximum of 3 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 12.5ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		table (based on temp and exhaust gas flow) 3. WorstPassing OSC value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2) / (3-2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part. Refer to the **P0430_WorstPassingOSCTableB2** and **P0430_BestFailingOSCTableB2** in Supporting Tables tab for details The Catalyst Monitoring Test is completed during a decel fuel cutoff event. This fuel cutoff event occurs following a rich instrusive fueling event initiated by the 02 Sensor Signal Stuck Lean Bank 2 Sensor 2 test (P2272). Several conditions must be met in order to execute this test. Additional conditions and their related values			listed under P2272, the following DTC's shall also not be set: For switching 02 sensors: For WRAF 02 sensors:	02S_Bank_1_Sensor_1_FA 02S_Bank_1_Sensor_2_FA 02S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA WRAF_Bank_1_FA WRAF_Bank_2_FA **P0430_WorstPassingOSCTableB2** **P0430_BestFailingOSCTableB2**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		are listed in the "Secondary Parameters" and "Enable Conditions" section of this document for P2272 (02 Sensor Signal Stuck Lean Bank 2 Sensor 2)						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission (EVAP) System Small Leak Detected (No ELCP - Conventional EVAP Diagnostic - with EAT using OAT Sensor - with Fuel Tank Zome Module (FTZM))	P0442	This DTC will detect a small leak (> 0.020") in the EVAP system between the fuel fill cap and the purge solenoid. On some applications a small leak is defined as > 0.025", 0.030", or 0.150". The engine off natural vacuum method (EONV) is used. EONV is an evaporative system leak detection diagnostic that runs when the vehicle is shut off when enable conditions are met. Prior to sealing the system and performing the diagnostic, the fuel volatility is analyzed. In an open system (Canister Vent Solenoid [CVS] open) high volatility fuel creates enough flow to generate a measurable pressure differential relative to atmospheric.After the volatility check, the vent solenoid will close. After the vent is closed, typically a build up of pressure from the hot soak begins (phase-1). The pressure typically will peak and then begin to decrease as the fuel cools. When	The total delta from peak pressure to peak vacuum during the test is normalized against a calibration pressure threshold table that is based upon fuel level and ambient temperature. (Please see **P0442 EONV Pressure Threshold (Pascals)** in Supporting Tables). The normalized value is calculated by the following equation: 1 - (peak pressure - peak vacuum) / pressure threshold. The normalized value is entered into EWMA (with 0= perfect pass and 1= perfect fail). When EWMA is the DTC light is illuminated. The EWMA calculation uses a 0.12 weighting coefficient. The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 3 additional consecutive trips.	> 0.55 (EWMA Fail Threshold), < 0.35 (EWMA Re-Pass Threshold)	Diagnostic is Enabled Fuel Level Drive Time Drive length (ECT OR OBD Coolant Enable Criteria Baro Distance since assembly plant Engine not run time before key off must be Time since last complete test if normalized result and EWMA is passing OR Time since last complete test if normalized result or EWMA is failing Estimated Ambient Temperature (EAT) using OAT sensor at end of drive Conditions for Estimated	10 % < Percent < 90 % > 600 seconds > 5.0 miles > 63 °C = TRUE) > 70 kPa > 10.0 miles < refer to **P0442 Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature** in Supporting Tables. > 8 hours > 8 hours 0 °C<Temperature<35 °C	Once per trip, during hot soak (up to 2,400 sec.). No more than 2 unsuccessful attempts between completed tests.	Type A, 1 Trips EWMA Average run length is 8 to 12 trips under normal condition s Run length is 3 to 6 trips after code clear or non-volatile reset

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		the pressure drops (-62) Pa from peak pressure, the vent is then opened for 60 seconds to normalize the system pressure. The vent is again closed to begin the vacuum portion of the test (phase-2). As the fuel temperature continues to fall, a vacuum will begin forming. The vacuum will continue until it reaches a vacuum peak. When the pressure rises 62 Pa from vacuum peak, the test then completes. If the key is turned on while the diagnostic test is in progress, the test will abort.			Ambient Temperature Using OAT Sensor to be Valid ***************************** 1. Startup OAT is less than previous trip EAT OR 2. Startup ECT - previous trip EAT OR 3. Engine off time OR 4. At startup, time since previous EAT valid and able to learn OR 5. EAT - current OAT OR 6. EAT < current OAT and speed timer and current OAT - EAT Speed timer increments at 100 msec rate and increments vary based on vehicle speed as follows: vehicle speed < 15 mph 15 mph<speed<40 mph 40 mph<speed<124 124 mph<speed<124 Speed timer can never be less than 0 seconds ***************************** 1. High Fuel Volatility	 ***************************** < o ° c > 7,200 seconds < 3,600 seconds 0 °C < difference < 2 °C > 240 seconds < 2 °C - 0.2 seconds 0.10 seconds 0.20 seconds 0.20 seconds *****************************		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					During the volatility phase, pressure in the fuel tank is integrated vs. volatility time. If the integrated pressure is then test aborts and unsuccessful attempts is incremented. This value equates to an average integrated fuel tank pressure > 1,245 Pa. Please see **P0442 Volatility Time as a Function of Estimate of Ambient Temperature** in Supporting Tables. OR 2. Vacuum Refueling Detected See P0454 Fault Code for information on vacuum refueling algorithm. OR 3. Fuel Level Refueling Detected See P0464 Fault Code for information on fuel level refueling. OR 4. Vacuum Out of Range and No Refueling See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for	< -5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					information on fuel level refueling. OR 5. Vacuum Out of Range and Refueling Detected See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling. OR 6. Vent Valve Override Failed Device control using an off-board tool to control the vent solenoid, cannot exceed during the EONV test OR 7. Key up during EONV test	0.50 seconds		
					No active DTCs:	MAF_SensorFA ECT_Sensor_FA IAT_SensorFA VehicleSpeedSensor_FA ModuleOftTime_FA AmbientAirDefault FuelLevelDataFault		
					No Active DTC's TFTKO	P0443 P0446 P0449 P0452 P0453 P0455		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P0458 P0459 P0498 P0499 P0496 P1001 P1005 P11FF P130F U18A2		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission (EVAP) Canister Purge Solenoid Valve Circuit (ODM) (No ELCP - Conventional EVAP Diagnostic)	P0443	Controller specific output driver circuit diagnoses the canister purge solenoid 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.	> 200 K Q impedance between output and controller ground.	Diagnostic is Enabled Powertrain relay voltage	Voltage >11.0 volts	20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0458 may also set (Canister Purge Solenoid Short to Ground)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission (EVAP) Vent System Performance (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0446	This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or EVAP canister. This diagnostic runs with normal purge control and canister vent solenoid commanded open. The diagnostic fails when the FTP sensor vacuum measurement is above a vacuum threshold before it accumulates purge volume above a threshold. The diagnostic passes when it accumulates purge volume above a threshold before the FTP sensor vacuum measurement is above a vacuum threshold.	Vent Restriction Prep Test: Vented Vacuum for OR Vented Vacuum for Vent Restriction Test: Tank Vacuum for before Purge Volume After setting the DTC for the first time, 0 liters of fuel must be consumed before setting the DTC for the second time.	 < -623 Pa 60 seconds > 1,245 Pa 60 seconds > 2,989 Pa 5 seconds > 8 liters	Diagnostic is Enabled Fuel Level System Voltage Startup IAT Startup ECT BARO No active DTCs: No Active DTC's TFTKO	 10 % < Percent < 90 % > 10.0 volts 4 °C<Temperature<35 °C <35 °C > 70 kPa MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited FuelLevelDataFault P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0498 P0499 P1001 P1005 P11FF P130F U18A2	Once per Cold Start Time is dependent on driving conditions Maximum time before test abort is 1,400 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission (EVAP) Vent Solenoid Control Circuit (ODM) (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0449	Controller specific output driver circuit diagnoses the vent solenoid 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.	> 200 K Q impedence between output and controller ground	Diagnostic is Enabled No active DTCs:	P1005 P130F U18A2	50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips Note: In certain controllers P0498 may also set (Vent Solenoid Short to Ground)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Tank Pressure (FTP) Sensor Circuit Performance Diagnostic (Conventional ELCP Vented Fuel System with Fuel Tank Zone Module (FTZM))	P0451	Fuel Tank Pressure (FTP) sensor correlation diagnostic with propulsion system not active. Propulsion System Off The FTP sensor correlation diagnostic is performed during the EVAP leak check section which allows the sensor to be checked over a wider operating range. For the FTP sensor to ELCP pressure sensor correlation, the ELCP vacuum pump is on and the ELCP switching valve is in the pump position. When the ELCP vacuum pump is creating a vacuum in the fuel tank, the FTP sensor and ELCP pressure sensor readings are compared. The FTP sensor correlation check uses an average difference comparison between the FTP sensor and ELCP pressure sensor readings. This logic is also used when the FTP sensor is beyond its range but the ELCP	This diagnostic runs when the ELCP vacuum pump is creating a vacuum on the fuel tank during the ELCP leak detection test sequence. After a delay time of IF 1) the FTP sensor reading is and (the FTP sensor is in a readable range) or 2) the ELCP pressure sensor (gauge) reading is and (the ELCP pressure sensor indicates that the FTP sensor is in a readable range) THEN if the average difference between the FTP sensor reading and ELCP pressure sensor (gauge) reading is over a time period then a FTP sensor correlation failure has been detected and the DTC fails. The period of time is from to	5 seconds, > -4,010 Pa < 3,587 Pa > -3,736 Pa < 3,313 Pa > 1,021 Pa > 5 seconds 1) < 2,500 seconds, or 2) the time when both the FTP and ELCP	Propulsion System Not Active Diagnostic is Disabled Propulsion system not active time Distance since assembly plant Drive distance Min baro Max baro Min fuel level Max fuel level ECT Min IAT MaxIAT Time since last test when passing P0442/P0455 Time since last test when failing P0442/P0455 ***************************** ELCP hardware can be powered by battery or powertrain relay. For this application the ELCP hardware is powered by battery Voltage ***************************** Vehicle speed Propulsion system not active time Previous propulsion system active time Abort Conditions: Key up during test	4.3 < time < 5.8 hours or 6.0 < time <8.1 hours or 8.2 < time < 11.0 hours > 9.9 miles > 0.1 miles > 70 kPa < 110 kPa > 10% < 90% < 40 °C > 4 °C < 45 °C > 0 hours > 0 hours ***************************** >10 volts ***************************** < 3 MPH > 0 seconds > 0 seconds	Once per trip with Propulsion System Not Active, for each required wake-up event 100 msec loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		pressure sensor indicates it should be in a readable range. The difference between the two sensor readings is averaged over a time period and then compared to a fail threshold. If the average difference is above the threshold, a fail is reported for P0451. The ELCP EVAP diagnostic test sequence is complete if a failure is detected.		sensors indicate that the FTP sensor is outside its readable range, or 3) the time when the EVAP leak check section ends.	Or Service bay test active Or Device control exceeds Or Vacuum Refueling Detected (See P0454 Fault Code for information on vacuum refueling algorithm) Or Fuel Level Refueling Detected (See P0464 Fault Code for information on fuel level refueling)	 0.5 seconds		
		In the case where the vacuum level in the fuel tank is beyond the FTP sensor range and the ELCP pressure sensor indicates the same, then P0451 concludes and pass/fail results are based on the average difference results before both sensors indicated the FTP sensor was beyond its readable range.			No Active DTC's	FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault ELCPCircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA ModuleOffTime_FA		
					No Active DTC's TFTKO	P043E P043F P145C P145D P1462 P1463 P2450 P24B9 P0458 P0496 P1005 P14CD P16FD P16FE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						U18A2 U131D		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Tank Pressure (FTP) Sensor Circuit Low Voltage (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0452	This DTC will detect a Fuel Tank Pressure (FTP) sensor signal that is too low out of range. The FTP sensor circuit out of range diagnostic compares the raw sensor voltage to a lower voltage threshold. It is an X out of Y diagnostic that runs continuously anytime the controller is awake. If the sensor voltage is below the lower voltage threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported for P0452 DTC. A pass is reported for P0452 DTC if the low sample counter reaches its threshold.	FTP sensor signal The normal operating range of the FTP sensor is 0.5 volts (-1245 Pa) to 4.5 volts (~ -3736 Pa).	< 0.15 volts (3.0 % of Vref or - 1,495 Pa)	No active DTC's:	P1001 P1005 U18A2	640 failures out of 800 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 Tank Pressure (FTP) Sensor Circuit High Voltage (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0453	This DTC will detect a Fuel Tank Pressure (FTP) sensor signal that is too high out of range. The FTP sensor circuit out of range diagnostic compares the raw sensor voltage to an upper voltage threshold. It is an X out of Y diagnostic that runs continuously anytime the controller is awake. If the sensor voltage is above the upper voltage threshold, the high fail counter then increments. If the high fail counter reaches its threshold then a fail is reported for P0453 DTC. A pass is reported for P0453 DTC if the high sample counter reaches its threshold.	FTP sensor signal The normal operating range of the FTP sensor is 0.5 volts (-1245 Pa) to 4.5 volts (~ -3736 Pa).	> 4.85 volts (97.0 % of Vref or - -3,985 Pa)	No active DTCs:	P1001 P1005 U18A2	640 failures out of 800 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 Tank Pressure (FTP) Sensor Circuit Intermittent (No ELCP - Conventional EVAP Diagnostic)	P0454	This DTC will detect intermittent tank vacuum sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event. During the EONV test, an abrupt change in fuel tank vacuum is identified as a possible refueling event. If the abrupt change occurs while the vent valve is closed, the EONV small-leak test aborts and the refueling rationality test starts. If the refueling rationality test detects a refueling event, then the vacuum change is considered “rational.” If the refueling rationality test does not detect a refueling event, then the vacuum change is considered “irrational.” The vacuum change rationality diagnostic is an “X out of Y” test. 1) Each time the EONV test completes, the (Y) sample counter is incremented. 2) Each time the	If an abrupt change in tank vacuum is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem. An abrupt change is defined as a change in vacuum in the span of 1.0 seconds. But in 12.5 msec. A refueling event is confirmed if the fuel level has a persistent change of for 30 seconds during a 600 second refueling rationality test.	> 112 Pa < 249 Pa >10 %	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes and the canister vent solenoid is closed		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period.The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.The test will report a failure if 2 out of 3 samples are failures. 12.5 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.
		rationality test has an irrational result; the (X) fail counter is incremented. 3) If the (X) fail counter reaches the fail limit before the (Y) sample counter reaches the sample limit, the vacuum change rationality test fails. 4) If the (Y) sample counter reaches the limit before the (X) fail counter fails, the vacuum change rationality test passes.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission (EVAP) System Large Leak Detected (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0455	This DTC will detect a weak vacuum condition (large leak or purge blockage) in the EVAP system. This mode checks for large leaks and blockages when proper driving conditions are met. If these conditions are met, the diagnostic commands the vent valve closed and controls the purge duty cycle to allow purge flow to purge the fuel tank and canister system while monitoring the fuel tank vacuum level. The algorithm accumulates purge flow during the test to determine a displaced purge volume as the test proceeds. If the displaced purge volume reaches a threshold before the fuel tank vacuum level reaches its passing threshold, then a large leak failure is detected. On fuel systems with fuel caps If the first failure of	Purge volume while Tank vacuum After setting the DTC for the first time, 0 liters of fuel must be consumed before setting the DTC for the second time. Weak Vacuum Follow-up Test (fuel cap replacement test) Weak Vacuum Test failed. Passes if tank vacuum Note: Weak Vacuum Follow-up Test can only report a pass.	> 7 liters < 2,740 Pa > 2,740 Pa	Diagnostic is Enabled Fuel Level System Voltage BARO Purge Flow No active DTCs: No Active DTCs TFTKO If ECT > IAT, Startup temperature delta (ECT-IAT): Startup IAT Startup ECT Weak Vacuum Follow-up Test This test can run following	10 % < Percent < 90 % > 10.0 volts > 70 kPa > 2.50 % MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited FuelLevelDataFault P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0498 P0499 P1001 P1005 P11FF P130F U18A2 < 8 °C 4 °C < Temperature < 35 °C < 35 °C	Once per cold start Time is dependent on driving conditions Maximum time before test abort is 1,400 seconds Weak Vacuum Follow-up Test With large leak detected, the follow-up test is limited to 0 seconds. Once the MIL is on, the follow-up test runs indefinitely.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		P0455 occurred after a refueling event was detected and the MIL is off for P0455, the MIL will be commanded off after the first pass of P0455 is reported. If the first failure of P0455 did not occur after a refueling event was detected, the MIL will be commanded off on the ignition cycle after the third consecutive pass of P0455 is reported.the MIL will be commanded off on the ignition cycle after the third consecutive pass of P0455 is reported. On fuel systems without fuel caps The P0455 MIL will be commanded off on the ignition cycle after the third consecutive pass of P0455 is reported.			a weak vacuum failure or on a hot restart.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission System Purge Control Valve Circuit Low (No ELCP - Conventional EVAP Diagnostic)	P0458	Controller specific output driver circuit diagnoses the canister purge solenoid 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.	< 0.5 Q impedence between output and controller ground	Diagnostic is Enabled Powertrain relay voltage	Voltage > 11.0 volts	20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0443 may also set (Canister Purge Solenoid Open Circuit)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission System Purge Control Valve Circuit High (No ELCP - Conventional EVAP Diagnostic)	P0459	Controller specific output driver circuit diagnoses the canister purge solenoid 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.	< 0.5 Q impedence between output and controller power	Diagnostic is Enabled Powertrain relay voltage	Voltage >11.0 volts	20 failures out of 25 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 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) > 27.81 liters	1. Diagnostic Enabled 2. Engine Operational State	1. == True 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 enabled status b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	a) == True 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 enabled status b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	a) == True 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 Intermittent (No ELCP - Conventional EVAP Diagnostic)	P0464	This DTC will detect intermittent fuel level sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event. During the EONV test, a change in fuel level is identified as a possible refueling event. If the change occurs while the vent valve is closed, the EONV small-leak test aborts and the refueling rationality test starts. If the refueling rationality test detects a refueling event, the fuel level change is considered “rational.” If the refueling rationality test does not detect refueling, the fuel level change is considered “irrational.” The fuel level change rationality diagnostic is an “X out of Y” test. 1) Each time the EONV test completes, the (Y) sample counter is incremented. 2) Each time the rationality test has an	If a change in fuel level is detected, the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that an actual refueling event occurred. If a refueling event is confirmed, then the test sample is considered passing. Otherwise, if a refueling event is not confirmed, then the test sample is considered failing which indicates an intermittent signal problem. An intermittent fuel level signal problem is defined as: The fuel level changes by and does not remain for 30 seconds during a 600 second refueling rationality test.	 >10 % >10 %	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period.The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.The test will report a failure if 2 out of 3 samples are failures. 100 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		irrational result; the (X) fail counter is incremented. 3) If the (X) fail counter reaches the fail limit before the (Y) sample counter reaches the sample limit, the fuel level change rationality test fails. 4) If the (Y) sample counter reaches the limit before the (X) fail counter fails, the fuel level change rationality test passes.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan Speed Low [LIN Bus Electric PWM Fans Only - Internal or External controller]	P0494	Measured actual fan speed is monitored against a calibrated lower acceptable limit for the cooling fan RPM under normal operating conditions. The diagnostic is set when the threshold is crossed. This diagnostic ensures that the fan is not under cooling. Only after first fan activation, the fan will be held commanded on for enough time to ensure this monitor has an opportunity to mature a decision.	Measured Fan Speed	<= Speed Low Limit [Supporting Table] **P0494_LIN_Threshold**	a] Diagnostic Enabled b] Configuration calibration for number of fans c] Diagnostic System Disabled d] Battery Voltage In-Range e] LIN Bus based Fan Operation Enabled f] LIN Bus Lost Communication Fault Active g] LIN Bus Continuous Operation Fault Active h] Fan Commanded On	a] == 1.00 [True if 1; False if 0] b] >= 1 unit c] <>True d] > 11.00 volts e] == TRUE f] <> True g] <> True h] ==TRUE	16.00 failures / 20.00 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.
Evaporative Emission (EVAP) System Flow During Non-Purge (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0496	This DTC will determine if the purge solenoid is leaking to engine manifold vacuum. This test checks for purge valve leaks to intake manifold vacuum such that there would always be a small amount of purge flow present. It does this by sealing the EVAP system (purge and vent valve closed) and then monitors fuel tank vacuum level. The fuel tank vacuum level should not increase. If tank vacuum increases above a threshold, a malfunction is indicated. Additional Information This diagnostic test detects purge valve leaks to intake manifold vacuum. It is not intended to detect purge valve leaks to the atmosphere which are monitored by the EONV small leak diagnostic (P0442). The purge valve leak diagnostic exists to helps service replace	Tank Vacuum for Test time	> 2,491 Pa 5 seconds < refer to **P0496 Purge Valve Leak Test Engine Vacuum Test Time (Cold Start) as a Function of Fuel Level** in Supporting Tables. Test time only increments when engine vacuum > 10.0 kPa.	Diagnostic is Enabled Fuel Level System Voltage BARO Startup IAT Startup ECT Engine Off Time No active DTCs: No Active DTCs TFTKO	 10 % < Percent < 90 % > 10.0 volts > 70 kPa 4 °C<Temperature<35 °C <35 °C > 28,800.0 seconds MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited FuelLevelDataFault P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0498 P0499 P1001 P1005 P11FF P130F U18A2	Once per cold start Cold start: max time is 1,400 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		leaking purge valves that could otherwise be detected with the EONV small leak diagnostic (P0442).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission System Vent Solenoid Control Circuit Low (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0498	Controller specific output driver circuit diagnoses the vent solenoid 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.	< 0.5 Q impedence between output and controller ground	Diagnostic is Enabled No active DTC's:	P1005 P130F U18A2	50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips Note: In certain controllers P0449 may also set (Vent Solenoid Open Circuit)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission System Vent Solenoid Control Circuit High (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0499	Controller specific output driver circuit diagnoses the vent solenoid low sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. If the P0499 is active, an intrusive test is performed with the vent solenoid commanded closed for 15 seconds.	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.	< 0.5 Q impedence between output and controller power	Diagnostic is Enabled No active DTC's:	P1005 P130F U18A2	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.
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 > 10 sec > 12.00 pct < 75.00 pct PTO 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_EngSpdMinLimit AND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion) Clutch is not depressed		
					No active DTCs	TCJBoostPresSnsrFA ECT_Sensor_FA EnginePowerLimited EGRValveCircuit_FA EGRValvePerformance_FA IAT_SensorCircuitFA EvapFlowDuringNonPurge_FA FuelTrimSystemBIFA 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	> 10 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 Filter coefficient	< -182.00 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 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 > 12.00 pct < 75.00 pct PTC not active Transfer Case not in 4WD LowState Off-vehicle device control (service bay control) must not be active.	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.
						following conditions not TRUE: (VeTESR_e_EngSpdReqIntvType = CeTESR_e_EngSpdMinLimit AND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion)		
						Clutch is not depressed		
					No active DTCs	TCJBoostPresSnsrFA 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	> 10 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.
Cold Start Rough Idle	P050D	Monitors the combustion performance when the cold start emission reduction strategy is active by accumulating and determining the percentage of engine cycles that have less than complete combustion relative to the total number of engine cycles in which Dual Pulse is active.	Deceleration index vs. Engine Speed Vs Engine load Deceleration index calculation is tailored to specific vehicle. Tables used are 1st tables encountered that are not max of range. Undetectable region at a given speed/load point is where all tables are max of range point. Incomplete combustion identified by P0300 threshold tables:	(>Idle SCDAND >Idle SCD ddt Tables) OR (>Idle Cyl Mode AND > Idle Cyl Mode ddt Tables)	Misfire Algorithm Enabled (Refer to P0300 for Enablement Requirements) OBD Manufacturer Enable Counter To enable the diagnostic, the Cold Start Emission Reduction Strategy Must Be Active per the following: Catalyst Temperature AND Engine Coolant AND Engine Coolant AND Barometric Pressure AND NumCLOEvents In addition, Dual Pulse Strategy Is Enabled and Active Per the following: Engine Speed Accel Position Engine Run Time For the engine speeds and loads in which Dual	= 0 < 550.00 degC > 6.00 degC <= 66.00 degC >= 70.00 KPa < 1.00 >= 550.00 RPM <= 2,000.00 RPM <= 0.00 Pct < 100 seconds	Runs once per trip when the cold start emission reduction strategy is active and Dual Pulse is enabled and active. Frequency: 100ms Test completes after Dual Pulse is no longer active OR The first 500 engine cycles have been reached	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Pulse is active:			
					Dual Pulse Error induced misfires percentage	>= catalyst damaging misfire		
					Dual Pulse Error induced misfires percentage	< 90% of the maximum achieveable catalyst damaging misfire.		
					Engine Cycles	>= 50.00 <501		
					The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following:			
					Catalyst Temperature AND	>= 800.00 degC		
					Engine Run Time	>= 1.00 seconds		
					OR			
					Engine Run Time	> **P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit** This Extended Engine run time exit table is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details.		
					OR			
					Barometric Pressure	< 70.00 KPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Dual Pulse Strategy will exit per the following:			
					Engine Speed OR Accel Position	> 2,350.00 RPM > 10.00 Pct		
					Engine Run Time	>= 100 seconds		
					Dual Pulse Strategy will also exit if the any of the "Additional Dual Pulse Enabling Criteria" is not satisfied:			
					"Additional Dual Pulse Enabling Criteria":			
					Green Engine Enrichment	Not Enabled		
					Misfire Converter Protection strategy	Not being requested		
					Engine Metal Overtemp strategy	Not being requested		
					Fuel control state	Open Loop		
					Output State Control	Not being requested for fuel		
					DOD Or DFCO	Not Active		
					Power Enrichment	Not Active		
					Dynamic Power Enrichment	Not Active		
					Piston Protection	Not Active		
					Hot Coolant Enrichment	Not Active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Injector Flow Test	Not Active		
					General Enable			
					DTC's Not Set:	EngineMisfireDetected_FA AcceleratorPedalFailure ECT_Sensor_FA IAT_SensorCircuitFA MnfdTempSensorCktFA CrankSensor_FA FuelInjectorCircuit_FA MAF_SensorFA MAP_SensorFA AnyCamPhaser_TFTKO ClutchPstnSnsr FA IAC_SystemRPM_FA IgnitionOutputDriver_FA TPS_FA VehicleSpeedSensor_FA FuelInjectorCircuit_TFTKO FHPR_b_FRP_SnsrCkt_FA FHPR_b_FRP_SnsrCkt_TFTKO FHPR_b_PumpCkt_FA FHPR_b PumpCkt TFTKO TransmissionEngagedState_FA EngineTorqueEstInaccurate FuelPumpRlyCktFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Pressure (EOP) Sensor Performance - Two Stage Oil Pump	P0521	Determines if the Engine Oil Pressure (EOP) Sensor is stuck or biased in range. The engine oil pressure is compared against thresholds when engine is running and when engine is off.The engine oil pressure rationality diagnostic has two parts: engine runing test and engine off test. The engine running test compares the measured oil pressure to threshold. If the measured oil pressure is out of the thresholds, then the error counter increments. The engine off test compares the measured oil pressure against thresholds after the engine has stopped rotating. If the measured oil pressure is out of the thresholds, then the error counter increments.	**Two Stage Oil Pump EOP Sensor Test with Engine Running, High Pressure State** <u>To Fail when previously passing with the engine running:</u> Filtered Engine Oil Pressure below expected threshold OR Filtered Engine Oil Pressure above expected threshold <u>To pass when previously failing:</u> Filtered Engine Oil Pressure above low threshold plus an offset OR	Filtered Oil Pressure < (**P0521_P06DD_P06DE_OP_HiStatePressure** * 1.00 - 133.0 kPa) OR Filtered Oil Pressure > (**P0521_P06DD_P06DE_OP_HiStatePressure** * 1.32 + 133.0 kPa) Filtered Oil Pressure > **P0521_P06DD_P06DE_OP_HiStatePressu (re** * 1.00 - 133.0 kPa + 10.0 kPa) OR Filtered Oil Pressure <(	Two Stage Oil Pump is Present = TRUE Pump is in high pressure state Engine Running Diagnostic Status Engine Off Rationality Test Diagnostic Reporting Status Oil Pressure Sensor In Use Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 8,000 RPM for longer than 65,000.0 seconds) Filtered Engine Speed within range Sensed Oil Temperature within range Pump state change complete No active DTC's	TRUE Enabled Test not report a fail state Yes > 30.0 seconds >70.0 kPa FALSE 1,000 RPM < Filtered Engine Speed < 4,500 RPM 40.0 deg C < Sensed Oil Temperature < 120.0 deg C Time since state change > 0.50 s Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA	> 40 errors out of 50 samples. Performed every 100 msec > 10passes out of 50 samples. Performed 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.
			Filtered Engine Oil Pressure below high threshold minus an offset	**P0521_P06DD_P06DE_OP_HiStatePressure** * 1.32 + 133.0 kPa - 10.0 kPa) (Details on Supporting Tables Tab: **P0521_P06DD_P06DE_OP_HiStatePressure**)		EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA CrankSensor_FA		
			Two Stage Oil Pump EOP Sensor Test with Engine Running, Low Pressure State		Two Stage Oil Pump is Present = TRUE	TRUE		
					Pump is in low pressure state	Enabled		
			To Fail when previously passing with the engine running: Filtered Engine Oil Pressure below expected threshold OR Filtered Engine Oil Pressure above expected threshold	Filtered Oil Pressure < (**P0521_P06DDP06DE_OP_LoStatePressure** * 1.00 - 133.0 kPa) OR Filtered Oil Pressure > (**P0521_P06DD_P06DE_OP_LoStatePressure** * 1.00 + 180.0 kPa)	Engine Running Diagnostic Status	Test not report a fail state		
					Engine Off Rationality Test Diagnostic Reporting Status	Yes	> 40 errors out of 50 samples.	
					Oil Pressure Sensor In Use	> 30.0 seconds		
					Engine Running		Performed every 100 msec	
					Ambient Air Pressure	>70.0 kPa		
					Oil Aeration (= TRUE if engine speed > 8,000 RPM for longer than 65,000.0 seconds)	FALSE		
					Filtered Engine Speed within range	1,000 RPM < Filtered Engine Speed < 4,500 RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			To pass when previously failing: Filtered Engine Oil Pressure above low threshold plus an offset OR Filtered Engine Oil Pressure below high threshold minus an offset	Filtered Oil Pressure > (**P0521_P06DD_P06DE_OP_LoStatePressure** * 1.00 - 133.0 kPa + 10.0 kPa) OR Filtered Oil Pressure < (**P0521_P06DD_P06DE_OP_LoStatePressure** * 1.00 + 180.0 kPa - 10.0 kPa) (Details on Supporting Tables Tab: **P0521_P06DD_P06DE_OP_LoStatePressure**)	Sensed Oil Temperature within range Pump state change complete No active DTC's	40.0 deg C < Sensed Oil Temperature < 120.0 deg C Time since state change > 0.50 s Time since state change > Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA CrankSensor_FA	> 10passes out of 50 samples. Performed every 100 msec	
			Two Stage Oil Pump EOP Sensor Test with Engine Off If enabled: To Fail when previously passing with the engine off: Filtered Engine Oil Pressure greater than threshold	Filtered Oil Pressure > 40.0 kPa	Two Stage Oil Pump is Present = TRUE Engine Off Rationality Test Diagnostic Status Engine Running Rationality Test Diagnostic Status Modelled Oil Temperature No Engine Movement No active DTC's	TRUE Enabled Test not report a fail state > 60.0 deg C > 10.0 seconds EngineModeNotRunTimer_FA EngOilTempFA	> 20 errors out of 40 samples. Run once per trip	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Pressure (EOP) Sensor Circuit Low Voltage	P0522	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too low. This diagnostic compares the EOP circuit voltage to the reference voltage.	(Engine Oil Pressure Sensor Circuit Voltage) - 5 Volts) *100	< 5.00 percent Deadband: < 5 percent or > 95 percent	Engine Speed Enable Engine Speed Disable Oil Pressure Sensor In Use Diagnostic Status	> 400 rpm < 350 rpm Yes Enabled	1,280 failures out of 1,600 samples Performed 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.
Engine Oil Pressure (EOP) Sensor Circuit High Voltage	P0523	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too high. This diagnostic compares the EOP circuit voltage to the reference voltage.	(Engine Oil Pressure Sensor Circuit Voltage) - 5 Volts) *100	> 95.00 percent Deadband: < 5 percent or > 95 percent	Oil Pressure Sensor In Use Diagnostic Status	Yes Enabled	1,280 failures out of 1,600 samples Performed 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.
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, NoSVS

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, NoSVS

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	P0564	Detect when cruise control multi-function switch circuit (analog) voltage is in an invalid range. "Emissions Neutral Default Action : 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.	The cruise control analog voltage A/D count ratio is considered 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	fail continuously for greater than 0.500 seconds	Type C, NoSVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control On Switch Circuit	P0565	Detects a failure of the cruise on/off switch in a continously applied state "Emissions Neutral Default Action - 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.	fail continuously in the applied state for greater than 20.00 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 20.00 seconds	Type C, NoSVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Resume Circuit	P0567	Detects a failure of the cruise resume switch in a continously applied state "Emissions Neutral Default Action : 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.	fail continuously in the applied state for greater than 89.000 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	Type C, NoSVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Set Circuit	P0568	Detects a failure of the cruise set switch in a continously applied state "Emissions Neutral Default Action : 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.	fail continuously in the applied state for greater than 89.000 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	Type C, NoSVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Cancel Switch Circuit	P056C	Detects a failure of the cruise cancel switch in a continously applied state "Emissions Neutral Default Action : 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."	Cruise Control Cancel switch remains applied for greater than a calibratable period of time.	fail continously in the applied state for greater than 20.00 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 20.00 seconds	Type C, NoSVS , "Emissions Neutral Diagnostics - special type C"

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 > 50.00 for fast test OR calculated brake pedal position delta sample counter > 1,000.00 for slow test	calculated brake pedal position delta > 3.25 OR (for slow test) shift lever has been in park once this key cycle vehicle speed >= 5.00 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 >= 5.00 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.	5.00	Diagnostic is enabled. Brake Pedal Position Sensore Low Voltage Diagnostic Enable	1.00	20 / 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	25.00	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	P0580	detects short to ground failure for cruise multi-function switch circuit "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch circuit 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.	Cruise Control analog circuit voltage must be in an "Open Short To Ground" range for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considered to be "open 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	fail continuously for greater than 2.00 seconds	Type C, NoSVS , "Emissions Neutral Diagnostics - special type C"

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	P0581	detects short to power failure for cruise multi-function switch circuit "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch circuit 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 "Short To Power" range for greater than a calibratable period of time.	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	fail continuously for greater than 2.00 seconds	Type C, NoSVS , "Emissions Neutral Diagnostics - special type C"

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	P0589	Detect when cruise control multi-function switch circuit B (analog) voltage is in an illegal range "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch for the secondary cruise switch circuit 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." Only applicable for applications with a secondary cruise switch circuit.	Cruise Control analog circuit B voltage must be "between ranges" for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considered 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	fail continuously for greater than 0.500 seconds	Type C, NoSVS, "Emissions Neutral Diagnostics - special type C"

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	P0592	detects short to ground failure for cruise multi-function switch circuit B. "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch for the secondary cruise switch circuit is detected 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 applications with a secondary cruise switch circuit.	Cruise Control analog circuit B voltage must be in an "Open Short To Ground" range for greater than a calibratable period of time.	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	fail continuously for greater than 2.00 seconds	Type C, NoSVS ,"Emissions Neutral Diagnostics - special type C"

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	P0593	detects short to power failure for cruise multi-function switch circuit B "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch for the secondary cruise switch circuit 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." Only applicable for applications with a secondary cruise switch circuit.	Cruise Control analog circuit B voltage must be in a "Short To Power" range for greater than a calibratable period of time.	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	fail continuously for greater than 2.00 seconds	Type C, NoSVS , "Emissions Neutral Diagnostics - special type C"

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	A 2-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 > 99.00 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 a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	0.47247 s			When dual store updates occur.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	0 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	0.450 seconds	Type A, 1 Trips
			MAIN processor receives seed in wrong order			always running	3 / 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 0.150 seconds continuous; 50 ms/count in the ECM 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: 0 (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: 1 (If 0, this test is disabled)	Fail Table, f(Loop Time). See supporting tables: **P0606_PSW Sequence Fail f (Loop Time)** / Sample Table, f (Loop Time)See supporting tables: **P0606_PSW Sequence Sample f(Loop Time)** 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.
			MAIN processor determines a seed has not changed within a specified time period within the 50ms task.	Previous seed value equals current seed value.		Test is Enabled: 1 (If 0, this test is disabled)	Table, f(Loop Time). See supporting tables: **P0606_Last Seed Timeout f (Loop Time)**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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: 0. (If 0, this test is disabled)	5 counts background task/ count in the ECM main processor	Type A, 1 Trips
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		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.
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.
Generator 1 L-Terminal Circuit	P0621	This DTC checks the alternator L-Terminal circuit for electrical integrity during operation.	Impedance across voltage source pin and ground during on or off state indicates open circuit OR Impedance across voltage source pin and controller 5V source during on or off state indicates shorted to power	Open circuit condition: circuit attached to the Controller external connection has an impedance between voltage source pin and controller ground of >= 200 K [Ohm] OR Power short condition: circuit attached to the Controller external connection has an impedance between voltage source pin and controller 5V source of <= 0.5 [Ohm]	Test enabled by calibration; and (Generator present and Generator 1 L-Terminal Circuit test fault in engine running) and Run Crank voltage and No Active DTCs and Engine Running and Engine Crank movement detected and (Starter engaged OR Run Crank voltage above 11.00) for a time)	==0.00 [Boolean] ==1.00 [Boolean] == FALSE >= 11.00 [V] CrankSensor_FA CamSensorAnyLocationFA == FALSE == FALSE == FALSE > 1.00 [s]	5.00 [s] (Debouncing performed based on cumulative time in fault condition) Task rate = 250 [ms]	Type C, NoSVS
			Impedance across voltage source pin and ground during on or off state indicates shorted to ground	Ground short condition: circuit attached to the Controller external connection has an impedance between	Test enabled by calibration; and (Generator present	1.00 [Boolean] ==1.00 [Boolean]	15.00 [s] (Debouncing performed based on cumulative time in fault condition)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			OR Impedance across voltage source pin and controller 5V source during on or off state indicates shorted to power	voltage source pin and controller ground of <= 0.5 [Ohm] OR Power short condition: circuit attached to the Controller external connection has an impedance between voltage source pin and controller 5V source of <= 0.5 [Ohm]	and Generator 1 L-Terminal Circuit test fault in key on) and No Active DTCs and Engine Running and Generator control disabled and Generator Service Device Control Command Request	== FALSE CrankSensor_FA CamSensorAnyLocationFA == TRUE == FALSE == FALSE	Task rate = 250 [ms]	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Generator 1 F-Terminal Circuit	P0622	This DTC checks the alternator F-Terminal circuit for electrical integrity during operation.	Generator field winding duty cycle	>= 65.00 [Pct]	Test enabled by calibration; and (Generator present and Generator 1 F-Terminal Circuit test fault in engine running) Run Crank voltage and No Active DTCs and Engine Running and Engine Crank movement detected and (Starter engaged OR Run Crank voltage above 11.00) for a time)	1.00 [Boolean] ==1.00 [Boolean] == FALSE >= 11.00 [V] CrankSensor_FA CamSensorAnyLocationFA == FALSE == FALSE == FALSE 1.00	5.00 [s] (Debouncing performed based on cumulative time in faulty condition) Task rate = 50 ms	Type A, 1 Trips
			Generator field winding duty cycle	<= 5.00 [Pct]	Test enabled by calibration;	1.00 [Boolean]	5.00 [s] (Debouncing performed based on cumulative	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					and (Generator present	==1.00 [Boolean]	time in faulty condition) Task rate = 50 ms	
					and Generator 1 F-Terminal Circuit test fault in key on)	== FALSE		
					and Engine speed	< 1,000.00 [rpm]		
					and L-Terminal_FA	== FALSE		
					and Generator 1 F-Terminal present	== 1.00 [Boolean]		
					and Generator PWM command	> 42.00 [Pct]		
					and No Active DTCs	CrankSensor_FA CamSensorAnyLocationFA		
					and Engine Running	== TRUE		
					and Generator control disabled	== FALSE		
					and Generator Service Device Control Command Request	== FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Relay Control Circuit Open	P0627	Controller specific output driver circuit diagnoses the Feed Fuel Pump Relay high sided driver for an 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 open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal 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 controllers P0629 may also set (Fuel Pump Relay Control Short to Power)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Relay Control Circuit Low Voltage	P0628	Controller specific output driver circuit diagnoses the Feed Fuel Pump Relay high sided driver for a short to ground 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.	<= 0.5 Ohms impedance between signal and controller ground	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.
Fuel Pump Relay Control Circuit High Voltage	P0629	Controller specific output driver circuit diagnoses the Feed Fuel Pump Relay high sided driver for a short to power 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 power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Run/Crank Voltage	Voltage 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips Note: In certain controllers P0627 may also set (Fuel Pump Relay Control Open Circuit)

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 determines the internal fuel injctor control module circuit is faulted. The faulted status is set on any failure that could potentially damage the drivers or injectors, or could result in uncontrolled fueling. The following general classes of failures shall be covered: Communication error with control circuit Internal corruption of control circuit values, Invalid interface values (from control circuit)	Internal ECU Boost Voltage OR Internal ECU Boost Voltage OR Driver Status OR Driver Status	>= 90 Volts <= 40 Volts = Not Ready = Uninitialized	Battery Voltage	>= 8 or >= 11 Enabled when a code clear is not active or not exiting device control Engine is not cranking Powertrain Relay Voltage within range	High Voltage - 160 failures out of 200 samples Low Voltage - 160 failures out of 200 samples Driver Status Not Ready- 160 failures out of 200 samples Driver Status Uninitialized - Uninitialized state for >= 100 counts All at 12.5ms per sample	Type A, 1 Trips

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 >	4.875 % Vrefl 5.125 % Vrefl 0.0495 % 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 0.2500 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.
Internal Control Module 02 Sensor Processor Performance Bank 1) (For use with WRAF	P064D	Diagnoses the WRAF Application-Specific Integrated Circuit (ASIC) for Controller Status and Measure Valid faults. These faults can impact closed loop fuel control. This DTC when enabled, monitors the two different failure counters it receives from the WRAF ASIC. The individual diagnostic failure counters are incremented based on the message received from the ASIC. The DTC is set based on any of the two individual fail and sample counters.	B1S1 WRAF ASIC indicates control module faults	Controller Status fail counts and Measure Valid fail counts are accumulated to determine fault status	Diagnostic is Enabled Engine Run or Auto stop Heater Warm-up delay WRAF circuit diagnostic delay since power up	 = True = Complete > 15.0 sec	128 controller status fail counts out of 160 samples OR 128 measure valid fail counts out of 160 samples 25 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.
Internal Control Module 02 Sensor Processor Performance Bank 2) (For use with WRAF	P064E	Diagnoses the WRAF Application-Specific Integrated Circuit (ASIC) for Controller Status and Measure Valid faults. These faults can impact closed loop fuel control. This DTC when enabled, monitors the two different failure counters it receives from the WRAF ASIC. The individual diagnostic failure counters are incremented based on the message received from the ASIC. The DTC is set based on any of the two individual fail and sample counters.	B2S1 WRAF ASIC indicates control module faults	Controller Status fail counts and Measure Valid fail counts are accumulated to determine fault status	Diagnostic is Enabled Engine Run or Auto stop Heater Warm-up delay WRAF circuit diagnostic delay since power up	 = True = Complete > 15.0 sec	128 controller status fail counts out of 160 samples OR 128 measure valid fail counts out of 160 samples 25 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.
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 >	4.875 % Vref2 5.125 % Vref2 0.0495 % 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 0.2500 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.
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 Ω 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 Q 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 m s / 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.
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 >	4.875 % Vref3 5.125 % Vref3 0.0495 % 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 0.2500 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.
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 >	4.875 % Vref4 5.125 % Vref4 0.0495 % 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 0.2500 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.
Torque Managment System - Forced Engine Shutdown	P06AF	This diagnostic is monitoring that the TCM is processing code correctly. The TCM computes the correct pattern sent via a CAN message to the monitoring ECM. When the ECM does not receive a correct pattern or a missing pattern to the monitoring ECM, the DTC is set.	Received pattern from the TCM OR Received malfunction pattern	# expected pattern >= 2 counts	 Run Crank Active Time	Run or Crank >= 0.63 seconds	6/12 counts or 2.00 seconds continuous; 25 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.
Internal Control Module Knock Sensor Processor 1 Performance	P06B6	This diagnostic checks for a fault with the internal test circuit (sensor #1) used only for the '20 kHz' method of the Open Circuit Diagnostic. A fault is present when the signal level from the 20 kHz range of the FFT output falls between the Open Test Circuit thresholds.	FFT Diagnostic Output	**> P06B6_P06B7_OpenTestCktThrshMin** **AND** **< P06B6_P06B7_OpenTestCktThrshMax** **See Supporting Tables**	Diagnostic Enabled? Engine Run Time Engine Speed Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow	Yes > 2.0 seconds > 450 RPM and < 5,250 RPM > 500 Revs > 50 mg/cylinder and < 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0224 Updated each engine event	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 Knock Sensor Processor 2 Performance	P06B7	This diagnostic checks for a fault with the internal test circuit (sensor #2) used only for the '20 kHz' method of the Open Circuit Diagnostic. A fault is present when the signal level from the 20 kHz range of the FFT output falls between the Open Test Circuit thresholds.	Individual Sensor Threshold Enabled? FFT Diagnostic Output	0.00 , Use Case 1 **Case 1:** **> P06B6_P06B7_OpenTestCktThrshMin** **AND** **< P06B6_P06B7_OpenTestCktThrshMax** **See Supporting Tables** **Case 2:** > **P06B7_OpenTestCktMin2** **AND** < **P06B7_OpenTestCktMax2** **See Supporting Tables**	Diagnostic Enabled? Engine Run Time Engine Speed Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow	Yes > 2.0 seconds > 450 RPM and < 5,250 RPM > 500 Revs > 50 mg/cylinder and < 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient **Case 1 Weight Coefficient =** 0.0224 Updated each engine event **Case 2 Weight Coefficient =** 0.0100 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Pressure Control Circuit/Open	P06DA	Controller specific output driver circuit diagnoses the oil pump 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.	Open Circuit > 200 k Q impedance between output and controller ground	Powertrain Relay Voltage Run/Crank Active Cranking State	> 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type B, 2 Trips Note: In certain controllers P06DB may also set (Engine Oil Pressure Control Circuit Short To Ground)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Pressure Control Circuit Low	P06DB	Controller specific output driver circuit diagnoses the oil pump 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.	Short to Ground Circuit < 0.5 Q impedance between output and controller ground	Powertrain Relay Voltage Run/Crank Active Cranking State	> 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type B, 2 Trips Note: In certain controllers P06DA may also set (Engine Oil Pressure Control Circuit Open)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Pressure Control Circuit High	P06DC	Controller specific output driver circuit diagnoses the oil pump 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.	Short to Power < 0.5 Q impedance between output and controller power	Powertrain Relay Voltage Run/Crank Active Cranking State	> 11.00 = True = False	>= 40 errors out of 50 samples. Performed 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.
Two Stage Oil Pump Control Circuit Performance - Two Sided	P06DD	Diagnoses the two stage oil pump is stuck in the high pressure state. This diagnostic includes an intrusive test and a passive test. Intrusive test: The oil pump control is cycled off (high pressure) and on (low pressure) Y = 15 times at calibratable intervals. If a change in oil pressure above a calibration is not detected then the oil pressure is checked to determine if it is stuck. It takes X-out-of-Y failures to fail and set the appropriate code. Passive test: After the intrusive test passes, then a passive test will begin to run. The passive test will monitor the oil pressure changes associated with oil pump control state changes. If the passive test determines that the oil pressure change was less then desired then the intrusive test is retriggered.	Fail from passing state: Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is above a threshold	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change - filtered oil pressure after 1.7 seconds] Oil Pressure delta < **P06DD_P06DE_OP_StateChangeMin** AND Filtered Oil Pressure ≥ (**P0521 P06DDP06DE_OP_HiStatePressure** + **P0521_P06DD_P06DE_OP_LoStatePressure**) - 2 (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin** **P0521 P06DDP06DEOPHiStatePressure** **P0521_P06DDP06DE_OP_LoStatePressure**)	Common Criteria: Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 8,000 RPM for longer than 65,000.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control enable: Active Criteria: One Sided Performance Test = Disabled	TRUE > 30.0 seconds >70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA OilPmpTFTKO Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Enabled	> 12 errors out of 15 samples. Run once per trip or activiated by the Passive Test	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Oil Pump in Low State	> 1.7 seconds		
					Modelled Oil Temperature within range	40.0 deg C < Oil Temp < 110.0 deg C		
					Filtered Engine Speed within range	1,200 RPM < Filtered Engine Speed < 2,500 RPM		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] < 250 RPM		
					Engine Torque within range	**P06DD_P06DE_MinEnableTorque_OP** ≤ Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinEnableTorque_OP P06DD_P06DE_MaxEnableTorque_OP)**		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinOilPressThresh**)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Expected Oil Pressure Delta within range	83.0 kPa < ABS [**P0521_P06DD_P06DE_OP_HiStatePressure - P0521_P06DD_P06DE_OP_LoStatePressure]** < 200.0 kPa		
					Passive Criteria:			
					Active Test Passed	TRUE		
					Filtered Engine Speed within range	1,000 RPM < Filtered Engine Speed < 4,500 RPM		
					Modelled Oil Temperature within range	40.0 deg C < Oil Temp < 120.0 deg C		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.70 seconds] < 1,000 RPM		
					Oil Pressure Delta within a range	Oil Pressure Delta < **P06DD_P06DE_OP_StateChangeMin** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin**)		
			Fast Pass Condition		Common Criteria:		0 errors out of 5 samples.	
			Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change -	Two Stage Oil Pump is Present	TRUE	Run once per trip or activiated by the Passive Test	
					Engine Running	> 30.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			above a threshold	filtered oil pressure after 1.7 seconds]	Ambient Air Pressure	>70.0 kPa		
				Oil Pressure delta < **P06DD_P06DE_OP_StateChangeMin** AND Filtered Oil Pressure ≥ (**P0521 P06DDP06DE_OP_HiStatePressure** **-** **P0521_P06DD_P06DE_OP_LoStatePressure**) 2	Oil Aeration (= TRUE if engine speed > 8,000 RPM for longer than 65,000.0 seconds)	FALSE		
					No active DTC's for diagnsotic enable:	Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA OilPmpTFTKO CrankSensor_FA		
					Check oil pump TFTKO as a diagnostic enable when Enabled.	Enabled : OilPmpTFTKO		
				(see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin** **P0521_P06DD_P06DE_OP_HiStatePressure** **P0521_P06DD_P06DE_OP_LoStatePressure**)	No active DTC's for control enable:	Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA		
					<u>Active Criteria:</u> One Sided Performance Test = Disabled	Enabled		
					Oil Pump in Low State	> 1.7 seconds		
					Modelled Oil Temperature within range	40.0 deg C < Oil Temp < 110.0 deg C		
					Filtered Engine Speed within range	1,200 RPM < Filtered Engine Speed < 2,500		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						RPM		
					Engine Torque within range	**P06DD_P06DE_MinEnableTorque_OP** ≤ Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinEnableTorque_OP P06DD_P06DE_MaxEnableTorque_OP)**		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] < 250 RPM		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinOilPressThresh**)		
					Expected Oil Pressure Delta within range	83.0 kPa < ABS [**P0521_P06DD_P06DE_0 P_HiStatePressure - P0521_P06DD_P06DE_OP_LoStatePressure]** < 200.0 kPa		

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.
Unable to Engage Neutral	P073D	Detects the inability to achieve or remain in Neutral.	Actual Arbitrated Transmission Range	≠Neutral	Actual Transmission Range Commanded Transmission Range AND CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup	= Good value = Neutral =False =False =True = True =True =Park =False	10,000.00 msec from Park 10,000.00 msec from Reverse 10,000.00 msec from Drive	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Unable to Engage Reverse	P073E	Detects the failure to achieve the expected command to Reverse range.	Actual Arbitrated Transmission Range	#Reverse	Actual Transmission Range Commanded Transmission Range AND CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup	= Good value = Reverse =False =False =True =True =True =Park =False	10,000.00 msec from Park 3,600,000.00 msec from Neutral* 3,600,000.00 msec from Drive* internal does not diagnose from N&D	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Position Sensor/ Switch A Circuit Low	P07B3	The Park Button Circuit Diagnostic detects a reading LowCorrelation diagnosis compares the two switches behind the Park pushbutton	Park Position Measured Voltage	< Low 446 counts 446 counts = 43.6% of 5 Volts 1023 counts = 5 Volts			16 Failures out of 20 Samples (SIB is 5 msec loop)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Position Sensor/ Switch A Circuit High	P07B4	The Park Button Circuit Diagnostic detects a reading High	Park Position Measured Voltage	> High 853 counts 853 counts = 83.3% of 5 Volts. 1023 Counts = 5 V			16 Failures out of 20 Samples (SIB is 5 msec loop)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Position Sensor/ Switch A Circuit Performance	P07B5	The Park Button Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Park Position Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	DTC not set	P07B3 OR P07B4	2000 Failures out of 2500 Samples =10 sec (SIB is 5 msec loop)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Position Sensor/ Switch B Circuit Low	P07B9	The Park Button Circuit Diagnostic detects a reading Low	Park Position Measured Voltage	< Low 446 counts 446 counts = 43.6% of 5 Volts. 1023 Counts = 5 V	Diagnostic Enable Calibration	=TRUE	16 Failures out of 20 Samples (SIB is 5 msec loop)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Position Sensor/ Switch B Circuit High	P07BA	The Park Button Circuit Diagnostic detects a reading High	Park Position Measured Voltage	> High 853 counts 853 counts = 83.3% of 5 Volts. 1023 Counts = 5 V	Diagnostic Enable Calibration	=TRUE	16 Failures out of 20 Samples (SIB is 5 msec loop)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Position Sensor/ Switch B Circuit Performance	P07BB	The Park Button Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Park Position Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	Diagnostic Enable Calibration DTC not set	=TRUE P07BA or P07B9	2000 Failures out of 2500 Samples =10 sec (SIB is 5 msec loop)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Position Switch A/B Correlation	P07BE	Correlation diagnosic compares the two switches behind the Park pushbutton	Compares Park Switch A and Park Switch B "PRESSED" and "RELEASED" states. Park 1 and Park 2 are both:	=Valid, but not equal continuously = valid states (RELEASED or PRESSED), but disagree.	Not Fault Active Diagnostic System Disable Calibration: Park Comparison Diagnostics Enable Calibration: Vehicle speed:	P07B3, P07B4, P07B5, P07B9, P07BA, P07BB =FALSE = TRUE <= Park Request Spd, calibrated with a hysteresis loop: 8.00 and 7.50 .	4,800 failures out of 6,000 samples 12.5 ms rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Unable to Engage Park	P07E4	Detects the inability to achieve or remain in Park.	Actual Arbitrated Transmission Range	#Park	Actual Transmission Range Commanded Transmission Range AND CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup	= Good value = Park =False =False =True = True =True =Park =False	10,000.00 msec from Reverse 10,000.00 msec from Neutral 10,000.00 msec from Drive	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Unable to Engage Drive	P07E5	Detects the failure to achieve the expected command to Drive range.	Actual Arbitrated Transmission Range	#Drive	Actual Transmission Range Commanded Transmission Range AND CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup	= Good value = Drive =False =False =True = True =True =Park =False	10,000.00 msec from Park 10,000.00 msec from Reverse 10,000.00 msec from Neutral	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Gear Lever X Position Sensor 1 Circuit Range/ Performance	P082A	Detects Gear Lever X Position Sensor 1 circuit is reading outside expected values	Gear Lever Position Sensor 1 Measured Duty Cycle on X OR Gear Lever Position Sensor 1 Frequency error detection flag on X OR Gear Lever Position Sensor 1 Measured Duty Cycle on X and Gear Lever Position Sensor 2 Measured Duty Cycle on X differ by more than	Are outside the shifter path of movement 5.5% to meet 100 Nm force on shifter from nominal path OR = True >12.00%	Not Fault Active Controller has been awake for at least	P082B, P082C 0.05 seconds	10.00 failures out of 12.00 samples 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.
Gear Lever X Position Sensor 1 Circuit Low	P082B	Detects Gear Lever X Position Sensor 1 circuit reading low	Gear Lever Position Sensor 1 Measured Duty Cycle on X	< 5.00 %	Controller has been awake for at least	0.05 seconds	10.00 failures out of 12.00 samples 25 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.
Gear Lever X Position Sensor 1 Circuit High	P082C	Detects Gear Lever X Position Sensor 1 circuit reading high	Gear Lever Position Sensor 1 Measured Duty Cycle on X	> 95.00%	Controller has been awake for at least	0.05 seconds	10.00 failures out of 12.00 samples 25 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.
Gear Lever Y Position Sensor 1 Circuit Performance	P082D	Detects Gear Lever Y Position Sensor 1 circuit is reading outside expected values	Gear Lever Position Sensor 1 Measured Duty Cycle on Y OR Gear Lever Position Sensor 1 Frequency error detection flag on Y	Are outside the shifter path of movement 5.5% to meet 100 Nm force on shifter from nominal path = True	Not Fault Active Controller has been awake for at least	P082E, P082F 0.05 seconds	10.00 failures out of 12.00 samples 25 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.
Gear Lever Y Position Sensor 1 Circuit Low	P082E	Detects Gear Lever Y Position Sensor 1 circuit reading low	Gear Lever Position Sensor 1 Measured Duty Cycle on Y	< 5.00 %	Controller has been awake for at least	0.05 seconds	10.00 failures out of 12.00 samples 25 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.
Gear Lever Y Position Sensor 1 Circuit High	P082F	Detects Gear Lever Y Position Sensor 1 circuit reading high	Gear Lever Position Sensor 1 Measured Duty Cycle on Y	> 95.00 %	Controller has been awake for at least	0.05 seconds	10.00 failures out of 12.00 samples 25 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.
Gear Lever X Position Sensor 2 Circuit Performance	P089B	Detects Gear Lever X Position Sensor 2 circuit is reading outside expected values	Gear Lever Position Sensor 2 Measured Duty Cycle on X OR Gear Lever Position Sensor 2 Frequency error detection flag on X OR Gear Lever Position Sensor 2 Measured Duty Cycle on X and Gear Lever Position Sensor 1 Measured Duty Cycle on X differ by more than	Are outside the shifter path of movement 5.5% to meet 100 Nm force on shifter from nominal path = True >12.00%	Not Fault Active Controller has been awake for at least	P089C, P089D 0.05 seconds	10.00 failures out of 12.00 samples 25 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.
Gear Lever X Position Sensor 2 Circuit Low	P089C	Detects Gear Lever X Position Sensor 2 circuit reading low	Gear Lever Position Sensor 2 Measured Duty Cycle on X	< 5.00%	Controller has been awake for at least	0.05 seconds	10.00 failures out of 12.00 samples 25 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.
Gear Lever X Position Sensor 2 Circuit High	P089D	Detects Gear Lever X Position Sensor 2 circuit reading high	Gear Lever Position Sensor 2 Measured Duty Cycle on X	> 95.00 %	Controller has been awake for at least	0.05 seconds	10.00 failures out of 12.00 samples 25 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.
Gear Lever Y Position Sensor 2 Circuit Performance	P08A0	Detects Gear Lever Y Position Sensor 2 circuit is reading outside expected values	Gear Lever Position Sensor 2 Measured Duty Cycle on Y OR Gear Lever Position Sensor 2 Frequency error detection flag on Y OR Gear Lever Position Sensor 1 Measured Duty Cycle on Y and Gear Lever Position Sensor 2 Measured Duty Cycle on Y differ by more than	Are outside the shifter path of movement 5.5% to meet 100 Nm force on shifter from nominal path = True > 12.00%	Not Fault Active Controller has been awake for at least	P08A1, P08A2 0.05 seconds	10.00 failures out of 12.00 samples 25 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.
Gear Lever Y Position Sensor 2 Circuit Low	P08A1	Detects Gear Lever Y Position Sensor 2 circuit reading low	Gear Lever Position Sensor 2 Measured Duty Cycle on Y	< 5.00%	Controller has been awake for at least	0.05 seconds	10.00 failures out of 12.00 samples 25 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.
Gear Lever Y Position Sensor 2 Circuit High	P08A2	Detects Gear Lever Y Position Sensor 2 circuit reading high	Gear Lever Position Sensor 2 Measured Duty Cycle on Y	> 95.00%	Controller has been awake for at least	0.05 seconds	10.00 failures out of 12.00 samples 25 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 Pump Driver Control Module Reset Error	P1005	This diagnostic is intended to monitor a message from the Fuel Pump Driver Control Module/Fuel Tank Zone Module and use the information in the message to diagnose if the module is resetting unexpectedly. The message contains the time since the last reset as measured by the module. If the time since the last reset decreases from one message to another without indicating that a timer rollover occurred, a reset of the external module will be indicated. If too many resets occur in a sample window the diagnostic will fail.	If the diagnostic has detected that an unexpected reset has occured:		DTC is enabled	Enabled	This diagnostic samples every 100.00 milliseconds.	Type A, 1 Trips
					Sensor bus relay is on			
					Battery voltage	> 11.00 Volts		
			The time since last module reset event data value received from the FPDCM/FTZM is less than the previous value and also	<=0.50 seconds	No FTZM reconfiguration is requested for	1.00second(s)		
					A new message that contains the FPDCM/ FTZM reset data is received			
			And					
			The rollover occurred value received from the FPDCM/FTZM is false		The following DTCs that diagnose the message that contains the FPDCM/ FTZM reset data are not active:			
			for	>=2.00 counts				
			out of total samples	>=400.00 counts	P1000			
					U18A2			

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 Chassis Fuel Pres System type c) Diagnostic is .. d) CAN Sensor Bus message $3EC Available e) Sensor Bus Relay On f) Sensor Bus B Message $3EC Temp Signal Message Counter Incorrect [Info7]	a) == 0 RPM b) == Brushless motor c) ENABLED d) ==TRUE e) == TRUE f) == False	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 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-	Phased-pair circuit voltage Difference	Vdelta > 0.145 V	a) Chassis Fuel Pres System type Device configuration b) Diagnostic is .. c) CAN Sensor Bus message $3EC_Avail d) Sensor Bus Relay On e) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [Info7]	a) == Brushless motor b) Enabled c) == TRUE d) ==TRUE e) == False	40.00 failures / 80.00 samples 1 sample / 12.5 ms	Type A, 1 Trips
			Phased-pair circuit voltage	V [back-EMF] >= 6 V	a) Sensed fuel pump speed b) Chassis Fuel Pres System type Device configuration c) Diagnostic is .. d) CAN Sensor Bus message $3EC Available e) Sensor Bus Relay On f) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [Info7]	a) == 0 RPM b) == Brushless motor c) Enabled d) ==TRUE e) ==TRUE f) == False	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.
		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.						

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 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	Phased-pair circuit voltage Difference	Vdelta > 0.4 V	a) Diagnostic is .. b) Device configuration Chassis Fuel Pressure SysType == FTZM Electronically Commutated c) CAN Sensor Bus message $3EC_Avail d) Sensor Bus Relay On e) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect	a) Enabled b) == TRUE c) == TRUE d) ==TRUE e) == False	40.00 failures / 80.00 samples 1 sample / 12.5 ms	Type A, 1 Trips
			Phased-pair circuit voltage	V[backEMF]> 6 V	a) Diagnostic is .. b) Sensed fuel pump speed b) Device configuration Fuel Pressure System Type == FTZM Electronically Commutated c) CAN Sensor Bus message $3EC_Avail d) Sensor Bus Relay On e) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect	a) Enabled b) == 0 RPM b) ==TRUE c) == TRUE d) ==TRUE e) == False	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.
		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.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Heater Supply Voltage Sense Circuit Range/ Performance	P103B	The P103B diagnostic determines if the heater supply circuit is rational by comparing the heater supply voltage to the run crank voltage and calculating the difference. The heater supply voltage input is connected to the 02 heater supply circuit inside the vehicle relay center. It is representative of the voltage supplied to the 02 heaters. The 02 heater voltage is used by the HWIO to calculate the 02 heater resistance on switching type 02 sensors (non-WRAF). With a fault set, the resistance calculation is performed with run crank voltage. The diagnostic failure counter is incremented if the voltage difference is greater than the threshold. This DTC is set based on the fail and sample counters.	The absolute value of Heater Supply Voltage delta from Run Crank voltage	> 2.00 volts	Diagnostic is Enabled Powertrain relay in range (Relay in range is defined as relay voltage Run Crank signal active	= True > 11.00 volts) = True (Please see **"Run/Crank Active conditiions"** in Supporting Tables)	8 failures out of 10 samples 250 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.
02 Sensor Heater Supply Voltage Sense Circuit Low	P103C	The P103C diagnostic determines if the heater supply circuit is low by comparing the heater supply voltage to the threshold. The heater supply voltage input is connected to the 02 heater supply circuit inside the vehicle relay center. It is representative of the voltage supplied to the 02 heaters. The 02 heater voltage is used by the HWIO to calculate the 02 heater resistance on switching type 02 sensors (non-WRAF). With a fault set, the resistance calculation is performed with run crank voltage. The diagnostic failure counter is incremented if the heater supply voltage is less than the threshold. This DTC is set based on the fail and sample counters.	Heater Supply Voltage	< 8.00 volts	Diagnostic is Enabled Powertrain relay in range (Relay in range is defined as relay voltage Run Crank signal active	 = True > 11.00 volts) = True (Please see **"Run/Crank Active conditiions"** in Supporting Tables)	8 failures out of 10 samples 250 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.
Cylinder 1 Injection Pulse Performance	P10A3	Diagnostic to determine if injection pulse total compensation for cylinder 1 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	< **P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag_TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Pulse Performance	P10A4	Diagnostic to determine if injection pulse total compensation for cylinder 1 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	> **P10A4P10A6 P10A8 P10AAP10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag_TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P10A5	Diagnostic to determine if injection pulse total compensation for cylinder 2 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	< **P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag_TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P10A6	Diagnostic to determine if injection pulse total compensation for cylinder 2 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	> **P10A4P10A6 P10A8 P10AAP10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag _TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P10A7	Diagnostic to determine if injection pulse total compensation for cylinder 3 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	< **P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag_TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P10A8	Diagnostic to determine if injection pulse total compensation for cylinder 3 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	> **P10A4P10A6 P10A8 P10AAP10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag _TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P10A9	Diagnostic to determine if injection pulse total compensation for cylinder 4 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	< **P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag_TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P10AA	Diagnostic to determine if injection pulse total compensation for cylinder 4 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	> **P10A4P10A6 P10A8 P10AAP10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag_TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P10AB	Diagnostic to determine if injection pulse total compensation for cylinder 5 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	< **P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag_TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P10AC	Diagnostic to determine if injection pulse total compensation for cylinder 5 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	> **P10A4P10A6 P10A8 P10AAP10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag_TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P10AD	Diagnostic to determine if injection pulse total compensation for cylinder 6 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	< **P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag_TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P10AE	Diagnostic to determine if injection pulse total compensation for cylinder 6 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	> **P10A4P10A6 P10A8 P10AAP10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag_TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P10AF	Diagnostic to determine if injection pulse total compensation for cylinder 7 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	< **P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag_TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P10B0	Diagnostic to determine if injection pulse total compensation for cylinder 7 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	> **P10A4P10A6 P10A8 P10AAP10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag _TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P10B1	Diagnostic to determine if injection pulse total compensation for cylinder 8 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	< **P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag_TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P10B2	Diagnostic to determine if injection pulse total compensation for cylinder 8 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	> **P10A4P10A6 P10A8 P10AAP10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag_TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Coolant Pump Speed Performance	P10BA	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.	Absolute pump speed error =Abs(Desired pump speed - Actual Pump Speed) For more than	> Table f(Speed) See Supporting Table : **P10BA: Pump On Speed Error Limit** > Table f(Coolant) See Supporting Table : **P10BA: Pump On Speed Diag Delay**	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 *r*r*r*r*r*f*nlf*r*f**r**r**n**r*r*r*r*r*r*f*r*f*r	5 failures out of 8 samples 1000ms / sample	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 Sensor AZ C Correlation	P10BC	Detects a performance failure in the Barometric Pressure (BARO) sensor, such as when a BARO value is stuck in range. With this monitor, the BARO sensor is compared to a redundant sensor called BARO C. If the BARO sensor value is not similar to the BARO C sensor value, then the BARO Sensor A/C Correlation diagnostic will fail.	Difference between BARO A Sensor reading and BARO C Sensor reading	> 15.0 kPa	Diagnostic is Enabled LIN communications established with MAP		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.
Turbocharger/ Supercharger Bypass Valve "A" Control Circuit Shorted	P10EE	Controller specific output driver circuit diagnostic, diagnosing for the 'electric compressor recirculation valve 'A' actuator' H-bridge driver load short failure. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Voltage measurement outside of controller specific acceptable range during driver on state indicates a load short failure.	< 0.5 Q impedance between motor output A and motor output B	Diagnostic enabled Powertrain relay voltage Engine does not crank Diagnostic system not disabled	True >=11.0 Volts	80 failures out of 100 samples 12.5ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Inlet Airflow System Performance (supercharg ed)	P1101	Detects a performance failure in the Manifold Pressure (MAP) sensor, Supercharger Inlet Absolute Pressure (SCIAP) sensor, Throttle Position sensor (TPS) or Mass Air Flow (MAF) sensor that cannot be uniquely identified as a failure in one individual sensor. This diagnostic can set when more than one of these sensors has a performance concern. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from these four sensors. These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a	See table **P0101, P0106, P0121, P012B, P1101: Supercharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. TPS model fails when Filtered Throttle Model Error MAF model fails when ABS(Measured Flow - Modeled Air Flow) Filtered MAPI model fails when ABS(Measured MAP - MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP - MAP Model 2) Filtered SCIAP1 model fails when ABS(Measured SCIAP - SCIAP Model 1) Filtered SCIAP2 model fails when ABS(Measured SCIAP - SCIAP Model 2) Filtered	> 500 kPa*(g/s) > 30.0 grams/sec > 25.0 kPa > 25.0 kPa > 25.0 kPa > 25.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieve Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,200 RPM >= -9 Deg C = TRUE) <= 130 Deg C = FALSE) >= -20 Deg C <= 129 Deg C >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM** and	Continuous Calculation are performed every 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.
		performance issue with the system, but no single failed sensor can uniquely be identified. In this case, the Inlet Airflow System Performance diagnostic will fail.				**P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** and **P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost** Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** SCIAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P1101:SCIAP1 Residual Weight Factor based on RPM** and **P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost** SCIAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P1101: SCIAP2 Residual Weight Factor based on RPM**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						and **P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost**		
					No Active DTCs:	MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA SCIAP_SensorCircuitFA AmbientAirDefault CRAR_b_CRV_CktFA CRAR_b_PstnSnsrFA CRAR_b_PstnSnsrOfstFA CRAR_b_ObstructionFA		
					No Pending DTCs:	EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP SCIAP_SensorCircuitFP		
					Diagnostic is Enabled			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature Sensor Not Plausible (Non-ATM)	P111E	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: EngCoolantTempSnsrl Temperature Sensor 1: CeEECR_e_NollseAssgnmnt Temperature Sensor 2: CeEECR_e_NollseAssgnmnt Temperature Sensor 3: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 4: CeEECR_e_NoUseAssgnmnt Temperature Sensor 5: CeEECR_e_Nol)seAssgnmnt The comparison sensors, temperature thresholds, and aux heater effects can be looked up by finding the location associated with the physical (Temperature)		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: - BiasChkCylHdClntSnsr - BiasChkBlockClntSnsr - BiasChkEngInClntSnsr - BiasChkEngOutClntSnsr - BiasChkHtrCrInClntSnsr - BiasChkHtrCrOutClnSnsr - BiasChkRadOutClntSnsr - BiasChkBypInClntSnsr - BiasChkEngMetalSnsr - BiasChkIntakeAirSnsr - BiasChkHumTmpSnsr - BiasChkManfldAirSnsr - BiasChkOutsideAirSnsr - BiasChkEngOilSnsr - BiasChk_EGR_UpStrmSn	OAT_PtEstFiltFA PSAR_PropSyslnactveCrs_FA = FALSE EECR_EngineOutlet_CktFA EECR_CylHeadCoolant_CktFA EECR_BlockCoolant_CktFA EECR_Enginelnlet_CktFA EECR_EngineOutlet_CktFA EECR_HeaterCorelnlet_CktFA EECR_HeaterCoreOutlet_CktFA EECR_RadiatorOutlet_CktFA EECR_Bypasslnlet_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 B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			sensor number. **Auxilary Radiator Outlet 1:** CeEECR_e_NoPhysAssgnmnt Comparison sensor 1: CeEECR_e_BiasChkEngOutClntSnsr Comparison sensor 2: CeEECR_e_BiasChkIntakeAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterNoEffect Threshold A: Threshold B: **Auxilary Radiator Outlet 2:** CeEECR_e_NoPhysAssgnmnt Comparison sensor 1: CeEECR_e_BiasChkEngOutClntSnsr Comparison sensor 2: CeEECR_e_BiasChkIntakeAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterNoEffect Threshold A: Threshold B:	 50.0°C 15.0°C 50.0°C 15.0°C	sr - BiasChk_EGR_DwnStmSnsr - BiasChk_EGR_LowPrsSnsr - BiasChkFuelSnsr Comparison sensors	EGRTempSensorUPSS_FA EGRTempSensorDNSS_FA LPE_TempSnsrFA HRTR_b_FuelSensor_FA_Bndl = Availible		
					________________ The following thresholds are based on the sensor under diagnosis **Auxilary Radiator Outlet 1:** Propulsion Off Soak Time Ambient Air Temperature **Auxilary Radiator Outlet 2:** Propulsion Off Soak Time Ambient Air Temperature **Engine Outlet:** Propulsion Off Soak Time Ambient Air Temperature **Head Metal:** Propulsion Off Soak Time Ambient Air Temperature **Radiator Outlet:** Propulsion Off Soak Time Ambient Air Temperature	 > 28,800 seconds >-9.0 °C > 28,800 seconds >-9.0 °C >21,600 seconds >-9.0 °C >*28,800* seconds >-9.0 °C > 28,800 seconds >-9.0 °C		
					Comparison sensor 1 & 2			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Engine Outlet: CeEECR_e_PhysSnsr3 Comparison sensor 1: CeEECR_e_BiasChkFuelSnsr		are not	= CeEECR_e_BiasChkNoSelection		
			Comparison sensor 2: CeEECR_e_BiasChkEngOilSnsr		Aux Heat Detection Aux heat detection can only be enabled the following are met:			
			Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasHigh		No Active DTCs	Same set as listed above and EngineModeNotRunTimerError EngineModeNotRunTimer_FA VehicleSpeedSensor_FA		
			Threshold A: Threshold B:	50.0°C 15.5°C				
			Head Metal: CeEECR_e_NoPhysAssgnmnt		At power-up a warm sensor and cool sensor are compared			
			Comparison sensor 1: CeEECR_e_BiasChkNoSelection		Warm sensor	CeAEHReBlkHtrEngOutClntSnsr		
			Comparison sensor 2: CeEECR_e_BiasChkNoSelection		Cool sensor	CeAEHR_e_BlkHtrIntakeAirSnsr		
			Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect		If the warm sensor is compared to the cool sensor	>10.00°C		
			Block Heater: CeEECR_e_AuxHeaterNoEffect		Propulsion Off Soak Time Engine Off Soak Time Ambient Air Temperature	>21,590 seconds >21,590 seconds >-9.00°C		
			Threshold A: Threshold B:	50.0°C 15.0°C	There are 4 different types of aux heater detection for this application:			
			Radiator Outlet: CeEECR_e_NoPhysAssgnmnt Comparison sensor 1:		2x2 signature Absolute Drop	Disabled Disabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeEECR_e_BiasChkBlockClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngInClntSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterNoEffect 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 source has not been detected to cause this skew	50.00 °C 15.00 °C >A °C >A °C >B °C >B °C	IAT Drop Temperature Derivative **2x2 Signature Criteria:** The warm sensors Sensor 1: Sensor 2: 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 Insuffcent coolant flow is present for	Disabled Enabled CeAEHR_e_BlkHtrCylHdClntSnsr CeAEHR_e_BlkHtrEngOutClntSnsr CeAEHR_e_BlkHtrOutsideAirSnsr CeAEHR_e_BlkHtrIntakeAirSnsr 5.0 °C 5.0 °C >10.0 °C CeAEHR_e_BlkHtrEngOutClntSnsr >0.00 L/min 0.0 - 60.0 seconds < 120.0 seconds >300.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					A block heater is detected if a drop is	>5.0 °C		
					IAT Drop Criteria:			
					The sensor will be used as IAT for this method	CeAEHR_e_BlkHtrIntakeAirSnsr		
					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_BlkHtrEngOutClntSnsr		
					Derivative will be monitored once coolant flow is	>-1.00 L/min		
					AND			
					Flow time is between	1.0 - 18.0 seconds		
					AND either			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Engine runtime is OR Insufficent coolant flow is present for Derivative count will increment if derivative is If counts are a block heater is detected	< 78.0 seconds > 300.0 seconds <-0.10°C/sec > 2 counts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENTSIDI High Pressure Rail Temperature Sensor Performance	P111F	This DTC Diagnoses Fuel Temperature sensors rationality by comparing Primary sensor (T1) vs. Secondary sensor (T2)	Fuel Temperature Error (Absolute delta between sensori and sensor2)	> 20.00 degC	Fuel Temperature Rationality Diagnostic Enabled	True	100.00 failures out of 125.00 samples 100 ms per Sample Continuous	Type B, 2 Trips
						Enabled when a code clear is not active or not exiting device control		
						Temperature sensors 1 out of range Low or High Fault Active (P0182, P0182)		
					No Fault Active on	Temperature sensors 2 out of range Low or High (P0187, P0188)		
						SENT Communication Fault Active (U0625, U101B, U0670, U0671)		
						SENT Intenal Error Fault Active (P126E, P126F)		
						Fuel Temperature Sensor SENT Message Error Fault Active (P128C, P128D)		
					No Fault Pending on	SENT Communication Fault Pending (U0625, U101B, U0670, U0671)		
						Fuel Temperature Sensor SENT Message Error Fault Pending (P128C, P128D)		

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 1 Circuit	P1176	This DTC monitors for an error in the Fuel Pump Driver Control Module 5V Reference 1 Circuit.	Raw Fuel Pump Driver Control Module 5V Reference 1 is or Raw Fuel Pump Driver Control Module 5V Reference 1 is or Absolute difference of the filtered Fuel Pump Driver Control Module 5V Reference 1 and Raw Fuel Pump Driver Control Module 5V Reference 1 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 PT Sensor Bus Relay The following DTCs that diagnose the message that contains the FPDCMZ FTZM reference circuit data are not active: P165C U0076 U18A2	Enabled >=11.00 Volts Commanded on (if present)	Samples every 12.50 milliseconds.	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 PT Sensor Bus Relay The following DTCs that diagnose the message that contains the FPDCMZ FTZM reference circuit data are not active: P165C U0076 U18A2	Enabled >=11.00 Volts Commanded on (if present)	Samples every 12.50 milliseconds.	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 Level Sensor 1 Internal Supply Circuit	P1178	This DTC monitors for an error in the Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit	Raw Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit is or Raw Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit is or Absolute difference of the filtered Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit and Raw Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit 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 PT Sensor Bus Relay The following DTCs that diagnose the message that contains the FPDCM/ FTZM reference circuit data are not active: P1200 U0076 U18A2	Enabled >=11.00 Volts Commanded on (if present)	Samples every 250.00 milliseconds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 low side circuit shorted to high side circuit	P1248	Controller specific output driver circuit diagnoses injector 1 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 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 low side circuit shorted to high side circuit	P1249	Controller specific output driver circuit diagnoses injector 2 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 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 3 low side circuit shorted to high side circuit	P124A	Controller specific output driver circuit diagnoses injector 3 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 low side circuit shorted to high side circuit	P124B	Controller specific output driver circuit diagnoses injector 4 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 5 low side circuit shorted to high side circuit	P124C	Controller specific output driver circuit diagnoses injector 5 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 low side circuit shorted to high side circuit	P124D	Controller specific output driver circuit diagnoses injector 6 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 low side circuit shorted to high side circuit	P124E	Controller specific output driver circuit diagnoses injector 7 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 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 8 low side circuit shorted to high side circuit	P124F	Controller specific output driver circuit diagnoses injector 8 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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.
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 is .. b) Sensor Bus Relay On c) CAN Sensor Bus message $3EC_Available d) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZMJ nfo7_ARCChkErr]	a) Enabled 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.
SENT Fuel Rail Temperature Sensor 1 Internal Fault - Error Code	P126E	This DTC Diagnoses the SENT Fuel Temperature Sensor 1 internal failure	Fuel Temperature Sensor 1 SENT digital read value	>= 4,089.00			50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips
					No Fault Active on	Enabled when a code clear is not active or not exiting device control SENT Communication Fault Active (U0625, U101B, U0670, U0671) Fuel Temperature Sensor SENT Message Error Fault Active (P128C)		
					No Fault Pending on	Fuel Temperature Sensor SENT Message Error Fault Pending (P128C)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Temperature Sensor 2 Internal Fault - Error Code	P126F	This DTC Diagnoses the SENT Fuel Temperature Sensor 2 internal failure	Fuel Temperature Sensor 2 SENT digital read value	>= 4,089.00			50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips
						Enabled when a code clear is not active or not exiting device control		
					No Fault Active on	SENT Communication Fault Active (U0625, U101B, U0670, U0671) Fuel Temperature Sensor SENT Message Error Fault Active (P128D)		
					No Fault Pending on	Fuel Temperature Sensor SENT Message Error Fault Pending (P128D)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail High Pressure Sensor 2 Out of Range	P127C	This DTC diagnose SENT high pressure sensor 2 that is too low out of range. If the sensor digital value (represnting the refernce voltage) is below the lower digital threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the low sample counter reaches its threshold.	High Pressure Rail Sensor 2 SENT digital read value	=< 94			Time Based: 400 Failuer out of 500 Samples 6.25 ms per 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.
SENT Fuel Rail Pressure Sensor 1 Internal Performance	P128A	This DTC determines if there is internal error within the SENT pressure sensor 1 (i.e. Broken wire bond internal to the SENT Sensor). Once the internal error is detected a fixed faulted digital values is communicated to the ECU.	Digital pressure sesnor 1 value	>= 4,089		Enabled when a code clear is not active or not exiting device control	400 failures out of 500 samples	Type A, 1 Trips
					SENT Fuel Rail Pressure Sensor Internal Performance Enable	True	6.25 ms per Sample Continuous	
					No Fault Pending	U0625 P16E5 P128F		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Pressure Sensor 2 Internal Performance	P128B	This DTC determines if there is internal error within the SENT pressure sensor 2 (i.e. Broken wire bond internal to the SENT Sensor). Once the internal error is detected a fixed faulted digital values is communicated to the ECU.	Digital pressure sesnor 2 value	>= 4,089		Enabled when a code clear is not active or not exiting device control	400 failures out of 500 samples	Type A, 1 Trips
					SENT Fuel Rail Pressure Sensor Internal Performance Enable	True	6.25 ms per Sample Continuous	
					No Fault Pending	U0625 P16E5 P128F		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Pressure &Temperature Sensor Temperature 1 Message Incorrect	P128C	This DTC diagnoses the the communication errors on the temperature 1 serial data channel	Serial Message 1 Age	>= 0.03 ms	SENT signal Serial waveform diagnostics enable SENT power up delay No Fault Active	True >=0.00 seconds U0625 P16E5	134 failures out of 167 samples 6.25 ms per 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.
SENT Fuel Rail Pressure & Temperature Sensor Temperature 2 Message Incorrect	P128D	This DTC diagnoses the the communication errors on the temperature 2 serial data channel	Serial Message 2 Age	>= 0.03 ms	SENT signal Serial waveform diagnostics enable SENT power up delay No Fault Active	True >=0.00 seconds U0625 P16E5	134 failures out of 167 samples 6.25 ms per 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.
SENT Fuel Rail Pressure & Temperature Sensor Pressure Message Incorrect	P128F	This DTC determines if there is any SENT signal waveform for discrepancies (i.e. too many pulse, too few pulse, clock shift). The SENT HWIO Determines message waveform fault (i.e.too many pulse, too few pulse, clock shift) and if the message age is too long.	SENT HWIO Determines message fault (i.e.too many pulse, too few pulse, clock shift) Message Age	= true > 1.69 ms	SENT signal Serial waveform diagnostics enable SENT power up delay No Fault Active on	True >= 0.00 seconds Enabled when a code clear is not active or not exiting device control U0625 P16E5	400 failures out of 500 samples 6.25 ms per 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.
Fuel Pump Driver Control Module System Voltage Low (Only on applications that use an FTZM)	P129B	Detects low voltage of the fuel pump driver control module. This diagnostic reports the DTC when the fuel pump driver control module voltage drops below a calibrated value.	Fuel Pump Driver Control Module System Voltage Low	Fuel Tank Zone Module (FTZM) Battery Voltage <= 9.00	Fuel Tank Zone Module (FTZM) is present on vehicle Fuel Pump Driver Control Module System Voltage Low diagnostic is enabled Fuel Tank Zone Module (FTZM) serial messages are available Starter motor not engaged Sensor Bus relay is commanded ON Sensor Bus Relay FA = False	 = 1 SensorBusRelayFA	50 failures out of 63 samples 12.5 ms / sample	Type C, NoSVS

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 High (Only on applications that use an FTZM)	P129C	Detects high voltage of the fuel pump driver control module. This diagnostic reports the DTC when the fuel pump driver control module voltage exceeds a calibrated value.	Fuel Pump Driver Control Module System Voltage High	Fuel Tank Zone Module (FTZM) Battery Voltage >= 18.00	Fuel Tank Zone Module (FTZM) is present on vehicle Fuel Pump Driver Control Module System Voltage Low diagnostic is enabled Fuel Tank Zone Module (FTZM) serial messages are available Sensor Bus relay is commanded ON Sensor Bus Relay FA = False	 = 1 SensorBusRelayFA	50 failures out of 63 samples 12.5 ms / sample	Type C, No SVS

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 is .. 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_ARCChkErr] 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_ARCChkErr] 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) Enabled 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) > 1.00 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 is .. b) Sensor Bus message $0CC Fuel Pump Command Message Signal Counter Incorrect [CFMR_b_FTZMJ nfo2_A RCChkErr] c) CAN Sensor Bus message $OCC_Available d) Sensor Bus Relay On e) Timer [FABR t RunCrankActive]	a) Enabled 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.
Ignition Coil Positive Voltage Circuit Group 1 * * SIDI ONLY * *	P135A	This diagnostic checks for minimum voltage at the fuse which supplies power to the Ignition Coils (applicable only for SIDI applications). A diagnostic failure indicates a blown fuse.	Ignition Module Supply Voltage.	<2.5 Volts	Diagnostic Enabled?	Yes	50 Failures out of 63 Samples 6.25 msec rate	Type A, 1 Trips
					Three possible Ignition Coil Power Sources (only 1 used):			
					Ignition Coil Power Source =	PT Relay (Case 3)		
					<u>Case 1: Battery</u> Delay starting at Key-On	5 Engine Revs		
					<u>Case 2: Ignition Run/ Crank</u> Ignition Run/Crank Voltage	> 5.0 volts		
					<u>Case 3: PT Relay</u> PT Relay Voltage	>11.0 volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Coil Positive Voltage Circuit Group 2 * * SIDI ONLY * *	P135B	This diagnostic checks for minimum voltage at the fuse which supplies power to the Ignition Coils (applicable only for SIDI applications). A diagnostic failure indicates a blown fuse.	Ignition Module Supply Voltage.	<2.5 Volts	Diagnostic Enabled?	Yes	50 Failures out of 63 Samples 6.25 msec rate	Type: Type A, 1 Trips
					Three possible Ignition Coil Power Sources (only 1 used):			
					Ignition Coil Power Source =	PT Relay (Case 3)		
					<u>Case 1: Battery</u> Delay starting at Key-On	5 Engine Revs		
					<u>Case 2: Ignition Run/ Crank</u> Ignition Run/Crank Voltage	>5.0 volts		
					<u>Case 3: PT Relay</u> PT Relay Voltage	>11.0 volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Emissions Reduction System Fault	P1400	Model based test computes power from exhaust flow and thermal energy resulting from elevated idle speed and retarded spark advance. Detects if the cold start emission reduction system has failed resulting in the delivered power being out of range.	Average desired accumulated exhaust power - Average actual accumulated exhaust power (too much energy delivered to catalyst) Average desired accumulated exhaust power - Average actual accumulated exhaust power (too little energy delivered to catalyst) (EWMA filtered) Average Power = output of **P1400_EngineSpeedResidual_Table** * output of **P1400_SparkResidual_Table** NOTE: Desired accumulated power would use the desired catalyst light off spark and desired engine speed and the actual accumuated power would use the final commanded spark and actual engine speed. Refer to the Supporting Tables for details	< -32.00 KJ/s (high RPM failure mode) > 4.20 KJ/s (low RPM failure mode)	To enable the diagnostic, the Cold Start Emission Reduction Strategy must be Active per the following: Catalyst Temperature AND Engine Coolant AND Engine Coolant AND Barometric Pressure The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following: Catalyst Temperature AND Engine Run Time OR Engine Run Time OR Barometric Pressure	< 550.00 degC > 6.00 degC <= 66.00 degC >= 70.00 KPa >= 800.00 degC >= 1.00 seconds > **P1400_CatalystLightOffExtendedEngineRunTimeExit** This Extended Engine run time exit is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details. < 70.00 KPa	Runs once per trip when the cold start emission reduction strategy is active Frequency: 100ms Loop Test completes after 10 seconds of accumulated qualified data.	EWMA Based - Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Other Enable Criteria:			
					OBD Manufacturer Enable Counter	0		
					Vehicle Speed	<1.86MPH		
					Allow diagnostic to calculate residual in an off-idle state. If the value of the OffIdleEnable is equal to 1 then the "DriverOffAccelPedal" will not be checked. However, if the value of OffIdleEnable is 0 then driver must be off the accel pedal	0 (A value of 1 allows diagnostic to run and calculate the residual while off idle. A value of 0 requires calculation of the residual at idle)		
					A change in throttle position (tip-in/tip-out) will initiate a delay in the calculation of the average qualified residual value. Therefore when the:			
					Pedal Close Delay Timer	> 2.00 seconds		
					the diagnostic will continue the calculation.			
					A change in gear will initiate a delay in the calculation of the average qualified residual value to			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					allow time for the actual engine speed and actual final commanded spark to achieve their desired values. Therefore, when the:			
					Gear Shift Delay Timer	> 1.50 seconds		
					the diagnostic will continue the calculation			
					For Manual Transmission vehicles:			
					Clutch Pedal Position	> 12.00%		
					Clutch Pedal Position	<75.00%		
					The diagnostic will delay calculation of the residual value and potentially weight the residual calculation differently based on engine run time. This is to ensure the diagnostic is operating in idle speed control as well as during the peak catalyst light off period.			
					The time weighting factor must be :	> 0 These are scalar values that are a function of engine run time. Refer to		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P1400_ColdStartDiagnosticDelayBasedOnEngineRunTime and the cal axis, **P1400_ColdStartDiagnosticDelayBasedOnEngineRunTimeCalAxis** in the "Supporting Tables" for details.		
					General Enable:			
					DTC's Not Set:			
						AcceleratorPedalFailure ECT_Sensor_FA IAT_SensorCircuitFA MnfdTempSensorCktFP CrankSensor_FA FuelInjectorCircuit_FA MAF_SensorFA MAP_SensorFA EngineMisfireDetected_FA ClutchPstnSnsr FA IAC_SystemRPM_FA IgnitionOutputDriver_FA TPS_FA VehicleSpeedSensor_FA 5VoltReferenceMAP_OOR_Flt TransmissionEngagedState_FA EngineTorqueEstInaccurate		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor A 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 RefV 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 RefV PW - Commanded RefV 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 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) > 8.00 volts d) == TRUE e) > 300.00 miilisec f) == TRUE g) == TRUE h) == TRUE	15.00 Fail counts out of 16.00 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 2 Message Counter Incorrect	P14D4	The FTZM monitors its specific command data serial message frames [message FTZM Command2 $1F6] 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 Command2 $1F6 Alive Rolling Counter transmitted from ECM OR FTZM bus CAN Message Command2 $1F6 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) > 8.00 volts d) == TRUE e) > 300.00 miilisec f) == TRUE g) == TRUE h) == TRUE	8.00 Fail counts out of 10.00 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 3 Message Counter Incorrect	P14D5	The FTZM monitors its specific command data serial message frames [message FTZM Commands $1FA] 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 $1FA Alive Rolling Counter transmitted from ECM OR FTZM bus CAN Message Commands $1FA 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) > 8.00 volts d) == TRUE e) > 300.00 miilisec f) == TRUE g) == TRUE h) == TRUE	8.00 Fail counts out of 10.00 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) > 8.00 volts d) == TRUE e) > 300.00 miilisec f) == TRUE g) ==TRUE h) == TRUE	8.00 Fail counts out of 10.00 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.
Throttle Position Steady State Actuation Fault	P1516	Detect an inablity to maintain a steady state throttle position.	The absolute difference between desired and indicated throttle position is >	2.00 percent	Run/Crank voltage	> 6.41 Volts	0.49 ms	Type B, 2 Trips
					TPS minimum learn is not active AND Throttle is being Controlled			
					Throttle is considered in a steady state condition when the desired throttle position over a 12.5 ms period is	< 0.25 percent		
					For a settling time period	> 4.00 seconds		
					Ignition voltage failure is false	P1682		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Switch State Undertermined	P155A	Detects when cruise switch state cannot be determined, such as low voltage conditions "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch “Data Invalid” (latched on/off switch architectures) or “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	fail continuously for greater than 3.0 seconds	Diagnostic is enabled.		fail continuously for greater than 3.0 seconds	Type C, NoSVS, "Emissions Neutral Diagnostics - special type C"

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	P155B	Detects a failure of the cruise set 2 switch in a continously applied state "Emissions Neutral Default Action : When the BCM tells the ECM that the secondary cruise control switch circuit 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." Only applicable for applications with the secondary cruise switch circuit.	Cruise Control Set 2 switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 89.000 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	Type C, NoSVS , "Emissions Neutral Diagnostics - special type C"

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	P155C	Detects a failure of the cruise resume 2 switch in a continously applied state "Emissions Neutral Default Action : When the BCM tells the ECM that the secondary cruise control switch circuit 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." Only applicable for applications with the secondary cruise switch circuit.	Cruise Control Resume 2 switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 89.000 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	MIL: Type C, NoSVS, "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Lane Center Switch Circuit	P1589	Detects failure for cruise lane centering control circuit "Emissions Neutral Default Action : When the BCM tells the ECM that the secondary cruise control switch circuit voltage is stuck in the LCC (Lane Centering Control) state for too long, ECM sets the code and adaptive cruise control will be disabled and disengaged for the remainder of the key cycle. Only applicable for applications with the secondary cruise switch circuit.	Lane Center Control switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 20.00 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 20.00 seconds	Type C, NoSVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Secondary Transmission Range Selector Position Message Sequence Number Incorrect	P15FE	Coherency number is a four-bit rolling counter appended to the CAN data frames as time stamps. Every time a newer and more updated version of a CAN frame is sent, the rolling counter is incremented by one. After 15 it restarts from 0. For safety and redundancy, each of the X and Y position sensor data is sent over two CAN buses in two CAN buses at the same time. Since CAN transmission is not perfectly synchronized, at the receiver side the parallel streams of arriving CAN frames are compared. When two CAN frames are compared, if the coherency numbers are different by more than 2 counts, then this DTC is set. If not, then the two CAN data streams are aligned with each other to be in time synch at the receiver side.	The coherency numbers on the two CAN frames arriving in two CAN buses differ by more than OR: the four-bit coherency sequence of one of the CAN frames is:	2 counts Unable to be aligned due to repeat values	Diagnostic enabling calibration: Reception of data through secondary bus is: Run/Crank Active Signal	1.00 Enabled Run or Crank	An X out of Y scheme is used: Fail counter threshold = 20.00 Sample counter threshold = 25.00	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 SIDI High Pressure Pump current monitor	P163A	This DTC Diagnoses the current from the control area and compares it with calibrated thresholds to set current high and low flags	SIDI fuel pump High Current Test Current SIDI fuel pump Low Current Test Current	 >= 11.00 Amps <= 0.10 Amps	Battery Voltage Low Side Fuel Pressure Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false andEngine movement detected is true and Manufacturers enable counter is 0) Flex Fuel Sensor Not FA	>= 11 Volts > 0.275 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking	Current High/ Low 10 seconds failures out of 12.50 seconds 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 out of correlation error(P1682) not active and Barometric Pressure Inlet Air Temp Fuel Temp	 >= 70.0 KPA >= -20.0 degC -12 <= Temp degC <= 132		

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 > Table, f(IAT). See supporting tables: **P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)** OR PT Relay Ignition voltage > 5.50 Volts) AND Run/Crank voltage > 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 commanded on AND (Run/Crank voltage > Table, f(IAT). See supporting tables: **P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)** OR PT Relay Ignition voltage > 5.50 Volts) AND Run/Crank voltage > 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, NoSVS

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 commanded on AND (Run/Crank voltage > Table, f(IAT). See supporting tables: **P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)** OR PT Relay Ignition voltage > 5.50 Volts) AND Run/Crank voltage > 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, NoSVS

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. 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 Q 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 B, 2 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	Sensor Bus relay circuit short to ground diagnostic = 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 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 Ω impedance between output and controller power	Sensor Bus relay circuit short to power diagnostic = 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.
Internal Control Module Redundant Memory Performance (Gasoline applications ONLY)	P16F3	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.	Equivance Ratio torque compensation exceeds threshold	-109.42 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	Type A, 1 Trips
			Absolute difference between Equivance Ratio torque compensation and its dual store out of bounds given by threshold	109.42 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of Accessory torque and its redundant calculation is out of bounds given by threshold range	109.42 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.
			Absolute difference of Filtered Air-per-cylinder and its redundant calculation is out of bounds given by threshold range	45.06 mg	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference between the previous Final Advance and the current Final Advance not Adjusted for Equivalence Ratio is out of bounds given by threshold range	15.00 degrees		Engine speed >0rpm	Up/down timer 429 ms continuous, 0.5 down time multipier	
			Torque Learn offset is out of bounds given by threshold range	High Threshold 0.00 Nm Low Threshold 0.00	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.
				Nm				
			One step ahead calculation of air-per-cylinder and two step ahead is greater than threshold	80.00 mg		Engine speed > 545 rpm	Up/down timer 460 ms continuous, 0.5 down time multipier	
			Difference between Unmanaged Spark and PACS Spark is greater than threshold	15.00 degrees	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 1,729.71 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Creep Coast Axle Torque is out of bounds given by threshold range	High Threshold 1,729.71 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	
			Absolute difference of Friction torque and its redundant calculation is out of bounds given by threshold range	109.42 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.
			Arbitrated Air-Per-Cylinder filter coefficient is out of bounds given by threshold range	High Threshold 1.000 Low Threshold 0.074	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Launch spark is active but the launch spark redundant path indicates it should not be active	N/A		Engine speed < 7,900.00 or 8,000.00 rpm (hysteresis pair)	Up/down timer 160 ms continuous, 0.5 down time multipier	
			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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			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 475 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 475 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 0.10 T/C Range Lo Low Threshold: 1.10 T/C Range Hi 0.10 T/C Range Lo	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.
			Cylinders active greater than commanded	2 cylinders		Engine run flag = TRUE > 2.00 s Number of cylinder events since engine run > 24 No fuel injector faults active	Up/down timer 460 ms continuous, 0.5 down time multipier	
			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) +** 109.42	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.
				Nm				
			Engine Predicted Request Without Motor is greater than its redundant calculation plus threshold	108.42 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine Immediate Request Without Motor is greater than its redundant calculation plus threshold	108.42 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.
			Positive Torque Offset is greater than its redundant calculation plus threshold OR Positive Torque Offset is less than its redundant calculation minus threshold	109.42 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Commanded Predicted Engine Request is greater than its redundant calculation plus threshold	109.42 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, down time multipier 0.5	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			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 2,048 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	
			Regeneration Brake Assist is not within a specified range	Brake Regen Assist < 0 Nm or Brake Regen Assist > 0.00 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.
			Cylinder Spark Delta Correction exceeds the absolute difference as compared to Unadjusted Cylinder Spark Delta	15.00 degrees	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.
			1. Cylinder Torque Offset exceeds step size threshold OR 2. Sum of Cylinder Torque Offset exceeds sum threshold	1. 109.42 Nm 2. 109.42 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine Capacity Minimum Immediate Without Motor is greater than its dual store plus threshold	109.42 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine Capacity Minimum Engine Off is greater than threshold	0 Nm	Ignition State	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.
			Engine Capacity Minimum Engine Immediate Without Motor is greater than threshold	0 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded Immediate Engine Request is greater than its redundant calculation plus threshold	109.42 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 Speed Lores Intake Firing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than Orpm	Up/down timer 160 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing timing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than Orpm	Up/down timer 160 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque request exceeds calculated torque limit	Table, f(Oil Temp, RPM). See supporting tables: **P060C_Speed Control External Load f(Oil Temp, RPM) +** 109.42 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.
			Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit	Table, f(Oil Temp, RPM). See supporting tables: **P060C_Speed Control External Load f(Oil Temp, RPM) +** 109.42 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	1,729.71 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Driver Immediate Request is less than its redundant calculation minus threshold	1,729.71 Nm	Ignition State	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.
			Commanded Immediate Request is greater than its redundant calculation plus threshold OR Commanded Immediate Request is less than its redundant calculation minus threshold	1,729.71 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 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	
			Difference between Cruise Axle Torque Arbitrated Request and	45.75 Nm		Cruise has been engaged for more than 4.00	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.
			Cruise Axle Torque Request exceeds threshold			seconds	0.5 down time multipier	
			Desired engine torque request greater than redundant calculation plus threshold	108.42 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Engine min capacity above threshold	109.42 Nm	Ignition State	Accessory, run or crank	Up/down timer 69 ms continuous, 0.5 down time multipier	
			No fast unmanaged retarded spark above the applied spark plus the threshold	15.00 Degree		Engine speed greater than Orpm	Up/down timer 429 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	2.76 m/s	Ignition State	Accessory, run or crank	Up/down timer 97 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 160 ms continuous, 0.5 down time multipier	
			After throttle blade pressure and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Speed Control's Preditcted Torque Request and its dual store	N/A	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.
			do not match				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 233 ms continuous, 0.5 down time multipier	
			Desired throttle position greater than redundant calculation plus threshold	7.02 percent	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the rate limited pre-throttle pressure and its redundant calculation greater than threshold	0.06 kpa	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.
			Throttle desired torque above desired torque plus threshold	109.42 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Desired filtered throttle torque exceeds the threshold plus the higher of desired throttle torque or modeled throttle torque	109.42 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Torque feedback proportional term is out of allowable range or its dual store copy does not match	High Threshold 54.71 Nm Low Threshold -54.71 Nm	Ignition State	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.
			Torque feedback integral term magnitude or rate of change is out of allowable range or its dual store copy do not match	High Threshold 102.58 Nm Low Threshold -109.42 Nm Rate of change threshold 6.84 Nm/loop	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of Final Torque feedback proportional plus integral term and its redundant calculation is out of bounds given by threshold range	High Threshold 109.42 Nm Low Threshold - 109.42 Nm	Ignition State	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.
			Difference of torque desired throttle area and its redundant calculation is out of bounds given by threshold range	High Threshold 0.50 % Low Threshold - 0.50 %	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of torque model coefficients and its redundant calculation is out of bounds given by threshold range	High Threshold 0.0000388 Low Threshold - 0.0000388	Ignition State	Accessory, run or crank	Up/down timer 175 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 109.42 Nm	Ignition State	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.
				Low Threshold - 109.42 Nm				
			Accessory drive friction torque is out of bounds given by threshold range	High Threshold 109.42 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			AC friction torque is greater than commanded by AC control software or less than threshold limit	High Threshold 40.00 Nm Low Threshold 0.00 Nm	Ignition State	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.
			Difference of Oil temperature delta friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 109.42 Nm Low Threshold - 109.42 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Generator friction torque is out of bounds given by threshold range	High Threshold 109.42 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Absolute difference between the Supercharger friction torque and its redundant	109.42 Nm	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.
			calculation greater than threshold				down time multipier	
			Filtered Torque error magnitude or its increase rate of change is out of allowable range or its dual store copy do not match	High Threshold 109.42 Nm Low Threshold -109.42 Nm Rate of change threshold 6.84 Nm/loop		Engine speed >0rpm MAF, MAP and Baro DTCs are false	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Torque error compensation is out of bounds given by threshold range	High Threshold 109.42 Nm Low Threshold 0.00 Nm	Ignition State	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.
			Delta Torque Baro compensation is out of bounds given by threshold range	High Threshold 0.00 Nm Low Threshold -20.10 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.
			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 engine torque above allowable capacity threshold	1.108.42 Nm 2. N/A 3.108.42 Nm 4.108.42 Nm	3. &4.: Ignition State	1. &2.: Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 109.42 Nm 3. &4.: Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Engine Vacuum and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the calculated Intake Manifold Pressure during engine event versus during time	Table, f(Desired Engine Torque). See supporting tables:		Engine speed >0rpm	Up/down timer 160 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			event is greater than threshold	**P060C_Delta MAP Threshold f(Desired Engine Torque)**			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 threshold	1,729.71 Nm	Ignition State	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.
			Cold Delta Friction Torque and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Predicted torque for zero pedal determination is greater than calculated limit.	Table, f(Oil Temp, RPM). See supporting tables: **Speed Control External Load f(Oil Temp, RPM) +** 109.42 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			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	
			Steady State Estimated Engine Torque and its dual store are not equal	N/A		AFM not changing from Active to Inactive and preload torque not	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.
						changing and one loop after React command Engine speed >0rpm	0.5 down time multipier	
			Difference of Weighting factor for number of cylinders fueled and its redundant calculation is above threshold	0.26		Engine run flag = TRUE > 10.00 s	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference of minimum spark advance limit and its redundant calculation is out of bounds given by threshold range	15.00 degrees	Ignition State	Accessory, run or crank	Up/down timer 160 ms continuous, 0.5 down time multipier	
			Difference of commanded spark advance and adjusted delivered is out of bounds given by threshold range	15.00 degrees		Engine speed >0rpm	Up/down timer 429 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 between Estimated Engine Torque and its dual store are above a threshold	109.42 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Absolute difference between Estimated Engine Torque without reductions due to torque control and its dual store are above a threshold	109.42 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of desired spark advance for managed torque and its redundant calculation is out of bounds given by threshold range	15.00 degrees		Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 109.42 Nm	Up/down timer 460 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 Engine Capacity Minimum Running Immediate Brake Torque Excluding Cylinder Sensitivity and its redundant calculation is out of bounds given by threshold range	109 Nm		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	
			One step ahead calculation of air-per-cylinder greater than two step ahead calculation by threshold for time	Threshold: Dynamically calculated based on current engine conditions Fault Pending Threshold: 100 ms		Engine speed > 545 rpm	Up/down timer 460 ms continuous, 0.5 down time multipier	
			Rate limited cruise axle torque request and its dual store do not match within a threshold	45.75 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 ms continuous, 0.5 down time multipier	
			Commanded axle torque	1./29./1	Ignition State	Accessory, run or crank	Up/down timer	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			is greater than its redundant calculation by threshold	Nm			475 ms continuous, 0.5 down time multipier	
			Commanded axle torque is less than its redundant calculation by threshold	2,594.56 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Preload timer and its redundant calculation do not equal	N/A	Ignition State	Accessory, run or crank AFM apps only	Up/down timer 160 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			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	
			Absolute difference of the calculated spark offset for equivalence ratio and its redundant cacluation is greater than a threshold	15.00 degrees		Engine speed >0rpm	Up/down timer 160 ms continuous, 0.5 down time multipier	
			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	
			Absolute difference of the predicted motor torque ACS and its redundant cacluation is greater than a threshold	0.01 Nm			Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Absolute difference of maximum throttle area	15 mm2			Up/down timer 97	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			and its redundant cacluation is greater than a threshold				ms continuous, 0.5 down time multipier	
			Absolute difference of Desired TIAP and its redundant cacluation is greater than a threshold	5.00 kPa			Up/down timer 475 ms continuous, 0.5 down time multipier	
			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	
			Throttle 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	
			Desired Throttle Position and its 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	0.9 109.42 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,047.97 ms continuous, 0.5 down time multipier	
			Difference between	45.75 Nm	Ignition State	Accessory, run or crank	Up/down timer	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Cruise Arbitration Request and its redundant calcultion exceeds a threshold -OR- Difference between Cruise Accleration Request and its redundant calcultion exceeds a threshold	 0.05 KPH/Second			500.00 ms continuous, 0.5 down time multipier	
			Delivered fraction does not match commanded fraction within a specified time limit	0.0100	Engine State	Running	Up/down timer 200.00 ms continuous, 0.5 down time multipier	
			Difference between delivered cylinder deactivation does not match commanded cylinder deactivation is greater than a threshold	64.00	Engine State	Running	Up/down timer 200.00 ms continuous, 0.5 down time multipier	
			Difference between commanded Axle Torque and its redundant calcultion is greater than a threshold -OR- Difference between commanded Axle Torque and its redundant calcultion is less than a threshold	1,729.71 Nm 2,594.56 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,047.97 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.
Internal Control Module Transmission Range Control Performance	P16F4	Determines if the Electronic Transmission Range Select control module software incorrectly processes a range request which would result in an unsafe condition	Driver Requested Arbitrated Range Commanded OR: Transmission range control routine Transmission range control routine Transmission range control routine	is issued unexpectedly OR # expected range Does not issue Park or Neutral command quickly enough in response to driver request Issues a request to Drive, Low or Manual without a matching input by the customer within a calibrated time T1. Issues a request to Reverse without a matching input by the customer within a calibrated time limit T2.	TRCR Global Diagnostic Enable CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup	= True =False =False =True = True =True =Park =False	200, 200, 200, 2,050, 200 or 200 msec, depending on conditions. T1 = 200 msec T2 = 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.
Unexpected Range Change Detected	P1787	Detects an unexpected change in transmission range.	Actual Arbitrated Transmission Range The internal system only diagnoses range changes in and out of Park.	# Previous Value and # Commanded Range	Actual Tranmission Range Range Change Achievement Diag	= Valid Range = Not running	1,500 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Current Transmissio n Range Unknown	P1789	Detects the failure of the ETRS system to identify the current transmission range with sufficient confidence.	Actual Transmission Range	= Undefined	Range Indication Source AND CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup	= Valid =False =False =True = True =True =Park =False	80 failures out of 100 samples 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Enable Switch A Circuit Low	P17A3	Detects Selector Enable Switch A circuit reading low	Shift Enable Switch Measured Voltage Percent	< Low 446 counts 1023 counts = 5 Volts			16 Failures out of 20 Samples (5 msec loop)	Type C, NoSVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Enable Switch A Circuit High	P17A4	Detects Selector Enable Switch A circuit reading high	Selector Enable Switch Measured Voltage Percent	> High = 853 counts 853 counts = 83.3% of 5 Volts. 1023 Counts = 5 V			16 Failures out of 20 Samples (5 msec loop)	Type C, NoSVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Enable Switch A Circuit Performance	P17A5	Detects Selector Enable Switch A circuit reading outside "Released" or "Pressed" values	Selector Enable Switch Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	Not Fault Active	P17A4, P17A3	100 Failures out of 120 Samples =500 msec (5 msec loop)	Type C, NoSVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Enable Switch A/B Correlation	P17A6	Correlation diagnosic compares both switches	Measured Voltage Percent of Selector Enable Switch A and Switch B	Are both VALID, (Release or Pressed), but disagree. Pressed: 49% - 61% Released: 70% - 82%	Interlock comparison diagnostic enabling calibration = The controller has been awake for at least:	1.00 =0.05 seconds	12.5 ms rate 24,000.00 failures out of 24,000.00 samples	Type C, NoSVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Enable Switch B Circuit Low	P17A7	Detects Selector Enable Switch B circuit reading low	Selector Enable Switch Measured Voltage	< Low 446 counts 446 counts = 43.6% of 5 Volts. 1023 Counts = 5 V			16 Failures out of 20 Samples (5 msec loop)	Type C, NoSVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Enable Switch B Circuit High	P17A8	Detects Selector Enable Switch B circuit reading high	Selector Enable Switch Measured Voltage	> High 853 counts 853 counts = 83.3% of 5 Volts. 1023 Counts = 5 V			16 Failures out of 20 Samples (5 msec loop)	Type C, NoSVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Enable Switch B Circuit Performance	P17A9	Detects Selector Enable Switch B circuit reading outside "Released" or "Pressed" values	Selector Enable Switch Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	Not Fault Active	P17A8, P17A7	100 Failures out of 120 Samples =500 msec (5 msec loop)	Type C, NoSVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Control Module Memory Checksum Error	P17D8	[1] This DTC will be stored if any software or calibration check sum is incorrect. [2] Circuit Monitor mismatch occurs	[1] Calculated Checksum [2] Switch circuit calculated values:	# stored checksum for any of the parts (boot, software, application calibration, system calibration) # switch circuit monitor values	Ignition OR Accessory	Run or Run/Crank ON	[1] 1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background [2] Test runs during calculation of switch circuit values	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Control Module Read Only Memory (ROM) Error	P17D9	Reports a failure if the BIST (=Built in Self Test) for [1] the ROM checksum or [2] the ROM Error correcting code (ECO) check fails.	[1] Checksum at power-up [2] ROM ECC	# checksum at power-down = fault	Ignition OR Accessory:	Run or Run/Crank ON	[1] 1 failure Frequency: Once at power-up [2] 1 failure Frequency: Runs continuously in the background	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Control Module Internal Random Access Memory (RAM) Error	P17DA	Indicates that control module is unable to correctly write and read data to and from RAM.	Data read	# Data written	Ignition: OR Accessory	Run or Run/Crank ON	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures This test runs continuously in the background	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Control Module Processor	P17DB	Indicates the ECU has detected an internal processor fault. This DTC is dependent on the microprocessor and includes self testing not listed. [1] Microprocessor ALU Integrity Diagnostic Monitor Algorithm [2] Main Processor Configuration Register Test [3] Seed and Key fault (Set by ECM when seeds and keys do not match) [4] Stack overflow [5] Program Counter Exception Error [6] Watchdog Fails to reset	[1] Calculated key from rolling seed [2] Processor register [3] <This test has no threshold value.> [4] Unused stack memory above maximum stack used [5] Illegal instruction loaded into program counter [6] Set when a fault that should cause a reset fails to cause a reset.	[1] # expected key [2] # expected processor register value [3] No threshold value [4] # initialized special pattern [5] No threshold value [6] No threshold value	For all six cases: Ignition Accessory	For all six cases: Run or Run/Crank OR ON	[1] 1 failure Test runs continuously (20ms loop or less) [2] 1 failure Test runs continuously (20ms loop or less) [3] 1 failure Test runs continuously (25ms loop or less) [4] 1 failure Test run by OS on task switches [5] 1 failure [6] 1 failure	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Control Module Ignition On/ Start Switch Circuit Low	P17E0	Detects if the IgnitionI Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine Controller Run Crank Terminal Status - CAN Message	= 1 indicating RUN/ CRANK	4.5 sec in 5.5 second window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Control Module Ignition On/ Start Switch Circuit High	P17E1	Detects if the IgnitionI Switch circuit is shorted to vehicle supply voltage	Ignition 1 voltage	> 11.7V	Engine Controller Run Crank Terminal Status - CAN Message	= 0, indicating NOT RUN/CRANK	8 sec in 10 second window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Position Switch A/B Circuit Stuck On	P17F3	Checks if both Park switches are stuck closed	Both Park Switches are PRESSED	> 1.00 seconds	Not Fault Active Controller is "on"	P07B3, P07B4, P07B4, P07B9, P07BA, P07BB >~ 100 ms	4,800.00 failures out of 6,000.00 samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Enable Switch A/B Circuit Stuck On	P17F4	Checks if enable switch is stuck pressed.	Enable Switch A or B are PRESSED	> 1.00 seconds	Enabled via calibration Controller is	1.00 "On"	24,000.00 failures out of 30,000.00 samples	Type C, NoSVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Position Switch A/B Circuit Stuck Off	P189D	Compares Park Switch A and Park Switch B "PRESSED" and "RELEASED" states	[1] The number of Park button Press AND Switch-1-Closed count AND Switch-2-Closed count	>=8.00 <= 0.08* 8.00 >=0.80* 8.00	Not Fault Active Controller is on Park button switch signals: Vehicle Speed Comprehensive correlation diagnostics:	P07B3, P07B4, P07B5, P07B9, P07BA, P07BB >~100 ms =valid <= Park Request Spd, calibrated with a hysteresis loop: 8.00 and 7.50 . =True*	This is based on the number of button and switch activation, not time. *note: these samples can accumulate over key-cycles	Type B, 2 Trips
			1] The number of Park button Press AND Switch-1-Closed count AND Switch-2-Closed count	>=8.00 >= 0.80* 8.00 <=0.08* 8.00	Not Fault Active Controller is on Park button switch signals: Vehicle Speed	P07B3, P07B4, P07B5, P07B9, P07BA, P07BB >~100 ms =valid <= Park Request Spd, calibrated with a hysteresis loop: 8.00 and 7.50 . =True*	This is based on the number of button and switch activation, not time. *note: these samples can accumulate over key-cycles	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Actuator Solenoid Circuit Low-Bank 1	P2088	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for a short to ground 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.	< 0.5 Q impedance between signal and controller ground	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 > 11.00 Volts	20 failures out of 25 samples 250 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.
Intake Camshaft Actuator Solenoid Circuit High - Bank 1	P2089	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for a short to power 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 power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 0.5 Q impedance between signal and controller power	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 > 11.00 Volts	20 failures out of 25 samples 250 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.
Post Catalyst Fuel Trim System Too Lean Bank 1	P2096	Determines if the post catalyst 02 sensor based fuel control system is indicating a lean exhaust gas condition. If the lean condition is such that the control system utilizes all or most of its available high limit authority (high limit = 100% authority), then P2096 will set. The monitor can be calibrated to fail based on the Average Integral Offset % Authority, the Average Total Offset % Authority or both combined. The Average Total Offset metric consists of the average of the Integral Offset+ Proportional Offset. Note: When the post catalyst 02 voltage is too lean, the post catalyst 02 integral and proportional offset control is increased (positive % authority). This applies a rich bias to fuel control in an attempt to counteract the lean condition. A perfectly balanced control system (no rich or lean bias required) is represented by integral	The Average Integral Offset % Authority AND The Average Total Offset % Authority (Note: any value greater than or equal to +100% effectively nullifies the Average Total Offset % Authority criteria) High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 18 % for >= 5.0 seconds AND the % Authority metric is approaching the failure threshold. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 14 % for >= 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	>= 97.5 % >= 65.0 % If the P2096 is actively failing then the Average Integral Offset must be < 95.0 % and the Average Total Offset must be < 60.0 % for the diagnostic to report a pass.	The post cat fuel trim diagnostic is enabled The diagnostic is enabled during: Deceleration Idle Cruise Light Acceleration Heavy Acceleration Ambient Air Pressure Engine AirFlow Intake Manifold Pressure Induction Air Temperature Start-up Coolant Temp. PTO Intrusive diag. fuel control Ethanol Estimation in Progress 02 Heater Learned Resistance Long Term Secondary Fuel Trim Enabled for (see **"Long Term Secondary Fuel Trim Enable Criteria"** in Supporting Tables) High Vapor Conditions Green Cat System	No No Yes Yes Yes >= 70 kPa >= 0.0 g/s <= 10,000.0 >= 0 kPa <= 256 >= -20 deg. C <= 200 >= -20 deg. C (or OBD Coolant Enable Criteria = TRUE) Not Active Not Active Not Active = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") >= 0.1 seconds Not Present = Not Valid,	Frequency: Continuous Monitoring in 100ms loop. The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 35.0 seconds (350 samples) before comparing to their respective failure thresholds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		and proportional offset values of "0" (i.e. 0% authority) and a post catalyst 02 sensor that is within its optimal operating range (neither rich nor lean).			Condition	Green Cat System condition is considered valid until the accumulated air flow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is above 22grams/sec.		
					Delay during GPF Regeneration If the diagnostic delays during a GPF Regen, it will continue to delay following completion of the Regen until the following number of samples have been accumulated. (1 sample = 100ms): Deceleration Idle Cruise Light Acceleration Heavy Acceleration	No Delay 0.00 0.00 0.00 0.00 0.00		
					No Fault Active for:	AmbientAirDefault AIR System FA Ethanol Composition Sensor FA ECT_Sensor_FA EGRValveCircuit_FA EGRValvePerformance_FA IAT_SensorFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						CamSensorAnyLocationFA EvapEmissionSystem_FA EvapFlowDuringNonPurge_FA FuelTankPressureSnsrCkt_FA EvapPurgeSolenoidCircuit_FA EvapSmallLeak_FA EvapVentSolenoidCircuit_FA FuelInjectorCircuit_FA MAF_SensorFA MAF_SensorTFTKO MAP_SensorFA MAP_EngineVacuumStatus EngineMisfireDetected_FA A/F Imbalance BankI O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA		
					For the cells identified as enabled (i.e. those containing a "Yes" at the beginning of the Enable Conditions column), the minimum accumulated samples required before the fuel control metric is considered usable for that cell (1 sample = 100ms):			
					Deceleration Idle Cruise Light Acceleration Heavy Acceleration	300 300 0 200 300		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(Note: A value in any of the above operating "cells" that is an order of magnitude (or more) higher than other cells is an indication that the diagnostic is not capable of diagnosing in that cell).			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Post Catalyst Fuel Trim System Too Rich Bank 1	P2097	Determines if the post catalyst 02 sensor based fuel control system is indicating a rich exhaust gas condition. If the rich condition is such that the control system utilizes all or most of its available low limit authority (low limit = -100% authority), then P2097 will set. The monitor can be calibrated to fail based on the Average Integral Offset % Authority, the Average Total Offset % Authority or both combined. The Average Total Offset metric consists of the average of the Integral Offset+ Proportional Offset. Note: When the post catalyst 02 voltage is too rich, the post catalyst 02 integral and proportional offset control is decreased (negative % authority). This applies a lean bias to fuel control in an attempt to counteract the rich condition. A perfectly balanced control system (no rich or lean bias required) is represented by integral	The Average Integral Offset % Authority AND The Average Total Offset % Authority (Note: any value less than or equal to -100% effectively nullifies the Average Total Offset % Authority criteria) High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 18 % for >= 5.0 seconds. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 14 % for >= 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	<= -97.5 % <= -65.0 % If the P2097 is actively failing then the Average Integral Offset must be > -95.0 % and the Average Total Offset must be > -60.0% for the diagnostic to report a pass.	Same as P2096	Same as P2096	Frequency: Continuous Monitoring in 100ms loop. The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 35.0 seconds (350 samples) before comparing to their respective failure thresholds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		and proportional offset values of “0” (i.e. 0% authority) and a post catalyst 02 sensor that is within its optimal operating range (neither rich nor lean).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Post Catalyst Fuel Trim System Too Lean Bank 2	P2098	Determines if the post catalyst 02 sensor based fuel control system is indicating a lean exhaust gas condition. If the lean condition is such that the control system utilizes all or most of its available high limit authority (high limit = 100% authority), then P2098 will set. The monitor can be calibrated to fail based on the Average Integral Offset % Authority, the Average Total Offset % Authority or both combined. The Average Total Offset metric consists of the average of the Integral Offset+ Proportional Offset. Note: When the post catalyst 02 voltage is too lean, the post catalyst 02 integral and proportional offset control is increased (positive % authority). This applies a rich bias to fuel control in an attempt to counteract the lean condition. A perfectly balanced control system (no rich or lean bias required) is represented by integral	The Average Integral Offset % Authority AND The Average Total Offset % Authority (Note: any value greater than or equal to +100% effectively nullifies the Average Total Offset % Authority criteria) High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 18 % for >= 5.0 seconds AND the % Authority metric is approaching the failure threshold. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 14 % for >= 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	>= 97.5% >= 65.0% If the P2098 is actively failing then the Average Integral Offset must be < 95.0 % and the Average Total Offset must be < 60.0 % for the diagnostic to report a pass.	The post cat fuel trim diagnostic is enabled The diagnostic is enabled during: Deceleration Idle Cruise Light Acceleration Heavy Acceleration Ambient Air Pressure Engine AirFlow Intake Manifold Pressure Induction Air Temperature Start-up Coolant Temp. PTO Intrusive diag. fuel control Ethanol Estimation in Progress 02 Heater Learned Resistance Long Term Secondary Fuel Trim Enabled for (see "Long Term Secondary Fuel Trim Enable Criteria" in Supporting Tables) High Vapor Conditions Green Cat System	No No Yes Yes Yes >= 70 kPa >= 0.0 g/s <= 10,000.0 >= 0 kPa <= 256 >= -20 deg. C <= 200 >= -20 deg. C (or OBD Coolant Enable Criteria = TRUE) Not Active Not Active Not Active = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") >= 0.1 seconds Not Present = Not Valid,	Frequency: Continuous Monitoring in 100ms loop. The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 35.0 seconds (350 samples) before comparing to their respective failure thresholds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		and proportional offset values of “0” (i.e. 0% authority) and a post catalyst 02 sensor that is within its optimal operating range (neither rich nor lean).			Condition	Green Cat System condition is considered valid until the accumulated air flow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is above 22grams/sec.		
					Delay during GPF Regeneration If the diagnostic delays during a GPF Regen, it will continue to delay following completion of the Regen until the following number of samples have been accumulated. (1 sample = 100ms): Deceleration Idle Cruise Light Acceleration Heavy Acceleration	No Delay 0.00 0.00 0.00 0.00 0.00		
					No Fault Active for:	AmbientAirDefault AIR System FA Ethanol Composition Sensor FA ECT_Sensor_FA EGRValveCircuit_FA EGRValvePerformance_FA IAT_SensorFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						CamSensorAnyLocationFA EvapEmissionSystem_FA EvapFlowDuringNonPurge_FA FuelTankPressureSnsrCkt_FA EvapPurgeSolenoidCircuit_FA EvapSmallLeak_FA EvapVentSolenoidCircuit_FA FuelInjectorCircuit_FA MAF_SensorFA MAF_SensorTFTKO MAP_SensorFA MAP_EngineVacuumStatus EngineMisfireDetected_FA A/F Imbalance Bank2 O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA		
					For the cells identified as enabled (i.e. those containing a "Yes" above), the minimum accumulated samples required before the fuel control metric is considered usable for that cell (1 sample = 100ms): Deceleration Idle Cruise Light Acceleration Heavy Acceleration	300 300 0 200 300		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Note: A value in any of the above operating "cells" that is an order of magnitude (or more) higher than other cells is an indication that the diagnostic is not capable of diagnosing in that cell).			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Post Catalyst Fuel Trim System Too Rich Bank 2	P2099	Determines if the post catalyst 02 sensor based fuel control system is indicating a rich exhaust gas condition. If the rich condition is such that the control system utilizes all or most of its available low limit authority (low limit = -100% authority), then P2099 will set. The monitor can be calibrated to fail based on the Average Integral Offset % Authority, the Average Total Offset % Authority or both combined. The Average Total Offset metric consists of the average of the Integral Offset+ Proportional Offset. Note: When the post catalyst 02 voltage is too rich, the post catalyst 02 integral and proportional offset control is decreased (negative % authority). This applies a lean bias to fuel control in an attempt to counteract the rich condition. A perfectly balanced control system (no rich or lean bias required) is represented by integral	The Average Integral Offset % Authority AND The Average Total Offset % Authority (Note: any value less than or equal to -100% effectively nullifies the Average Total Offset % Authority criteria) High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 18 % for >= 5.0 seconds. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 14 % for >= 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	>= -97.5 % . >= -65.0 % If the P2099 is actively failing then the Average Integral Offset must be < -95.0 % and the Average Total Offset must be < -60.0 % for the diagnostic to report a pass.	Same as P2098	Same as P2098	Frequency: Continuous Monitoring in 100ms loop. The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 35.0 seconds (350 samples) before comparing to their respective failure thresholds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		and proportional offset values of “0” (i.e. 0% authority) and a post catalyst 02 sensor that is within its optimal operating range (neither rich nor lean).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Throttle Actuator Position Performance	P2101	1) Detect a throttle positioning error. This is determined if the difference between measured throttle position and modeled throttle position is greater than a threshold or less than a threshold. This diagnostic only runs when the engine is running and the voltage is high enough and there is not a voltage failure and the throttle position minimum learn is not active and the throttle is being controlled 2) Throttle control is driving the throttle in the incorrect direction. This is determined if the throttle position is greater than a threshold percent and the powertrain relay voltage is high enough and the throttle position minimum learn is active.	Difference between measured throttle position and modeled position, (modeled = MAX (Commanded vs. Commanded Filtered)) > OR Difference between modeled position (modeled = MIN (Commanded vs. Commanded Filtered)) and measured throttle position >	7.02 percent 7.02 percent	TPS minimum learn is not active AND Powertrain Relay Contactl Fault is FALSE (no P1682 fault) AND Throttle Control is not in Service or DVT control AND Throttle is being Controlled AND ((Engine Running AND Run/Crank Voltage) OR Run Crank Voltage) AND (PT Relay Command On OR ((Engine Running AND Powertrain Relay Voltage) OR Powertrain Relay Voltage))	> 5.50 Volts > 8.41 Volts > 5.50 Volts > 8.41 Volts	15 counts; 12.5 ms/count in the primary processor	Type A, 1 Trips
			Throttle Position >	36.00 percent	TPS minimum learn active AND Powertrain Relay Contactl Fault is FALSE (no P1682 fault) AND Throttle Control is not in Service or DVT control	= TRUE	11 counts; 12.5 ms/count in the primary processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Throttle Return to Default Performance	P2119	Throttle unable to return to default throttle position after de-energizing ETC motor.	(Normalized TPS1 percent Vref > AND Normalized TPS2 percent Vref > On the main processor) OR (Normalized TPS1 percent Vref < AND Normalized TPS2 percent Vref < On the main processor)	1.7560 % Vref 1.7590 % Vref 1.4340 % Vref 1.4310% Vref	Throttle de-energized due to one of the following conditions: Powerup Default Learn OR Default Throttle Authority OR PT Relay Voltage OR Main System Shutdown OR Battery Saver Active OR (Powertrain Relay On AND Run/Crank Active)	= TRUE = TRUE < 5.500 Volts = TRUE = TRUE = FALSE = FALSE	0.4969 s if ETC motor command is STOP (when Default Throttle Authority or Main System Shutdown is causing Throttle de-energize) 5.0000 s if ETC motor command is not STOP	Type B, 2 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	< 0.4625 % 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 >	4.7500 % 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 <	0.3250 % 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 >	2.6000 % 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.
Throttle Position (TP) Sensor 1-2 Correlation	P2135	Detect a continuous or intermittent correlation fault between TPS sensors #1 and #2 on Main processor. 1.) The diagnostic monitors the difference in position between TPS1 and the TPS2 and fails the diagnostic when the difference is too high. This diagnostic only runs when the battery voltage is high enough. 2.) The diagnostic monitors the difference in reference voltage between normalized min TPS1 and the normalized min TPS2 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 TPS sensors #1 and #2 on Main processor	Difference between TPS1 displaced and TPS2 displaced >	6.797 % offset at min. throttle position with a linear threshold to 9.720% at max. throttle position	Run/Crank voltage No TPS sensor faults No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts (P0122, P0123, P0222, P0223) P06A3	79/159 counts; or 58 counts continuous; 3.125 ms/count in the main processor	Type A, 1 Trips
			Difference between (normalized min TPS1) and (normalized min TPS2) >	5.000 % Vref	Run/Crank voltage No TPS sensor faults No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts (P0122, P0123, P0222, P0223) P06A3	79/159 counts; or 58 counts continuous; 3.125 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.
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.
Injector 1 high side circuit shorted to ground	P2147	Controller specific output driver circuit diagnoses Injector 1 high sided driver for a short to ground 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.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 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 high side circuit shorted to power	P2148	Controller specific output driver circuit diagnoses Injector 1 high sided driver for a short to power 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 power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	 <= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 high side circuit shorted to ground	P2150	Controller specific output driver circuit diagnoses Injector 2 high sided driver for a short to ground 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.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 high side circuit shorted to power	P2151	Controller specific output driver circuit diagnoses Injector 2 high sided driver for a short to power 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 power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	 <= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 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 3 high side circuit shorted to ground	P2153	Controller specific output driver circuit diagnoses Injector 3 high sided driver for a short to ground 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.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 3 high side circuit shorted to power	P2154	Controller specific output driver circuit diagnoses Injector 3 high sided driver for a short to power 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 power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 high side circuit shorted to ground	P2156	Controller specific output driver circuit diagnoses Injector 4 high sided driver for a short to ground 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.	 25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 high side circuit shorted to power	P2157	Controller specific output driver circuit diagnoses Injector 4 high sided driver for a short to power 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 power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 5 high side circuit shorted to ground	P216B	Controller specific output driver circuit diagnoses Injector 5 high sided driver for a short to ground 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.	 25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 5 high side circuit shorted to power	P216C	Controller specific output driver circuit diagnoses Injector 5 high sided driver for a short to power 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 power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 high side circuit shorted to ground	P216E	Controller specific output driver circuit diagnoses Injector 6 high sided driver for a short to ground 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.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 high side circuit shorted to power	P216F	Controller specific output driver circuit diagnoses Injector 6 high sided driver for a short to power 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 power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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.
Minimum Throttle Position Not Learned	P2176	Detect when the throttle position minimum learn on the main processor is not learned. This diagnostic detects this by monitoring if the throttle position is greater than a threshold and the number of learn attempts is greater than a threshold. This diagnostic only runs when the battery voltage is high enough and the throttle position minimum learn is active. Throttle position sensors were not in the minmum learn window after multiple attempts to learn the minimum.	During TPS min learn on the Main processor, TPS percent Vref > AND Number of learn attempts >	0.5740 % Vref 10 counts	Run/Crank voltage TPS minimum learn is active No previous TPS min learn values stored in long term memory	> 6.41 Volts = TRUE	2.0 secs	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 high side circuit shorted to ground	P217B	Controller specific output driver circuit diagnoses Injector 7 high sided driver for a short to ground 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.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 high side circuit shorted to power	P217C	Controller specific output driver circuit diagnoses Injector 7 high sided driver for a short to power 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 power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 8 high side circuit shorted to ground	P217E	Controller specific output driver circuit diagnoses Injector 8 high sided driver for a short to ground 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.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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 8 high side circuit shorted to power	P217F	Controller specific output driver circuit diagnoses Injector 7 high sided driver for a short to power 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 power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B not FAorTFTK	10.00 failures out of 20.00 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.
Bank 1 Air-Fuel Ratio Imbalance	P219A	This monitor determines if there is an Air Fuel Imbalance in the fueling system for a cylinder on Bank 1. Detection is based on a the pre catalyst oxygen sensor voltage. The pre catalyst 02 voltage is used to generate a variance metric that represents the statistical variation of the 02 sensor voltage over a given engine cycle. This metric is proportional to the air-fuel ratio imbalance (variance is higher with an imbalance than without). The observed Variance is dependent on engine speed and load and is normalized by comparing it to a known "good system" result for that speed and load, and generating a Ratio metric. The Ratio metric is calculated by selecting the appropriate threshold calibration from a 17x17 table (see Supporting Table	Standard Mode Filtered Ratio The EWMA calculation uses the weighting coefficient from the following supporting table: **P219A EWMA Coefficient** For this program, the Optional Mode is NOT used Optional Mode Filtered Ratio The EWMA calculation uses the weighting coefficient from the following supporting table while in Optional Mode:	>0.50 If the diagnostic has reported a failure on the prior trip, the EWMA Filtered Ratio must fall below 0.43 in order to report a pass. This feature prevents the diagnostic from toggling between failing and passing. > 0.50 If the diagnostic has reported a failure on the prior trip, the Optional Mode Filtered Ratio must fall below 0.25 in order to report a pass. This feature prevents the diagnostic from toggling between failing and passing.	The A/F imbalance diagnostic is enabled System Voltage Fuel Level Engine Coolant Temperature Cumulative engine run time Diagnostic enabled at Idle (regardless of other operating conditions) Engine speed range Engine speed delta during a short term sample period Mass Airflow (MAF) range Cumulative delta MAF during a short term sample period Filtered MAF delta between samples Note: first order lag filter coefficient applied to MAF	 No lower than 10.0 Volts for more than 0.2 seconds > 10.0 % The diagnostic will disregard the fuel level criteria if the fuel sender is faulty. > -20 deg. C (or OBD Coolant Enable Criteria = TRUE) > 0.0 seconds No 800 to 3,500 RPM <100 RPM 5 to 1,000 g/s <5 g/s <0.70 g/s	Minimum of 1 test per trip, up to 5 tests per trip during RSR or FIR. The front 02 sensor voltage is sampled once per cylinder event. Therefore, the time required to complete a single test (when all enable conditions are met) decreases as engine speed increases. For example, 9.00 seconds of data is required at 1000 rpm while double this time is required at 500 rpm and half this time is required at 2000 rpm. This data is collected only when enable conditions are met, and as such significantly more operating time is required than is indicated above. Generally, a report will be	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		P219A Variance Threshold Bankl Table)and subtracting it from the measured Variance. The result is then divided by a normalizer calibration from another 17x17 table (see Supporting Table **P219A Normalizer Bankl Table).** This quotient is then multiplied by a quality factor calibration from a 17x17 table (see Supporting Table **P219A Quality Factor Bankl Table)** . This result is referred to as the Ratio. Note that the quality factor ranges between 0 and 1 and represents robustness to false diagnosis in the current operating region. Regions with low quality factors are not used. Finally, a EWMA filter is applied to the Ratio metric to generate the Filtered Ratio malfunction criteria metric. Generally, a normal system will result in a negative Filtered Ratio while a failing system will result in a positive Filtered	**P219A EWMA Coefficient Opt Table**		= 0.050 Air Per Cylinder (APC) APC delta during short term sample period Filtered APC delta between samples Note: first order lag filter coefficient applied to APC = 0.050 Spark Advance Throttle Area (percent of max) Intake Cam Phaser Angle Exhaust Cam Phaser Angle -------------------------------- Electronic Waste Gate (eWG) present If eWG = yes then Waste Gate Position Intrusive eWG Feature If intrusive Waste Gate positin is enabled then the electronic Waste Gate will be commanded to the following range when the other enable conditions have been met. Intrusive Waste Gate Position Min	 180 to 650 mg/cylinder <30 mg/cylinder <10.00 percent 0 to 55 degrees 1 to 200 percent 0 to 30 degrees 0 to 25 degrees -------------------------------- No 0.0 to 100.0 Disabled 0.0	made within 5 minutes of operation. For RSRorFIR, 10 tests must complete before the diagnostic can report.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Ratio. The range of the Filtered Ratio metric is application specific since both the emissions sensitivity and relationship between imbalance and the Variance metric are application specific. Some applications may need to command a unique cam phaser value before performing the above calculations since cam phasing has been shown to have an impact on overall signal quality. This application Does Not Use his feature. For programs using Active Fuel Management or Multiple Cam profiles, a secondary Imbalance Ratio can be calculated while in the secondary operating modes. This secondary ratio is an optional calculation and is labeled as the "Optional Mode Ratio". The Optional Mode Ratio is calculated the same as explained above with the following supporting			Intrusive Waste Gate Position Max	101.0		
					Delay during GPF Regeneration	No Delay		
					Active Fuel Management Firing Fraction	0.99 to 1.10		
					if the Optional Mode is enabled (see Malfunction Criteria) Active Fuel Management Firing fraction for Optional Mode calculations	0.00 to 1.00		
					Intrusive Firing Fraction during Fast Initial Response or Rapid Step Response	Disabled		
					If the intrusive Firing Fraction feature is enabled the Active Fuel Management firing fraction will be forced to a value above this threshold when in Fast Initial Response or in Rapid Step Response.	>=0.99		
					For programs using multi-step cam profiles: High Lift Cam Profile will use:	Standard Mode Filtered Ratio		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		tables: **P219A Variance Threshold Bankl Opt Table** , **P219A Normalizer Bankl Opt Table ,** and **P219A Quality Factor Bankl Opt Table**			Low Lift Cam Profile will use: Quality Factor (QF) QF calibrations are located in a 17x17 lookup table versus engine speed and load (see Supporting Table **P219A Quality Factor Bankl Table).** QF values less than "1" indicate that we don't have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data. Fuel Control Status Closed Loop and Long Term FT Enabled for: Device Control AIR pump CASE learn EGR EVAP Engine Over Speed Protection Idle speed control PTO Injector base pulse width	Standard Mode Filtered Ratio >=0.99 >= 1.2 seconds (Please see **"Closed Loop Enable Clarification"** and **"Long Term FT Enable Criteria"** in Supporting Tables) Not active Not on Not active Not intrusive Not intrusive Not Active Normal Not Active Above min pulse limit		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					02 learned htr resistance	= Valid (the 02 heater resistance has learned since NVM reset)		
					Rapid Step Response (RSR): RSR will trigger if the Ratio result from the last test is AND it exceeds the last Filtered ratio by	>= 0.50 >= 1.50		
					Once triggered, the filtered ratio is reset to:	0.00		
					Fast Initial Response (FIR): FIR will trigger when an NVM reset or code clear occurs. Once triggered, the filtered ratio is reset to:	0.00		
					No Fault Active for:	MAP_SensorFA MAF_SensorFA ECT_Sensor_FA TPS_ThrottleAuthorityDefaulted FuelInjectorCircuit_FA AIR System FA EvapExcessPurgePsbl_FA CamSensorAnyLocationFA FuelTrimSystemB1_FA O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						WRAF_Bank_1_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Bank 2 Air-Fuel Ratio Imbalance	P219B	This monitor determines if there is an Air Fuel Imbalance in the fueling system for a cylinder on a Bank 2. Detection is based on a the pre catalyst oxygen sensor voltage. The pre catalyst 02 voltage is used to generate a variance metric that represents the statistical variation of the 02 sensor voltage over a given engine cycle. This metric is proportional to the air-fuel ratio imbalance (variance is higher with an imbalance than without). The observed Variance is dependant on engine speed and load and is normalized by comparing it to a known "good system" result for that speed and load, and generating a Ratio metric. The Ratio metric is calculated by selecting the appropriate threshold calibration from a 17x17 table (see Supporting Table	Standard Mode Filtered Ratio The EWMA calculation uses the weighting coefficient from the following supporting table: **P219B EWMA Coefficient** Optional Mode Filtered Ratio For this program the Optional Mode is NOT used The EWMA calculation uses the weighting coefficient from the following supporting table while in Optional Mode: **P219B EWMA Coefficient Opt Mode**	> 0.50 If the diagnostic has reported a failure on the prior trip, the Filtered Ratio must fall below 0.43 in order to report a pass. This feature prevents the diagnostic from toggling between failing and passing. > 0.50 If the diagnostic has reported a failure on the prior trip, the Filtered Ratio must fall below 0.25 in order to report a pass. This feature prevents the diagnostic from toggling between failing and passing	The A/F imbalance diagnostic is enabled System Voltage Fuel Level Engine Coolant Temperature Cumulative engine run time Diagnostic enabled at Idle (regardless of other operating conditions) Engine speed range Engine speed delta during a short term sample period Mass Airflow (MAF) range Cumulative delta MAF during a short term sample period Filtered MAF delta between samples Note: first order lag filter coefficient applied to MAF = 0.050	No lower than 10.0 Volts for more than 0.2 seconds > 10.0 % The diagnostic will disregard the fuel level criteria if the fuel sender is faulty. > -20 deg. C (or OBD Coolant Enable Criteria = TRUE) > 0.0 seconds No 800 to 3,500 RPM <100 RPM 5 to 1,000 g/s <5 g/s <0.70 g/s	Minimum of 1 test per trip, up to 5 tests per trip during RSR or FIR. The front 02 sensor voltage is sampled once per cylinder event. Therefore, the time required to complete a single test (when all enable conditions are met) decreases as engine speed increases. For example, 9.00 seconds of data is required at 1000 rpm while double this time is required at 500 rpm and half this time is required at 2000 rpm. This data is collected only when enable conditions are met, and as such significantly more operating time is required than is indicated above. Generally, a report will be made within 5	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		P219B Variance Threshold Bank2 Table)and subtracting it from the measured Variance. The result is then divided by a normalizer calibration from another 17x17 table (see Supporting Table **P219B Normalizer Bank2 Table)** This quotient is then multiplied by a quality factor calibration from a 17x17 table (see Supporting Table **P219B Quality Factor Bank2 Table)** . This result is referred to as the Ratio. Note that the quality factor ranges between 0 and 1 and represents robustness to false diagnosis in the current operating region. Regions with low quality factors are not used. Finally, a EWMA filter is applied to the Ratio metric to generate the Filtered Ratio malfunction criteria metric. Generally, a normal system will result in a negative Filtered Ratio while a failing system will result in a positive Filtered			Air Per Cylinder (APC) APC delta during short term sample period Filtered APC delta between samples Note: first order lag filter coefficient applied to APC = 0.050 Spark Advance Throttle Area (percent of max) Intake Cam Phaser Angle Exhaust Cam Phaser Angle -------------------------------- Electronic Waste Gate (eWG) present If eWG = yes then Waste Gate Position Intrusive eWG Feature If intrusive Waste Gate positin is enabled then the electronic Waste Gate will be commanded to the following range when the other enable conditions have been met. Intrusive Waste Gate	180 to 650 mg/cylinder <30 mg/cylinder < 10.00 percent 0 to 55 degrees 1 to 200 percent 0 to 30 degrees 0 to 25 degrees ---------------------------------- No 0.0 to 100.0 Disabled 0.0	minutes of operation. For RSR or FIR, 10 tests must complete before the diagnostic can report.See P219Ainfo	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Ratio. The range of the Filtered Ratio metric is application specific since both the emissions sensitivity and relationship between imbalance and the Variance metric are application specific. Some applications may need to command a unique cam phaser value before performing the above calculations since cam phasing has been shown to have an impact on overall signal quality. This application Does Not Use this feature. For programs using Active Fuel Management or Multiple Cam profiles a secondary Imbalance Ratio can be calculated while in the secondary operating modes. This secondary ratio is an optional calculation and is labeled as the "Optional Mode Ratio". The Optional Mode Ratio is calculated the same as explained above with the following supporting			Position Min Intrusive Waste Gate Position Max	 101.0		
					Delay during GPF Regeneration	No Delay		
					Active Fuel Management Firing Fraction if the Optional Mode is enabled (see Malfunction Criteria) Active Fuel Management Firing fraction for Optional Mode calculations Intrusive Firing Fraction during Fast Initial Response or Rapid Step Response If the intrusive Firing Fraction feature is enabled the Active Fuel Management firing fraction will be forced to a value above this threshold when in Fast Initial Response or in Rapid Step Response.	0.99 to 1.10 0.00 to 1.00 Disabled >=0.99		
					For programs using multi-step cam profiles: High Lift Cam Profile will use:	 Standard Mode Filtered Ratio		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		tables: **P219B Variance Threshold Bank2 Opt Table** , **P219B Normalizer Bank2 Opt Table ,** and **P219B Quality Factor Bank2 Table**			Low Lift Cam Profile will use: Quality Factor (QF) QF calibrations are located in a 17x17 lookup table versus engine speed and load (Supporting Table **P219B Quality Factor Bank2 Table).** QF values less than "1" indicate that we don't have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data. Fuel Control Status Closed Loop and Long Term FT Enabled for: Device Control AIR pump CASE learn EGR EVAP Engine Over Speed Protection Idle speed control PTO Injector base pulse width 02 learned htr resistance	Standard Mode Filtered Ratio >=0.99 >= 1.2 seconds (Please see "Closed Loop Enable Clarification" and "Long Term FT Enable Criteria" in Supporting Tables) Not active Not on Not active Not intrusive Not intrusive Not Active Normal Not Active Above min pulse limit = Valid (the 02 heater resistance has learned		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						since NVM reset)		
					Rapid Step Response (RSR): RSR will trigger if the Ratio result from the last test is	>= 0.50		
					AND it exceeds the last Filtered ratio by	>= 1.50		
					Once triggered, the filtered ratio is reset to:	0.00		
					Fast Initial Response (FIR): FIR will trigger when an NVM reset or code clear occurs. Once triggered, the filtered ratio is reset to:	0.00		
					No Fault Active for:	MAP_SensorFA MAF_SensorFA ECT_Sensor_FA TPS_ThrottleAuthorityDefaulted FuelInjectorCircuit_FA AIR System FA EvapExcessPurgePsbl_FA CamSensorAnyLocationFA FuelTrimSystemB2_FA O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA WRAF_Bank_2_FA		

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	< 50.0 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 (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 B, 2 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 40 consecutive BARO 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.
02 Sensor Pumping Current Circuit/Open Bank 1 Sensor 1 (For use with WRAF & Gen IV ECM	P2237	This DTC determines if the B1S1 WRAF 02 Sensor Pump Current signal circuit is Open. When enabled, the diagnostic monitors the failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC). The diagnostic failure counter is incremented based on the fault bit message received from the ASIC. The DTC is set based on fail and sample counters.	B1S1 WRAF ASIC indicates a Open circuit on the Pump Current circuit signal. Open fail counts are accumulated to determine fault status. Note: This ASIC is referred to as ATIC142 (Continental).	The ASIC provides a fault indication when the pumping current circuit pin is open, or pump cell voltage is > 1.2V and reference cell voltage is < 1.2V Note: the fault must exist for previous 2.5 seconds, it is split in two stages, a passive stage of 1.875 seconds and an active stage of 0.625 seconds.	Diagnostic is Enabled DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) **************************	 WRAF_Bank_1_FA P0135, P0030, P0031, P0032 = Valid = Ready = True = Complete > 15.0 seconds	20 failures out of 24 samples Continuous in 25 milli - second loop	Type B, 2 Trips
			B1S1 WRAF ASIC indicates a Open circuit on the Pump Current circuit signal. Open fail counts are accumulated to determine fault status. This application uses the following type of WRAF sensor: ForNGK ZFAS U2 For Bosch LSU 4p9	The ASIC provides a fault indication when the pumping current circuit fails the following criteria; Based on the type of WRAF sensor used; CeWRSG_e_NGK_ZFAS_U2 element resistance > 400 ohms pump cell reference resistance > Nernst	Diagnostic is Enabled DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) **************************	 WRAF_Bank_1_FA P0135, P0030, P0031, P0032 = Valid = Ready = True = Complete > 15.0 seconds	20 failures out of 24 samples Continuous in 25 milli - second loop	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch).	reference resistance Note: the faults must exist for more than 10 msec to qualify for a fail flag.				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Pumping Current Performance Bank 1 (For use with WRAF - non E80	P223C	This DTC determines if the WRAF 02 sensor pumping current has an incorrect or out of range value. This DTC will detect open circuit faults to the Pump current, Ref Cell voltage, Ref Ground circuits. When enabled, the diagnostic monitors the pumping current in three different fault regions during DFCO. The individual diagnostic failure counters are incremented based on the diagnostic results in each region. The DTC is set based on any of the three individual fail and sample counters.	Fault condition present when the pump current is in any of the fault regions when this test is enabled during DFCO.	The three pump current fault regions are: A) Pump current > 5.00 ma B) Pump current < 0.30 ma and > - 0.30 ma C) Pump current < -0.10 ma The three fault regions have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set.	Diagnostic is Enabled DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) ************************** Test starts when time in DFCO Test stops when time in DFCO	WRAF_Bank_1_FA P0135, P0030, P0031, P0032 = Valid = Ready = True = Complete > 15.0 seconds > 5.0 seconds > 10.0 seconds	Region A: 128 failures out of 160 samples OR Region B: 128 failures out of 160 samples OR Region C: 128 failures out of 160 samples Sample rate is 25 msec. Test enabled during DFCO.	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 Performance Bank 2 (For use with WRAF - E81	P223D	This DTC determines if the WRAF O2 sensor pumping current has an incorrect or out of range value. This DTC will detect open circuit faults to the Pump current, Ref Cell voltage, Ref Ground circuits. When enabled, the diagnostic monitors the pumping current in three different fault regions during DFCO. The individual diagnostic failure counters are incremented based on the diagnostic results in each region. The DTC is set based on any of the three individual fail and sample counters.	Fault condition present when the pump current is in any of the fault regions when this test is enabled during DFCO. Note: This ASIC is referred to as ATIC142 (Continental).	The three pump current fault regions are: A) Pump current > 5.00 ma B) Pump current < 0.30 ma and > - 0.30 ma C) Pump current < -0.10 ma The three fault regions have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set.	Diagnostic is Enabled DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) ************************** Test starts when time in DFCO Test stops when time in DFCO	WRAF_Bank_2_FA P0155, P0050, P0051, P0052 = Valid = Ready = True = Complete > 15.0 seconds > 5.0 seconds > 10.0 seconds	Region A: 128 failures out of 160 samples OR Region B: 128 failures out of 160 samples OR Region C: 128 failures out of 160 samples Sample rate is 25 msec. Test enabled during DFCO.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Reference Resistance Out Of Range Bank 1	P223E	This DTC determines if the WRAF 02 sensor reference cell has an incorrect or out of range resistance value. This test compares the element's resistance (from the WRAF sensor Application-Specific Integrated Circuit (ASIC)) to the expected values for the enabled condition. The element temperature is directly related to the element resistance based on the released sensor element specifications. The diagnostic failure counter is incremented if the element temperature is outside the expected range. This DTC is set based on the fail and sample counters.	Measured Reference cell temperature	<700 Deg C OR >1,000.0 Deg C	Diagnostic is Enabled DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then Delay after WRAF circuit diagnostic delay **************************	 WRAF_Bank_1_FA P0135, P0030, P0031, P0032 = Valid = Ready = True = Complete > 20.0 seconds	128 failures out of 160 samples Sample rate is 25 msec Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Reference Resistance Out Of Range Bank 2	P223F	This DTC determines if the WRAF 02 sensor reference cell has an incorrect or out of range resistance value. This test compares the element's resistance (from the WRAF sensor Application-Specific Integrated Circuit (ASIC)) to the expected values for the enabled condition. The element temperature is directly related to the element resistance based on the released sensor element specifications. The diagnostic failure counter is incremented if the element temperature is outside the expected range. This DTC is set based on the fail and sample counters.	Measured Reference cell temperature	<700 Deg C OR >1,000.0 Deg C	Diagnostic is Enabled DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then Delay after WRAF circuit diagnostic delay **************************	 WRAF_Bank_2_FA P0155, P0050, P0051 or P0052 = Valid = Ready = True = Complete > 20.0 seconds	128 failures out of 160 samples Sample rate is 25 msec Continuous	Type B, 2 Trips

Component/ System	**Fault Code**	**Monitor Strategy Description**	**Malfunction Criteria**	**Threshold Value**	**Secondary Parameters**	**Enable Conditions**	**Time Required**	**MIL Ilium.**
02 Sensor Pumping Current Circuit/Open Bank 2 Sensor 1 (For use with WRAF & Gen IV ECM	P2240	This DTC determines if the B2S1 WRAF 02 Sensor Pump Current signal circuit is Open. When enabled, the diagnostic monitors the failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC). The diagnostic failure counter is incremented based on the fault bit message received from the ASIC. The DTC is set based on fail and sample counters.	B2S1 WRAF ASIC indicates a Open circuit on the Pump Current circuit signal. Open fail counts are accumulated to determine fault status. <u>Note:</u> This ASIC is referred to as ATIC142 (Continental).	The ASIC provides a fault indication when the pumping current circuit pin is open, or pump cell voltage is > 1.2V and reference cell voltage is < 1.2V Note: the fault must exist for previous 2.5 seconds, it is split in two stages, a passive stage of 1.875 seconds and an active stage of 0.625 seconds.	Diagnostic is Enabled DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) **************************	WRAF_Bank_2_FA P0155, P0050, P0051, P0052 = Valid = Ready = True = Complete > 15.0 seconds	20 failures out of 24 samples Continuous in 25 milli - second loop	Type B, 2 Trips
			B2S1 WRAF ASIC indicates a Open circuit on the Pump Current circuit signal. Open fail counts are accumulated to determine fault status. This application uses the following type of WRAF sensor: For NGK_ZFAS_U2 For Bosch_LSU_4p9	The ASIC provides a fault indication when the pumping current circuit fails the following criteria; Based on the type of WRAF sensor used; CeWRSG_e_NGK_ZFASJJ2 element resistance > 400 ohms pump cell reference resistance > Nernst	DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) **************************	WRAF_Bank_2_FA P0155, P0050, P0051, P0052 = Valid = Ready = True = Complete > 15.0 seconds	20 failures out of 24 samples Continuous in 25 milli - second loop	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch).	reference resistance Note: the faults must exist for more than 10 msec to qualify for a fail flag.				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1 (For use with WRAF & Gen IV ECM	P2243	This DTC determines if the B1S1 WRAF 02 Reference Voltage signal circuit is Open. When enabled, the diagnostic monitors the failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC). The diagnostic failure counter is incremented based on the fault bit message received from the ASIC. The DTC is set based on fail and sample counters.	B1S1 WRAF ASIC indicates a Open circuit on the Reference Voltage circuit signal. Open fail counts are accumulated to determine fault status. Note: This ASIC is referred to as ATIC142 (Continental).	The ASIC provides a fault indication when the reference voltage circuit pin is open, or reference cell voltage is > 1,2V and pump cell voltage is < 1.2V Note: the fault must exist for previous 2.5 seconds, it is split in two stages, a passive stage of 1.875 seconds and an active stage of 0.625 seconds.	Diagnostic is Enabled DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) **************************	 WRAF_Bank_1_FA P0135, P0030, P0031, P0032 = Valid = Ready = True = Complete > 15.0 seconds	20 failures out of 24 samples Continuous in 25 milli - second loop	Type B, 2 Trips
			B1S1 WRAF ASIC indicates a Open circuit on the Reference Voltage circuit signal. Open fail counts are accumulated to determine fault status. Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch).	The ASIC provides a fault indication when the reference voltage circuit fails the following criteria; |Nernst signal - 0.45| >1.0 volts Note: the faults must exist for more than 10 msec to qualify for a fail flag.	DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) **************************	WRAF_Bank_1_FA P0135, P0030, P0031, P0032 = Valid = Ready = True = Complete > 15.0 seconds	20 failures out of 24 samples Continuous in 25 milli - second loop	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Reference Voltage Circuit/Open Bank 2 Sensor 1 (For use with WRAF & Gen IV ECM	P2247	This DTC determines if the B2S1 WRAF 02 Reference Voltage signal circuit is Open. When enabled, the diagnostic monitors the failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC). The diagnostic failure counter is incremented based on the fault bit message received from the ASIC. The DTC is set based on fail and sample counters.	B2S1 WRAF ASIC indicates a Open circuit on the Reference Voltage circuit signal. Open fail counts are accumulated to determine fault status. Note: This ASIC is referred to as ATIC142 (Continental).	The ASIC provides a fault indication when the reference voltage circuit pin is open, or reference cell voltage is > 1,2V and pump cell voltage is < 1.2V Note: the fault must exist for previous 2.5 seconds, it is split in two stages, a passive stage of 1.875 seconds and an active stage of 0.625 seconds.	Diagnostic is Enabled DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) **************************	 WRAF_Bank_2_FA P0155, P0050, P0051, P0052 = Valid = Ready = True = Complete > 15.0 seconds	20 failures out of 24 samples Continuous in 25 milli - second loop	Type B, 2 Trips
			B2S1 WRAF ASIC indicates a Open circuit on the Reference Voltage circuit signal. Open fail counts are accumulated to determine fault status. Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch).	The ASIC provides a fault indication when the reference voltage circuit fails the following criteria; |Nernst signal - 0.45| >1.0 volts Note: the faults must exist for more than 10 msec to qualify for a fail flag.	DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) **************************	WRAF_Bank_2_FA P0155, P0050, P0051, P0052 = Valid = Ready = True = Complete > 15.0 seconds	20 failures out of 24 samples Continuous in 25 milli - second loop	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Reference Ground Circuit/Open Bank 1 Sensor 1 (For use with WRAF & Gen IV ECM	P2251	This DTC determines if the B1S1 WRAF 02 Reference Ground signal circuit is Open. When enabled, the diagnostic monitors the failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC). The diagnostic failure counter is incremented based on the fault bit message received from the ASIC. The DTC is set based on fail and sample counters.	B1S1 WRAF ASIC indicates a Open circuit on the Reference Ground circuit signal. Open fail counts are accumulated to determine fault status. Note: This ASIC is referred to as ATIC142 (Continental).	The ASIC provides a fault indication when the reference ground circuit pin is open, or pump cell voltage is > 1.2V and reference cell voltage is > 1.2V Note: the fault must exist for previous 2.5 seconds, it is split in two stages, a passive stage of 1.875 seconds and an active stage of 0.625 seconds.	Diagnostic is Enabled DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) **************************	 WRAF_Bank_1_FA P0135, P0030, P0031, P0032 = Valid = Ready = True = Complete > 15.0 seconds	20 failures out of 24 samples Continuous in 25 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			B1S1 WRAFASIC indicates a Open circuit on the Reference Ground circuit signal. Open fail counts are accumulated to determine fault status. Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch).	The ASIC provides a fault indication when the reference ground circuit fails the following criteria; CJ136 H/W detection Note: the faults must exist for more than 10 msec to qualify for a fail flag.	Diagnostic is Enabled DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) **************************	 WRAF_Bank_1_FA P0135, P0030, P0031, P0032 = Valid = Ready = True = Complete > 15.0 seconds	20 failures out of 24 samples Continuous in 25 milli - second loop	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Reference Ground Circuit/Open Bank 2 Sensor 1 (For use with WRAF & Gen IV ECM	P2254	This DTC determines if the B2S1 WRAF 02 Reference Ground signal circuit is Open. When enabled, the diagnostic monitors the failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC). The diagnostic failure counter is incremented based on the fault bit message received from the ASIC. The DTC is set based on fail and sample counters.	B2S1 WRAF ASIC indicates a Open circuit on the Reference Ground circuit signal. Open fail counts are accumulated to determine fault status. Note: This ASIC is referred to as ATIC142 (Continental).	The ASIC provides a fault indication when the reference ground circuit pin is open, or pump cell voltage is > 1.2V and reference cell voltage is > 1.2V Note: the fault must exist for previous 2.5 seconds, it is split in two stages, a passive stage of 1.875 seconds and an active stage of 0.625 seconds.	Diagnostic is Enabled DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) **************************	 WRAF_Bank_2_FA P0155, P0050, P0051, P0052 = Valid = Ready = True = Complete > 15.0 seconds	20 failures out of 24 samples Continuous in 25 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			B2S1 WRAFASIC indicates a Open circuit on the Reference Ground circuit signal. Open fail counts are accumulated to determine fault status. Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch).	The ASIC provides a fault indication when the reference ground circuit fails the following criteria; CJ136 H/W detection Note: the faults must exist for more than 10 msec to qualify for a fail flag.	Diagnostic is Enabled DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) **************************	 WRAF_Bank_2_FA P0155, P0050, P0051, P0052 = Valid = Ready = True = Complete > 15.0 seconds	20 failures out of 24 samples Continuous in 25 milli - second loop	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Signal Stuck Lean Bank 1 Sensor 2	P2270	The P2270 diagnostic is the first in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, & P013B. This DTC determines if the secondary 02 sensor is stuck in a normal lean voltage range and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary 02 sensor does not achieve the required rich voltage before the accumulated mass air flow threshold is reached.	Post 02 sensor signal AND The Accumulated mass airflow monitored during the Stuck Lean Voltage Test	< 845mvolts > 100 grams	Diagnostic is Enabled No Active DTC's B1S2 DTC's Not active this key cycle System Voltage Learned heater resistance Green 02S Condition	 TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_1_TFTK0 O2S_Bank_2_TFTKO P013A, P013B, P013E, P013F, P2270orP2271 >11.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "H02S Heater Resistance DTC's") = Not Valid, Green 02S condition is considered valid until the accumulated airflow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab.	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.		
					Low Fuel Condition Only when FuelLevelDataFault	= False = False		
					Pedal position	< 2.0%		
					Engine Airflow	4.0 < gps < 30.0		
					Closed loop integral Closed Loop Active	0.74 < C/L Int < 1.08 = TRUE (Please see **"Closed Loop Enable Clarification"** in Supporting Tables).		
					Evap	not in control of purge		
					Ethanol Estimation in Progress	= Not Active (Please see **"Ethanol Estimation in Progress"** in Supporting Tables).		
					Post fuel cell	= Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.		
					Crankshaft Torque	< 125.0 Nm		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater (post sensor) on Time	> 60.0 sec		
					Transmission Temp	> -40.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Predicted Catalyst temp Fuel State	550 < °C < 900 = DFCO possible		
					All of the above met for at least 0.0 seconds, and then check the following Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled)	 800 < RPM < 2,500 750 < RPM < 2,550 39.8 < MPH < 74.6 37.3 < MPH < 77.7		
					All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested.			
					During Stuck Lean test the following must stay TRUE or the test will abort: Commanded Fuel Crankshaft Torque	 0.95 < EQR < 1.10 <165.ONm		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Signal Stuck Rich Bank 1 Sensor 2	P2271	The P2271 diagnostic is the fourth in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, & P013B. This DTC determines if the secondary 02 sensor is stuck in a normal rich voltage range and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary 02 sensor does not achieve the required lean voltage before the accumulated mass air flow threshold is reached.	Post 02 sensor signal AND The Accumulated mass airflow monitored during the Stuck Rich Voltage Test	> 100 mvolts >25.0 grams	Diagnostic is Enabled No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage Learned heater resistance Green 02S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_1_TFTK0 O2S_Bank_2_TFTKO P013A, P013B, P013E, P013F or P2270 >11.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid, Green O2S condition is considered valid until the accumulated airflow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab.	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.		
					Low Fuel Condition	= False		
					Only when FuelLevelDataFault	= False		
					Fuel State	= DFCO possible		
					DTC's Passed	= P2270 = P013E = P013A		
					After above conditions are met: DFCO mode is continued (w/o driver initiated pedal input).			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Signal Stuck Lean Bank 2 Sensor 2	P2272	The P2272 diagnostic is the first in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, & P013D. This DTC determines if the secondary 02 sensor is stuck in a normal lean voltage range and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary 02 sensor does not achieve the required rich voltage before the accumulated mass air flow threshold is reached.	Post 02 sensor signal AND The Accumulated mass airflow monitored during the Stuck Lean Voltage Test	< 845 mvolts > 100 grams.	Diagnostic is Enabled No Active DTC's B2S2 DTC's Not Active this key cycle System Voltage Learned heater resistance Green 02S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_1_TFTK0 O2S_Bank_2_TFTKO P013C, P013D, P014A, P014B, P2272 or P2273 >11.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "H02S Heater Resistance DTC's") = Not Valid, Green 02S condition is considered valid until the accumulated airflow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 in Supporting Tables tab.	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.		
					Low Fuel Condition Only when FuelLevelDataFault	= False = False		
					Pedal position	< 2.0%		
					Engine Airflow	4.0 < gps < 30.0		
					Closed loop integral Closed Loop Active	0.74 < C/L Int < 1.08 = TRUE (Please see **“Closed Loop Enable Clarification”** in Supporting Tables).		
					Evap	not in control of purge		
					Ethanol Estimation in Progress	= Not Active (Please see **“Ethanol Estimation in Progress”** in Supporting Tables).		
					Post fuel cell	= Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.		
					Crankshaft Torque	< 125.0 Nm		
					EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time	= not active = not active >= 60.0 sec		
					Transmission Temp	> -40.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Predicted Catalyst temp Fuel State	550 < °C < 900 = DFCO possible		
					All of the above met for at least 0.0 seconds, and then check the following Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled)	800 < RPM < 2,500 750 < RPM < 2,550 39.8 < MPH < 74.6 37.3 < MPH < 77.7		
					All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested.			
					During Stuck Lean test the following must stay TRUE or the test will abort: Commanded Fuel Crankshaft Torque	0.95 < EQR < 1.10 <165.ONm		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Signal Stuck Rich Bank 2 Sensor 2	P2273	The P2273 diagnostic is the fourth in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, & P013D. This DTC determines if the secondary 02 sensor is stuck in a normal rich voltage range and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary 02 sensor does not achieve the required lean voltage before the accumulated mass air flow threshold is reached.	Post 02 sensor signal AND The Accumulated mass airflow monitored during the Stuck Rich Voltage Test	> 100 mvolts >25.0 grams.	Diagnostic is Enabled No Active DTC's B2S2 DTC's Not Active this key cycle System Voltage Learned heater resistance Green 02S Condition	 TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_1_TFTK0 O2S_Bank_2_TFTKO P013C, P013D, P014A, P014B or P2272 >11.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid, Green O2S condition is considered valid until the accumulated airflow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 in Supporting Tables tab.	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Low Fuel Condition Only when FuelLevelDataFault Fuel State DTC's Passed =================== After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).	Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. = False = False = DFCO possible = P2272 = P014A = P013C ==================		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure Sensor C Circuit Low	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	< 50.0 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 High	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	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 40 consecutive BARO C readings	Diagnostic is Enabled LIN communications established with MAP		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.
SIDI High Pressure Pump Performance	P228C	This DTC determines if the high pressure pump is not able to maintain target pressure. The fault is set if the measured fuel rail pressure is lower than desired fuel pressure by a value that can impact emission and drivability for a number of pump events.	Fuel Pressure Error (Desired Pressure - Measure Pressure)	>= **P228C P2C1F-High Pressure Pump Control (HPC) fail threshold of pressure too low** Mpa (see supporting tables)	High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or Crank Sensor Not FA and IATJAT2.ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false and	True >=11 Volts > 0.275 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking	Positive Pressure Error - 10.00 second failures out of 12.50 second samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Engine movement detected is true and Manufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active Barometric Pressure Inlet Air Temp Fuel Temp	>= 70.0 KPA >=-20.0 degC -12 <=Temp degC <= 132		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SIDI High Pressure Pump Performance	P228D	This DTC determines if the high pressure pump is delivering high pressure that desired pressure. The fault is set if the measured fuel rail pressure is higher than desired fuel pressure by a value that can impact emission and drivability for a number of pump events.	Fuel Pressure Error (Desired Pressure - Measure Pressure)	<= **P228D P2C20 - High Pressure Pump Control (HPC) fail threshold for pressure too high** Mpa (see supporting tables)	High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement	True >=11 Volts >0.275 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking	Negative Pressure Error - 10.00 second failures out of 12.50 second samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					detected is true andManufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active Barometric Pressure Inlet Air Temp Fuel Temp	 >= 70.0 KPA >= -20.0 DegC -12 <= Temp degC <= 132		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #1 CIRCUIT LOW	P2300	Diagnoses Cylinder #1 Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the 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 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.	< 100 Q impedance between signal and controller ground	Engine running Ignition Voltage	>11.0	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #1 CIRCUIT High	P2301	Diagnoses Cylinder #1 Ignition Control (EST) output driver circuit for a Short to Power fault. Controller specific output driver circuit diagnoses the 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.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #2 CIRCUIT Low	P2303	Diagnoses Cylinder #2 Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the 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 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.	< 100 Q impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #2 CIRCUIT High	P2304	Diagnoses Cylinder #2 Ignition Control (EST) output driver circuit for a Short to Power fault	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.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #3 CIRCUIT Low	P2306	Diagnoses Cylinder #3 Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the 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 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.	< 100 Q impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #3 CIRCUIT High	P2307	Diagnoses Cylinder #3 Ignition Control (EST) output driver circuit for a Short to Power fault	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.	 < 100 Q impedance between signal and controller power	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #4 CIRCUIT Low	P2309	Diagnoses Cylinder #4 Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the 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 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.	< 100 Q impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #4 CIRCUIT High	P2310	Diagnoses Cylinder #4 Ignition Control (EST) output driver circuit for a Short to Power fault	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.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #5 CIRCUIT Low	P2312	Diagnoses Cylinder #5 Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the 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 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.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #5 CIRCUIT High	P2313	Diagnoses Cylinder #5 Ignition Control (EST) output driver circuit for a Short to Power fault	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.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #6 CIRCUIT Low	P2315	Diagnoses Cylinder #6 Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the 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 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.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #6 CIRCUIT High	P2316	Diagnoses Cylinder #6 Ignition Control (EST) output driver circuit for a Short to Power fault	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.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #7 CIRCUIT Low	P2318	Diagnoses Cylinder#? Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the 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 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.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #7 CIRCUIT High	P2319	Diagnoses Cylinder#? Ignition Control (EST) output driver circuit for a Short to Power fault	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.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #8 CIRCUIT Low	P2321	Diagnoses Cylinder #8 Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the 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 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.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #8 CIRCUIT High	P2322	Diagnoses Cylinder #8 Ignition Control (EST) output driver circuit for a Short to Power fault	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.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger/ Supercharger Bypass Valve "A" Position Sensor Performance	P23AA	This DTC indicates a position performance failure and is set, when the position error is too high for a certain time. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Absolut Valve Position Error for at least	> 25.00 % >= 1.00 s	Diagnostic enabled ***************************** No active DTCs: ***************************** Valve speed for at least ***************************** Engine does not crank Diagnostic system not disabled Valve operation not in 'Anti Sticking' Valve Sate is 'Opening' or 'Closing'	True ***************************** CRAR_b_PstnSnsrFA ***************************** >= -10.00 Pct/s <= 10.00 Pct/s >= 1.00 s *****************************	10 failures out of 14 samples 6.25ms / 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 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 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 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 A, 1 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 > 910 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.
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: 8 failures out of 40 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.
Cold Start Cylinder 1 Injection Pulse Performance	P2B08	Diagnostic to determine if any of the commanded injection pulses for cylinder 1 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/ armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter.	Injector voltage feedback is not able to detect an opening magnitude Or Measured Voltage feedback converted to Injector Opening Magnitude	=< **P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Catalyst Warm up enabled (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Cylinder 2 Injection Pulse Performance	P2B09	Diagnostic to determine if any of the commanded injection pulses for cylinder 2 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/ armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter.	Injector voltage feedback is not able to detect an opening magnitude Or Measured Voltage feedback converted to Injector Opening Magnitude	=< **P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Catalyst Warm up enabled (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Cylinder 3 Injection Pulse Performance	P2B0A	Diagnostic to determine if any of the commanded injection pulses for cylinder 3 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/ armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter.	Injector voltage feedback is not able to detect an opening magnitude Or Measured Voltage feedback converted to Injector Opening Magnitude	=< **P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Catalyst Warm up enabled (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Cylinder 4 Injection Pulse Performance	P2B0B	Diagnostic to determine if any of the commanded injection pulses for cylinder 4 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/ armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter.	Injector voltage feedback is not able to detect an opening magnitude Or Measured Voltage feedback converted to Injector Opening Magnitude	=< **P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Catalyst Warm up enabled (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Cylinder 5 Injection Pulse Performance	P2B0C	Diagnostic to determine if any of the commanded injection pulses for cylinder 5 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/ armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter.	Injector voltage feedback is not able to detect an opening magnitude Or Measured Voltage feedback converted to Injector Opening Magnitude	=< **P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Catalyst Warm up enabled (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Cylinder 6 Injection Pulse Performance	P2B0D	Diagnostic to determine if any of the commanded injection pulses for cylinder 6 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/ armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter.	Injector voltage feedback is not able to detect an opening magnitude Or Measured Voltage feedback converted to Injector Opening Magnitude	=< **P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Catalyst Warm up enabled (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Cylinder 7 Injection Pulse Performance	P2B0E	Diagnostic to determine if any of the commanded injection pulses for cylinder 7 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/ armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter.	Injector voltage feedback is not able to detect an opening magnitude Or Measured Voltage feedback converted to Injector Opening Magnitude	=< **P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Catalyst Warm up enabled (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Cylinder 8 Injection Pulse Performance	P2B0F	Diagnostic to determine if any of the commanded injection pulses for cylinder 8 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/ armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter.	Injector voltage feedback is not able to detect an opening magnitude Or Measured Voltage feedback converted to Injector Opening Magnitude	=< **P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Catalyst Warm up enabled (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Coolant Pump Overspeed	P2B83	This DTC indicates a out of range high failure of the pump speed.	Actual pump speed	>= 7,300 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	[illegible]	5 failures out of 8 samples 1000ms / sample	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 Coolant Pump Underspeed	P2B84	This DTC indicates a out of range low failure of the pump speed.	Actual pump speed	< -150 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	[illegible]	5 failures out of 8 samples 1000ms / sample	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 Injection Pulse Performance	P2B95	Monitors injector pulses when the cold start emission reduction strategy is active by accumulating and determining the percentage of engine cycles that missed a pulse relative to the total number of pulses when multi pulse is active.	Injector voltage feedback is not able to detect an opening magnitude on any pulse for any cylinder Or Measured Voltage feedback converted to Injector Opening Magnitude on any pulse for any cylinder	=< **P2B96 - Opening Magnitude Misisng Pulse Fail Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)	= True	Runs once per trip when the cold start emission reduction strategy is active and Dual Pulse is enabled and active. Frequency: 100ms Test completes after Dual Pulse is no longer active OR The first 500 engine cycles have been reached	Type B, 2 Trips
					Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True		
					OBD Manufacturer Enable Counter	= 0		
					To enable the diagnostic, the Cold Start Emission Reduction Strategy Must Be Active per the following:			
					Catalyst Temperature AND	< 550.00 degC		
					Engine Coolant AND	> 6.00 degC		
					Engine Coolant AND	<= 66.00 degC		
					Barometric Pressure	>= 70.00 KPa		
					In addition, Multi Pulse Strategy Is Enabled and Active Per the following:			
					Engine Speed	>= 550.00 RPM <= 2,000.00 RPM		
					Accel Position	<= 0.00 Pct		
					Engine Run Time	< 100 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following:			
					Catalyst Temperature AND	>= 800.00 degC		
					Engine Run Time	>= 1.00 seconds		
					OR			
					Engine Run Time	> **P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit** This Extended Engine run time exit table is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details.		
					OR			
					Barometric Pressure	< 70.00 KPa		
					Multi Pulse Strategy will exit per the following:			
					Engine Speed OR	> 2,350.00 RPM		
					Accel Position	> 10.00 Pct		
					Engine Run Time	>= 100 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Mulit Pulse Strategy will also exit if the any of the "Additional Dual Pulse Enabling Criteria" is not satisfied:			
					"Additional Multi Pulse Enabling Criteria":			
					Green Engine Enrichment	Not Enabled		
					Misfire Converter Protection strategy	Not being requested		
					Engine Metal Overtemp strategy	Not being requested		
					Fuel control state	Open Loop		
					Output State Control	Not being requested for fuel		
					DOD Or DFCO	Not Active		
					Power Enrichment	Not Active		
					Dynamic Power Enrichment	Not Active		
					Piston Protection	Not Active		
					Hot Coolant Enrichment	Not Active		
					Injector Flow Test	Not Active		
					General Enable			
					DTC's Not Set:	AcceleratorPedalFailure ECT_Sensor_FA IAT_SensorCircuitFA MnfdTempSensorCktFA CrankSensor_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						FuelInjectorCircuit_FA MAF_SensorFA MAP_SensorFA AnyCamPhaser_TFTKO ClutchPstnSnsr FA IAC_SystemRPM_FA IgnitionOutputDriver_FA TPS_FA VehicleSpeedSensor_FA FuelInjectorCircuit_TFTK 0 FHPR_b_FRP_SnsrCkt_F A FHPR_b_FRP_SnsrCkt_T FTKO FHPR_b_PumpCkt_FA FHPR_b_PumpCkt_TFTK 0 TransmissionEngagedStat e_FA EngineTorqueEstInaccura te FuelPumpRlyCktFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger/ Supercharger Bypass Valve "A" Position Sensor Circuit Low	P2BBC	This DTC indicates a continuous or intermittent short low or open in CRV position circuit by monitoring the CRV position sensor percent Vref and failing the diagnostic when the CRV percent Vref is too low. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Raw position value	<10.0 %	Diagnostic enabled Powertrain relay voltage Engine does not crank Diagnostic system not disabled	True >=11.0 Volts	10 failures out of 14 samples 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.
Turbocharger/ Supercharger Bypass Valve "A" Position Sensor Circuit High	P2BBD	This DTC indicates a continuous or intermittent short high possition circuit by monitoring the CRV position sensor percent Vref and failing the diagnostic when the CRV percent Vref is too high. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Raw position value	>95.0 %	Diagnostic enabled Powertrain relay voltage Engine does not crank Diagnostic system not disabled	True >=11.0 Volts	10 failures out of 14 samples 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.
Turbocharger/ Supercharger Bypass Valve "A" Position Exceeded Learning Limit	P2BBE	This diagnostic detects a position learn failure. The diagnostic supports two paths: 1. Close position learning, triggered at engine shut down. The fault is set as soon as the learned close position is not in the expected range. 2. Open position learning, triggered at engine shut down, but after close position learning. The fault is set as soon as the learned open position is not in the expected range. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Learned Close Position ***************************** Close position learn complete.	> 95.00 % OR < 85.00 % *************************	Diagnostic enabled ***************************** eCRV close position learning ***************************** No active DTCs: ***************************** Diagnostic system not disabled End of trip in progress	True ***************************** Enabled ***************************** CRAR_b_PstnSnsrFA CRAR_b_CRV_CktFA	during shut down	Type A, 1 Trips
			Learned Open Position ***************************** Open position learn complete.	> 20.00 % OR <10.00% *************************	Diagnostic enabled ***************************** eCRV open position learning ***************************** No active DTCs: ***************************** Diagnostic system not disabled End of trip in progress	True ***************************** Enabled ***************************** CRAR_b_PstnSnsrFA CRAR_b_CRV_CktFA	during shut down	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger/ Supercharger Bypass Valve "A" Supply Voltage Low	P2BBF	Controller specific output driver circuit diagnostic, diagnosing for the 'electric compressor recirculation valve 'A' actuator' H-bridge driver low voltage failure. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Motor driver voltage supply outside of controller specific accaptable range during on state indicates low voltage.	< 6 V between main powertrain supply and controller ground	Diagnostic enabled ***************************** Powertrain relay voltage ***************************** Engine does not crank Diagnostic system not disabled	True ***************************** >=11.0 Volts *****************************	80 failures out of 100 samples 12.5ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger/ Supercharger Bypass Valve "A" Driver Current/ Temperature Too High	P2BC0	Controller specific output driver circuit diagnostic, diagnosing for the 'electric compressor recirculation valve 'A' actuator' H-bridge driver current or temperature failure. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Motor driver reports high current or high temperature ***************************** Over temperature: Fault flag set Fault flag removed ***************************** Over current: @-40°C Fault flag set Fault flag removed ***************************** Over current: @150°C Fault flag set Fault flag removed	****************************** >= [illegible]0 [illegible] <= [illegible]7 [illegible] ****************************** >= [illegible]2.6 [illegible] <= [illegible].2A ****************************** >= [illegible]2 [illegible] <= [illegible] [illegible]	Diagnostic enabled ***************************** Powertrain relay voltage ***************************** Engine does not crank Diagnostic system not disabled	True ***************************** >=11.0 Volts *****************************	80 failures out of 100 samples 12.5ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Variable Electric Exhaust Valve Control Circuit Open	P2BF8	Monitors for open circuit faults in the VEV valve PWM control circuit	Fuel Tank Zone Module Low-Side Flexible Output Load	>= 200 kOhms to Ground AND > 6 kOhms to Power Source	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4. VEV System Initiliazation Complete (Calibration) AND 5. VEV Circuit Open Serial Data Fault Active (Measurement) AND 6. VEV Circuit Open Serial Data Ready (Measurement) AND 7. VEV Valve Commanded Duty Cycle AND 8. VEV Valve Commanded Period	1. ==1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. == 1.00 [if 1, then TRUE, else FALSE] AND 4.== TRUE AND 5. == FALSE AND 6. ==TRUE AND 7. >=4.7058... % AND<= 95.2941... % AND 8. >= 4.95 ms AND <= 10.05 ms AND 9. >= 95 hz AND <= 205 hz	160.00 failures out of 320.00 samples 1 sample/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.
					AND 9. VEV Valve Commanded Frequency			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Variable Electric Exhaust Valve Control Circuit Low	P2BF9	Monitors for short-to-ground faults in the VEV valve PWM control circuit	Fuel Tank Zone Module Low-Side Flexible Output Load	<= 0.5 Ohms to Ground	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4.VEV System Initiliazation Complete (Calibration) AND 5. VEV Circuit Open Serial Data Fault Active (Measurement) AND 6. VEV Circuit Open Serial Data Ready (Measurement) AND 7. VEV Valve Commanded Duty Cycle AND 8. VEV Valve Commanded Period	1. == 1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. == 1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 5. == FALSE AND 6. == TRUE AND 7. >=4.7058... % AND<= 95.2941... % AND 8. >= 4.95 ms AND <= 10.05 ms AND 9. >= 95 hz AND <= 205 hz	160.00 failures out of 320.00 samples 1 sample/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.
					AND 9. VEV Valve Commanded Frequency			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Variable Electric Exhaust Valve Control Circuit High	P2BFA	Monitors for short-to-power faults in the VEV valve PWM control circuit	Fuel Tank Zone Module Low-Side Flexible Output Load	<= 0.5 Ohms to Power	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4. VEV System Initiliazation Complete (Calibration) AND 5. VEV Circuit Open Serial Data Fault Active (Measurement) AND 6. VEV Circuit Open Serial Data Ready (Measurement) AND 7. VEV Valve Commanded Duty Cycle AND 8. VEV Valve Commanded Period	1. == 1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. == 1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 5. == FALSE AND 6. == TRUE AND 7. >=4.7058... % AND<= 95.2941... % AND 8. >= 4.95 ms AND <= 10.05 ms AND 9. >= 95 hz AND <= 205 hz	160.00 failures out of 320.00 samples 1 sample/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.
					AND 9. VEV Valve Commanded Frequency			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module SIDI High Pressure Pump min/ max authority During Catalyst Warm Up	P2C1E	This DTC determines when the high pressure pump control has reached to its max or min authority during Cataylst Warm up	High Pressure Fuel Pump Delivery Angle OR High Pressure Fuel Pump Delivery Angle	>= 130° <= 0°	Catalyst Warm Up High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Barometric Pressure Inlet Air Temp Fuel Temp Catalyst Warm up enabled (See Definition in Supporting Material below) Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or	True >=11 Volts > 0.275 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking >= 70.0 KPA >= -20.0 degC -12 <= Temp degC <= 132 = True	Windup High/ Low 10.00 seconds failures out of 12.50 Seconds samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true andManufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SIDI High Pressure Pump Performance During Catalyst Warm Up	P2C1F	This DTC determines if the high pressure pump is not able to maintain target pressure Catalyst Warm Up. The fault is set if the measured fuel rail pressure is lower than desired fuel pressure by a value that can impact emission and drivability for a number of pump events.	Fuel Pressure Error (Desired Pressure - Measure Pressure)	>= **P228C P2C1F-High Pressure Pump Control (HPC) fail threshold of pressure too low** Mpa (see supporting tables)	Catalyst Warm Up High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Catalyst Warm up enabled (See Definition in Supporting Material below) Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and	True >=11 Volts > 0.275 MPa = True Enabled when a code clear is not active or not exiting device control Engine is not cranking	Positive Pressure Error - 10.00 second failures out of 12.50 second samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true and Manufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active Barometric Pressure Inlet Air Temp Fuel Temp	 >= 70.0 KPA >=-20.0 degC -12 <=Temp degC <= 132		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SIDI High Pressure Pump Performance During Catalyst Warm Up	P2C20	This DTC determines if the high pressure pump is delivering high pressure that desired pressure Catalyst Warm Up. The fault is set if the measured fuel rail pressure is higher than desired fuel pressure by a value that can impact emission and drivability for a number of pump events.	Fuel Pressure Error (Desired Pressure - Measure Pressure)	<= **P228D P2C20 - High Pressure Pump Control (HPC) fail threshold for pressure too high** Mpa (see supporting tables)	Catalyst Warm Up High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Catalyst Warm up enabled (See Definition in Supporting Material below) Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IATJAT2.ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not	True >=11 Volts >0.275 MPa = True Enabled when a code clear is not active or not exiting device control Engine is not cranking	Negative Pressure Error - 10.00 second failures out of 12.50 second samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					active and Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true andManufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active			
					Barometric Pressure Inlet Air Temp Fuel Temp	>= 70.0 KPA >= -20.0 DegC -12 <= Temp degC <= 132		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan 2 Underspeed Performance Fault [LIN Bus Electric PWM Fans Only - Internal or External controller]	P2CB9	Measured actual fan speed is monitored against a calibrated lower acceptable limit for the cooling fan RPM under normal operating conditions. The diagnostic is set when the threshold is crossed. This diagnostic ensures that the fan is not under cooling. Only after first fan activation, the fan will be held commanded on for enough time to ensure this monitor has an opportunity to mature a decision.	Measured Fan Speed	<= Speed Low Limit [Supporting Table] **P2CB9_LIN_Threshold**	a] Diagnostic Enabled b] Configuration calibration for number of fans c] Diagnostic System Disabled d] Battery Voltage In-Range e] LIN Bus based Fan Operation Enabled f] LIN Bus Lost Communication Fault Active g] LIN Bus Continuous Operation Fault Active h] Fan Commanded On	a] == 1.00 [True if 1; False if 0] b] >= 1 unit c] <>True d] > 11.00 volts e] == TRUE f] <> True g] <> True i] == TRUE	16.00 failures / 20.00 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.
Cooling Fan 3 Underspeed Performance Fault [LIN Bus Electric PWM Fans Only - Internal or External controller]	P2CBB	Measured actual fan speed is monitored against a calibrated lower acceptable limit for the cooling fan RPM under normal operating conditions. The diagnostic is set when the threshold is crossed. This diagnostic ensures that the fan is not under cooling. Only after first fan activation, the fan will be held commanded on for enough time to ensure this monitor has an opportunity to mature a decision.	Measured Fan Speed	<= Speed Low Limit [Supporting Table] **P2CBB_LIN_Threshold**	a] Diagnostic Enabled b] Configuration calibration for number of fans c] Diagnostic System Disabled d] Battery Voltage In-Range e] LIN Bus based Fan Operation Enabled f] LIN Bus Lost Communication Fault Active g] LIN Bus Continuous Operation Fault Active h] Fan Commanded On	a] == 1.00 [True if 1; False if 0] b] >= 1 unit c] <>True d] > 11.00 volts e] == TRUE f] <> True g] <> True h] == TRUE	16.00 failures / 20.00 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.
Charge Air Cooler Coolant Pump Motor Current Out Of Range High	P30AE	This DTC indicates a out of range high failure of the pump motor current.	Actual Motor Current	> 14.00 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 **************************** > 0 rpm **************************** >=11.0 Volts False > -39.00 C =TRUE <= 126.00 C =FALSE ****************************	5 failures out of 8 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.
Charge Air Cooler Coolant Pump Motor Current Out Of Range Low	P30AF	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	< -0.10 A > 1.00 sec	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 **************************** > 0 rpm **************************** >=11.0 Volts False > -39.00 C =TRUE <= 126.00 C =FALSE ****************************	5 failures out of 8 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.
Injector Circuit Range/ Performance	P30D4	Diagnostic to determine if any of the voltage feedback measured from the analog to digital converter on any cylinder is rational (total engine based). The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit.	Injector voltage feedback is not able to detect an opening magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Injector voltage feedback is not able to detect a closing time OR Measured Voltage feedback converted to Injector closing time OR Measured Voltage	=< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude** (See supporting table) >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude** (See supporting table) =< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time** (See supporting table) >=	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below) Injection Pulse Width	= True >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width**	1.25 Second Fail count out of 10.00 seconds Samples Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			feedback converted to Injector closing time	**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table)				

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 / 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 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 / 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 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 / 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 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.
Cooling Fan 1 Out of Range Low [LIN Bus Electric PWM Fans Only- Internal or External controller]	P30EE	The reported actual fan speed in RPM exceeds an lower limit for the fan speed, indicating that there is a failure of the measurement of the fan speed	Measured LIN Fan1 Speed	< = -110.00 rpm	a] Diagnostic Enabled b] Configuration calibration for number of fans c] Diagnostic System Disabled d] Battery Voltage In Range e] LIN Bus based Fan Operation Enabled f] LIN Serial data Lost communication Fault Active g] LIN Serial data Continuous Operation Fault Active	a] ==1.00 [True if 1; False if 0] b] >= 1 unit c] <>True d] > 11.00 volts e] == TRUE f] <>True g] <>True	16.00 failures out of 20.00 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.
Cooling Fan 1 Out of Range High [LIN Bus Electric PWM Fans Only- Internal or External controller]	P30EF	The reported actual fan speed in RPM exceeds an upper limit for the fan speed, indicating that there is a failure of the measurement of the fan speed	Measured LIN Fan1 Speed	> = 4,000.00 rpm	a] Diagnostic Enabled b] Configuration calibration for number of fans c] Diagnostic System Disabled d] Battery Voltage In Range e] LIN Bus based Fan Operation Enabled f] LIN Bus Lost Communication Fault Active g] LIN Bus serial data Continuous Operation Fault Active	a] == 1.00 [True if 1; False if 0] b] >= 1 unit c] <>True d] > 11.00 volts e] == TRUE f] <> True g] <>True	16.00 failures out of 20.00 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.
Cooling Fan 2 Out of Range Low [LIN Bus Electric PWM Fans Only- Internal or External controller]	P30F0	The reported actual fan speed in RPM exceeds an lower limit for the fan speed, indicating that there is a failure of the measurement of the fan speed	Measured LIN Fan2 Speed	< = -110.00 rpm	a] Diagnostic Enabled b] Configuration calibration for number of fans c] Diagnostic System Disabled d] Battery Voltage In Range e] LIN Bus based Fan Operation Enabled f] LIN Serial data Lost communication Fault Active g] LIN Serial data Continuous Operation Fault Active	a] ==1.00 [True if 1; False if 0] b] >= 1 unit c] <>True d] > 11.00 volts e] == TRUE f] <>True g] <>True	16.00 failures out of 20.00 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.
Cooling Fan 2 Out of Range High [LIN Bus Electric PWM Fans Only- Internal or External controller]	P30F1	The reported actual fan speed in RPM exceeds an upper limit for the fan speed, indicating that there is a failure of the measurement of the fan speed	Measured LIN Fan2 Speed	> = 4,000.00 rpm	a] Diagnostic Enabled b] Configuration calibration for number of fans c] Diagnostic System Disabled d] Battery Voltage In Range e] LIN Bus based Fan Operation Enabled f] LIN Bus Lost Communication Fault Active g] LIN Bus serial data Continuous Operation Fault Active	a] == 1.00 [True if 1; False if 0] b] >= 1 unit c] <>True d] > 11.00 volts e] == TRUE f] <> True g] <>True	16.00 failures out of 20.00 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.
Cooling Fan 3 Out of Range Low [LIN Bus Electric PWM Fans Only- Internal or External controller]	P30F2	The reported actual fan speed in RPM exceeds an lower limit for the fan speed, indicating that there is a failure of the measurement of the fan speed	Measured LIN Fan3 Speed	< = -110.00 rpm	a] Diagnostic Enabled b] Configuration calibration for number of fans c] Diagnostic System Disabled d] Battery Voltage In Range e] LIN Bus based Fan Operation Enabled f] LIN Serial data Lost communication Fault Active g] LIN Serial data Continuous Operation Fault Active	a] ==1.00 [True if 1; False if 0] b] >= 1 unit c] <>True d] > 11.00 volts e] == TRUE f] <>True g] <>True	16.00 failures out of 20.00 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.
Cooling Fan 3 Out of Range High [LIN Bus Electric PWM Fans Only- Internal or External controller]	P30F3	The reported actual fan speed in RPM exceeds an upper limit for the fan speed, indicating that there is a failure of the measurement of the fan speed	Measured LIN Fan3 Speed	> = 4,000.00 rpm	a] Diagnostic Enabled b] Configuration calibration for number of fans c] Diagnostic System Disabled d] Battery Voltage In Range e] LIN Bus based Fan Operation Enabled f] LIN Bus Lost Communication Fault Active g] LIN Bus serial data Continuous Operation Fault Active	a] == 1.00 [True if 1; False if 0] b] >= 1 unit c] <>True d] > 11.00 volts e] == TRUE f] <> True g] <>True	16.00 failures out of 20.00 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.
Variable Electric Exhaust Valve Feedback Circuit Low Duty Cycle (Bank 1)	P316E	Monitors for circuit low duty cycle values on the VEV valve 1 diagnostic PWM feedback signal	VEV Valve 1 PWM Feedback Signal Duty Cycle (Calibration)	<2.00%	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4. VEV System Initiliazation Complete (Calibration) AND 5. VEV Valve 1 PWM Feedback Serial Data Fault Active (Measurement) AND 6. VEV Valve 1 PWM Feedback Serial Data Ready (Measurement)	1. == 1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. ==1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 5. == FALSE AND 6. == TRUE	160.00 failures out of 320.00 samples 1 sample/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.
Variable Electric Exhaust Valve Feedback Circuit High Duty Cycle (Bank 1)	P316F	Monitors for circuit high duty cycle values on the VEV valve 1 diagnostic PWM feedback signal	VEV Valve 1 PWM Feedback Signal Duty Cycle (Calibration)	>98.00 %	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4. VEV System Initiliazation Complete (Calibration) AND 5. VEV Valve 1 PWM Feedback Serial Data Fault Active (Measurement) AND 6. VEV Valve 1 PWM Feedback Serial Data Ready (Measurement)	1. == 1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. ==1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 5. == FALSE AND 6. == TRUE	160.00 failures out of 320.00 samples 1 sample/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.
Variable Electric Exhaust Valve Feedback Circuit Low Frequency (Bank 1)	P3170	Monitors for out-of-range high period (i.e. out-of-range low frequency) values on the VEV valve 1 diagnostic PWM feedback signal	VEV Valve 1 PWM Feedback Signal Frequency (Calibration)	< 97.00 hz	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4. VEV System Initiliazation Complete (Calibration) AND 5. VEV Valve 1 PWM Feedback Serial Data Fault Active (Measurement) AND 6. VEV Valve 1 PWM Feedback Serial Data Ready (Measurement)	1. == 1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. ==1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 5. == FALSE AND 6. == TRUE	160.00 failures out of 320.00 samples 1 sample/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.
Variable Electric Exhaust Valve Feedback Circuit High Frequency (Bank 1)	P3171	Monitors for out-of-range low period (i.e. out-of range high frequency) values on the AFM valve 1 diagnostic PWM feedback signal	VEV Valve 1 PWM Feedback Signal Frequency (Calibration)	>=206.00 hz	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4. VEV System Initiliazation Complete (Calibration) AND 5. VEV Valve 1 PWM Feedback Serial Data Fault Active (Measurement) AND 6. VEV Valve 1 PWM Feedback Serial Data Ready (Measurement)	1. == 1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. ==1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 5. == FALSE AND 6. ==TRUE	160.00 failures out of 320.00 samples 1 sample/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.
Variable Electric Exhaust Valve Position Out of Range Low (Bank 1)	P3172	Monitors the sensed VEV valve 1 position for values that are out-of-range low	VEV Valve 1 PWM Feedback Signal Duty Cycle (Calibration)	< 3.50%	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4. VEV System Initiliazation Complete (Calibration) AND 5. VEV Valve 1 PWM Feedback Serial Data Fault Active (Measurement) AND 6. VEV Valve 1 PWM Feedback Serial Data Ready (Measurement) AND 7. VEV Valve 1 Feedback Circuit Low Diagnostic Fault Pending (Measurement) AND	1. ==1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. ==1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 5. == FALSE AND 6. ==TRUE AND 7. == FALSE AND 8. == FALSE	160.00 failures out of 320.00 samples 1 sample/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.
					8. VEVValve 1 Feedback Circuit High Diagnostic Fault Pending (Measurement)			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Variable Electric Exhaust Valve Position Out of Range High (Bank 1)	P3173	Monitors the sensed VEV valve 1 position for values that are out-of-range high	VEV Valve 1 PWM Feedback Signal Duty Cycle (Calibration)	>96.50 %	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4. VEV System Initiliazation Complete (Calibration) AND 5. VEV Valve 1 PWM Feedback Serial Data Fault Active (Measurement) AND 6. VEV Valve 1 PWM Feedback Serial Data Ready (Measurement) AND 7. VEV Valve 1 Feedback Circuit Low Diagnostic Fault Pending (Measurement) AND	1. == 1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. ==1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 5. == FALSE AND 6. == TRUE AND 7. == FALSE AND 8. == FALSE	160.00 failures out of 320.00 samples 1 sample/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.
					8. VEVValve 1 Feedback Circuit High Diagnostic Fault Pending (Measurement)			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Variable Electric Exhaust Valve Position Not Learned (Bank 1)	P3174	Monitors diagnostic feedback from VEV valve 1 to determine if the valve end stops have not been learned	VEV Valve 1 PWM Feedback Signal Frequency (Calibration)	>= 135.80 hz AND < 144.20 hz [Valve Alignment Not Performed]	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4. VEV System Initiliazation Complete (Calibration) AND 5. VEV Valve 1 PWM Feedback Serial Data Fault Active (Measurement) AND 6. VEV Valve 1 PWM Feedback Serial Data Ready (Measurement) AND 7. VEV Valve 1 PWM Feedback Signal Frequency (Calibration)	1. == 1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. == 1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 5. == FALSE AND 6. == TRUE AND 7.a. >= 194.00 hz AND <206.00 hz [Valve Normal Operation] OR 7.b. >= 135.80 hz AND < 144.20 hz [Valve Alignment Not Performed] OR 7.c. >= 97.00 hz AND < 103.00 hz [Valve Input Signal Missing]	160.00 failures out of 320.00 samples 1 sample/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.
Variable Electric Exhaust Valve Tracking Performance (Bank 1)	P3175	Monitors the response of the VEV valve 1 position against the commanded value during a steady state condition. The purpose of the diagnostic is to detect a faulty valve that is lagging or stuck. The system suspends the diagnostic for a calibrated amount of time if the valve is changing the direction of movement or exiting a steady state condition ; this logic/ time duration is required to allow the valve to respond and recover to the expected command.	1. VEV Valve 1 PWM Feedback Signal Duty Cycle Error [Commanded Duty Cycle - Feedback Duty Cycle] (Calibration) 2. VEV Valve 1 PWM Feedback Signal Duty Cycle Delta [Feedback Duty Cycle - Previous Sample Feedback Duty Cycle] (Calibration) 3. VEV Valve 1 Response Timer (Calibration)	1. >= 10.00% AND 2. < 3.00 % OR 1. <= - 10.00% AND 2. > - 3.00 % OR 3. >= 1.00 s	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Control Disabled for Remainder of Trip [output driver short circuit fault] (Measurement) AND 4. VEV Valve Hardware is Present (Calibration) AND 5. VEV System Initiliazation Complete (Calibration) AND 6. VEV Valve Control Disabled for Remainder of Trip [output driver short circuit fault] (Measurement) AND 7. VEV Valve 1 PWM Feedback Serial Data Fault Active	1. == 1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. ==1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 5. == TRUE AND 6. == FALSE AND 6. == TRUE AND 7. == FALSE AND 8. == TRUE AND 9. == FALSE AND	160.00 failures out of 320.00 samples 1 sample/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.
					(Measurement) AND 8. VEV Valve 1 PWM Feedback Serial Data Ready (Measurement) AND 9. VEV Valve Control Circuit Diagnostic Fault Active(Measurement) AND 10. VEV Valve 1 Feedback Circuit Duty Cycle Low Diagnostic Fault Active (Measurement) AND 11. VEV Valve 1 Feedback Circuit Duty Cycle High Diagnostic Fault Active (Measurement) AND 12.VEV Valve 1 Feedback Position Out-of-Range Low Diagnostic Fault Active (Measurement) AND 13. VEV Valve 1 Feedback Position Out-of-Range High Diagnostic	10. == FALSE AND 11. == FALSE AND 12. == FALSE AND 13. == FALSE AND 14. == FALSE AND 15. == FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Fault Active (Measurement) AND 14. VEV Valve 1 Signal Performance Fault Active [PWM Input Missing] (Measurement) AND 15. VEV Valve 1 Change of Direction Flag Active [Change of direction or steady state exit] (Measurement)			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Variable Electric Exhaust Valve Feedback Circuit Incorrect Frequency (Bank 1)	P3176	Monitors for in-range errors that result when the sensed period of the diagnostic PWM feedback signal for VEV valve 1 is neither out-of-range low nor out-of-range high and does not fall within any of the calibrated ranges defined for diagnostic feedback data	VEV Valve 1 PWM Feedback Signal Frequency (Calibration)	> 206.00 hz OR < 97.00 hz	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4. VEV System Initiliazation Complete (Calibration) AND 5. VEV Valve 1 PWM Feedback Serial Data Fault Active (Measurement) AND 6. VEV Valve 1 PWM Feedback Serial Data Ready (Measurement)	1. == 1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. ==1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 5. == FALSE AND 6. == TRUE	160.00 failures out of 320.00 samples 1 sample/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.
Variable Electric Exhaust Valve Signal Performance (Bank 1)	P3177	It is expected that the PWM-input-signal is always present at the actuator during normal usage. If there is no PWM-input-signal detected for more than 1 second (+/- 100 ms), then : • the gear-shaft moves active to OPEN-position (if it is already in OPEN-position, there is no reaction) • a failure-message is sent by the PWM-output	VEV Valve 1 PWM Feedback Signal Frequency (Calibration)	>= 97.00 hz AND < 103.00 hz [Valve Input Signal Missing]	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4. VEV System Initialization Complete (Measurement) AND 5. VEV Valve 1 PWM Feedback Serial Data Fault Active (Measurement) AND 6. VEV Valve 1 PWM Feedback Serial Data Ready (Measurement) AND 7. VEV Valve 1 PWM Feedback Signal Frequency (Calibration)	1. == 1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. ==1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 5. == FALSE AND 6. == TRUE AND 7.a. >= 194.00 hz AND < 206.00 hz [Valve Normal Operation] OR 7.b. >= 135.80 hz AND < 144.20 hz [Valve Alignment Not Performed] OR 7.c. >= 126.10 hz AND < 133.90 hz	160.00 failures out of 320.00 samples 1 sample/ 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.
						[Valve Open End Stop Learned] OR 7.d. >= 106.70 hz AND < 113.30 hz [Valve Closed End Stop Learned] OR 7.e. >= 97.00 hz AND < 103.00 hz [Valve Input Signal Missing]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Variable Electric Exhaust Valve Actuator Performance (Bank 1)	P3179	Monitors diagnostic feedback from VEV valve 1 to determine if an internal actuator fault is present or if the VEV valve is stuck in the end stop learning mode	VEV Valve Commanded Duty Cycle (Calibration) AND VEV Valve 1 PWM Feedback Signal Frequency (Calibration)	A. = 5.00 % with +/- 0.5% [Valve Open End Stop] AND >= 126.10 hz AND < 133.90 hz [Valve Open End Stop Learned] OR B. =95.00 % with +/- 0.5% [Valve Closed End Stop] AND >= 106.70 hz AND < 113.30 hz [Valve Closed End Stop Learned]	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4. VEV Valve Initialization Complete (Measurement) AND 5. VEV Valve 1 PWM Feedback Serial Data Fault Active (Measurement) AND 6. VEV Valve 1 PWM Feedback Serial Data Ready (Measurement) AND 7. VEV Valve 1 PWM Feedback Signal Frequency (Calibration)	1. == 1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. == 1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 5. == FALSE AND 6. == TRUE AND 7.a. >= 194.00 hz AND <206.00 hz [Valve Normal Operation] OR 7.b. >= 135.80 hz AND < 144.20 hz [Valve Alignment Not Performed] OR 7.c. >= 126.10 hz AND < 133.90 hz	160.00 failures out of 320.00 samples 1 sample/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.
						[Valve Open End Stop Learned] OR 7.d >= 106.70 hz AND < 113.30 hz [Valve Closed End Stop Learned] OR 7.e. >= 97.00 hz AND <103.00 hz [Valve Input Signal Missing]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Variable Electric Exhaust Valve Actuator Performance (Bank 2)	P317A	Monitors diagnostic feedback from VEV valve 2 to determine if an internal actuator fault is present or if the VEV valve is stuck in the end stop learning mode	VEV Valve Commanded Duty Cycle (Calibration) AND VEV Valve 1 PWM Feedback Signal Frequency (Calibration)	A. = 5.00 % with +/- 0.5% [Valve Open End Stop] AND >= 126.10 hz AND < 133.90 hz [Valve Open End Stop Learned] OR B. = 95.00 % with +/- 0.5% [Valve Closed End Stop] AND >= 106.70 hz AND < 113.30 hz [Valve Closed End Stop Learned]	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4. VEV Valve Initialization Complete (Measurement) AND 5. VEV Valve 2 PWM Feedback Serial Data Fault Active (Measurement) AND 6. VEV Valve 2 PWM Feedback Serial Data Ready (Measurement) AND 7. VEV Valve 2 PWM Feedback Signal Frequency (Calibration)	1. == 1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. == 1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 5. == FALSE AND 6. == TRUE AND 7.a. >= 194.00 hz AND <206.00 hz [Valve Normal Operation] OR 7.b. >= 135.80 hz AND < 144.20 hz [Valve Alignment Not Performed] OR 7.c. >= 126.10 hz AND < 133.90 hz	160.00 failures out of 320.00 samples 1 sample/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.
						[Valve Open End Stop Learned] OR 7.d >= 106.70 hz AND < 113.30 hz [Valve Closed End Stop Learned] OR 7.e. >= 97.00 hz AND <103.00 hz [Valve Input Signal Missing]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Variable Electric Exhaust Valve Feedback Circuit Low Duty Cycle (Bank 2)	P317B	Monitors for circuit low duty cycle values on the VEV valve 2 diagnostic PWM feedback signal	VEV Valve 2 PWM Feedback Signal Duty Cycle (Calibration)	<2.00%	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4. VEV System Initiliazation Complete (Calibration) AND 5. VEV Valve 2 PWM Feedback Serial Data Fault Active (Measurement) AND 6. VEV Valve 2 PWM Feedback Serial Data Ready (Measurement)	1. == 1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. ==1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 5. == FALSE AND 6. == TRUE	160.00 failures out of 320.00 samples 1 sample/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.
Variable Electric Exhaust Valve Feedback Circuit High Duty Cycle (Bank 2)	P317C	Monitors for circuit high duty cycle values on the VEV valve 2 diagnostic PWM feedback signal	VEV Valve 2 PWM Feedback Signal Duty Cycle (Calibration)	>98.00 %	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4. VEV System Initiliazation Complete (Calibration) AND 5. VEV Valve 2 PWM Feedback Serial Data Fault Active (Measurement) AND 6. VEV Valve 2 PWM Feedback Serial Data Ready (Measurement)	1. ==1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. ==1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 5. == FALSE AND 6. == TRUE	160.00 failures out of 320.00 samples 1 sample/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.
Variable Electric Exhaust Valve Feedback Circuit Low Frequency (Bank 2)	P317D	Monitors for out-of-range high period (i.e. out-of-range low frequency) values on the VEV valve 2 diagnostic PWM feedback signal	VEV Valve 2 PWM Feedback Signal Duty Cycle (Calibration)	<97.00 hz	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4. VEV System Initiliazation Complete (Calibration) AND 5. VEV Valve 2 PWM Feedback Serial Data Fault Active (Measurement) AND 6. VEV Valve 2 PWM Feedback Serial Data Ready (Measurement)	1. == 1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. ==1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 5. == FALSE AND 6. == TRUE	160.00 failures out of 320.00 samples 1 sample/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.
Variable Electric Exhaust Valve Feedback Circuit High Frequency (Bank 2)	P317E	Monitors for out-of-range low period (i.e. out-of range high frequency) values on the AFM valve 2 diagnostic PWM feedback signal	VEV Valve 2 PWM Feedback Signal Duty Cycle (Calibration)	>=206.00 hz	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4. VEV System Initiliazation Complete (Calibration) AND 5. VEV Valve 2 PWM Feedback Serial Data Fault Active (Measurement) AND 6. VEV Valve 2 PWM Feedback Serial Data Ready (Measurement)	1. == 1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. ==1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 5. == FALSE AND 6. == TRUE	160.00 failures out of 320.00 samples 1 sample/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.
Variable Electric Exhaust Valve Position Out of Range Low (Bank 2)	P317F	Monitors the sensed VEV valve 2 position for values that are out-of-range low	VEV Valve 2 PWM Feedback Signal Duty Cycle (Calibration)	< 3.50%	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4. VEV System Initiliazation Complete (Calibration) AND 5. VEV Valve 2 PWM Feedback Serial Data Fault Active (Measurement) AND 6. VEV Valve 2 PWM Feedback Serial Data Ready (Measurement) AND 7. VEV Valve 2 Feedback Circuit Low Diagnostic Fault Pending (Measurement) AND	1. ==1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. ==1.00 [if 1, then TRUE, else FALSE] AND 4. ==TRUE AND 5. == FALSE AND 6. ==TRUE AND 7. == FALSE AND 8. == FALSE	160.00 failures out of 320.00 samples 1 sample/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.
					8. VEV Valve 2 Feedback Circuit High Diagnostic Fault Pending (Measurement)			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Variable Electric Exhaust Valve Position Not Learned (Bank 2)	P3181	Monitors diagnostic feedback from VEV valve 2 to determine if the valve end stops have not been learned	VEV Valve 2 PWM Feedback Signal Frequency (Calibration)	>= 135.80 hz AND < 144.20 hz [Valve Alignment Not Performed]	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4. VEV System Initiliazation Complete (Calibration) AND 5. VEV Valve 2 PWM Feedback Serial Data Fault Active (Measurement) AND 6. VEV Valve 2 PWM Feedback Serial Data Ready (Measurement) AND 7. VEV Valve 2 PWM Feedback Signal Period (Calibration)	1. == 1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. == 1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 5. == FALSE AND 6. == TRUE AND 7.a. >= 194.00 hz AND < 206.00 hz [Valve Normal Operation] OR 7.b. >= 135.80 hz AND < 144.20 hz [Valve Alignment Not Performed] OR 7.c. >= 97.00 hz AND < 103.00 hz [Valve Input Signal Missing]	160.00 failures out of 320.00 samples 1 sample/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.
Variable Electric Exhaust Valve Tracking Performance (Bank 2)	P3182	Monitors the response of the VEV valve 1 position against the commanded value during a steady state condition. The purpose of the diagnostic is to detect a faulty valve that is lagging or stuck. The system suspends the diagnostic for a calibrated amount of time if the valve is changing the direction of movement or exiting a steady state condition ; this logic/ time duration is required to allow the valve to respond and recover to the expected command.	1. VEV Valve 2 PWM Feedback Signal Duty Cycle Error [Commanded Duty Cycle - Feedback Duty Cycle] (Calibration) 2. VEV Valve 2 PWM Feedback Signal Duty Cycle Delta [Feedback Duty Cycle - Previous Sample Feedback Duty Cycle] (Calibration) 3. VEV Valve 2 Response Timer (Calibration)	1. >= 10.00 % AND 2. <3.00 % OR 1. <=- 10.00% AND 2. > - 3.00 % OR 3. >= 1.00 s	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Control Disabled for Remainder of Trip [output driver short circuit fault] (Measurement) AND 4. VEV Valve Hardware is Present (Calibration) AND 5. VEV System Initiliazation Complete (Calibration) AND 6. VEV Valve Control Disabled for Remainder of Trip [output driver short circuit fault] (Measurement) AND 7. VEV Valve 2 PWM Feedback Serial Data Fault Active	1. == 1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. ==1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 5. == TRUE AND 6. == FALSE AND 6. == TRUE AND 7. == FALSE AND 8. == TRUE AND 9. == FALSE AND	160.00 failures out of 320.00 samples 1 sample/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.
					(Measurement) AND 8. VEV Valve 1 PWM Feedback Serial Data Ready (Measurement) AND 9. VEV Valve Control Circuit Diagnostic Fault Active(Measurement) AND 10. VEV Valve 1 Feedback Circuit Duty Cycle Low Diagnostic Fault Active (Measurement) AND 11. VEV Valve 1 Feedback Circuit Duty Cycle High Diagnostic Fault Active (Measurement) AND 12.VEV Valve 1 Feedback Position Out-of-Range Low Diagnostic Fault Active (Measurement) AND 13. VEV Valve 1 Feedback Position Out-of-Range High Diagnostic	10. == FALSE AND 11. == FALSE AND 12. == FALSE AND 13. == FALSE AND 14. == FALSE AND 15. == FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Fault Active (Measurement) AND 14. VEV Valve 1 Signal Performance Fault Active [PWM Input Missing] (Measurement) AND 15. VEV Valve 1 Change of Direction Flag Active [Change of direction or steady state exit] (Measurement)			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Variable Electric Exhaust Valve Feedback Circuit Incorrect Frequency (Bank 2)	P3183	Monitors for in-range errors that result when the sensed period of the diagnostic PWM feedback signal for VEV valve 2 is neither out-of-range low nor out-of-range high and does not fall within any of the calibrated ranges defined for diagnostic feedback data	VEV Valve 2 PWM Feedback Signal Frequency (Calibration)	> 206.00 hz OR < 97.00 hz	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4. VEV System Initiliazation Complete (Calibration) AND 5. VEV Valve 2 PWM Feedback Serial Data Fault Active (Measurement) AND 6. VEV Valve 2 PWM Feedback Serial Data Ready (Measurement)	1. == 1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. ==1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 6. == FALSE AND 7. == TRUE	160.00 failures out of 320.00 samples 1 sample/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.
Variable Electric Exhaust Valve Signal Performance (Bank 2)	P3184	It is expected that the PWM-input-signal is always present at the actuator during normal usage. If there is no PWM-input-signal detected for more than 1 second (+/- 100 ms), then : • the gear-shaft moves active to OPEN-position (if it is already in OPEN-position, there is no reaction) • a failure-message is sent by the PWM-output	VEV Valve 2 PWM Feedback Signal Frequency (Calibration)	>= 97.00 hz AND <103.00 hz [Valve Input Signal Missing]	1. Diagnostic Enabled (Calibration) AND 2. Diagnostic System Disabled (DiagSystemDisable) AND 3. VEV Valve Hardware is Present (Calibration) AND 4. VEV System Initialization Complete (Measurement) AND 5. VEV Valve 2 PWM Feedback Serial Data Fault Active (Measurement) AND 6. VEV Valve 2 PWM Feedback Serial Data Ready (Measurement) AND 7. VEV Valve 2 PWM Feedback Signal Frequency (Calibration)	1. == 1.00 [if 1, then TRUE, else FALSE] AND 2. == FALSE AND 3. ==1.00 [if 1, then TRUE, else FALSE] AND 4. == TRUE AND 5. == FALSE AND 6. == TRUE AND 7.a. >= 194.00 hz AND < 206.00 hz [Valve Normal Operation] OR 7.b. >= 135.80 hz AND < 144.20 hz [Valve Alignment Not Performed] OR 7.c. >= 126.10 hz AND < 133.90 hz	160.00 failures out of 320.00 samples 1 sample/ 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						[Valve Open End Stop Learned] OR 7.d. >= 106.70 hz AND < 113.30 hz [Valve Closed End Stop Learned] OR 7.e. >= 97.00 hz AND < 103.00 hz [Valve Input Signal Missing]		

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) >= 30.00 seconds c1)== TRUE c2) == False c3) == False c4) == False c5) == False c6) == False c7) == False c8] ==TRUE c9] == False d 0) == False c11) == 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 [DTC P129F] c13) CAN Sensor Bus message $0C3 Comm Fault [DTC P165C] 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 Rolling	 c12) == False c13) == False d 4] == 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 ..	a) Enabled	1 sample / 12.5 millisec	Type B, 2 Trips
					b1) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [Cmd1 DTC U131D]	b1) == False		
					b2) Sensor Configuration	b2) == CeFDBR_e_WiredTo_FTZM		
					b3) Fuel Pres Sensor Serial Comm Ready	b3) == TRUE		
					b4) Fuel Pres Sensor Serial Comm Fault Pending [DTC P14D5]	b4) == False		
					b5) Sensed Fuel Control Enable Serial Comm Ready	b5) == TRUE		
					b6) Sensed Fuel Control Enable Serial Comm Fault Pending	b6) == False		
					c1) Fuel Flow data Valid	c1)== TRUE		
					c2) Ambient Air Pressure Value Defaulted	c2) == False		
					c3) Fuel Pres Sensor Type	c3) == CeFDBR_e_AbsolutePressure		
					c4) Fault Bundle FDB_FuelPresSnsrCktFA	c4) == False		
					c5) Reference Voltage	c5) == False		

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 [DTC P129F]	c11) == False		
					c12) Fuel Pump Duty Cycle Fault Active [DTC P2BB3]	c12) == False		
					c13) CAN Sensor Bus message $0C3 Comm Fault [DTC P165C]	c13) == False		
					c14) Fuel Pres Sensor Serial Comm Fault Active [DTC P14D5]	c14) == False		
					c15) Sensor Bus Relay On	c15) == TRUE		
					d1) Timer-- Minimum Engine Running	d1) >= 30.00 seconds		
					d2) Diagnostic 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	e) ==TRUE		
					f) Fuel Pump Control State	f) == Normal AND == NOT Over Response Active		
					g) Instantaneous Fuel Flow	g) >= 0.05 gms / sec		
					h) Fuel Control Enable Fault Active [DTC P12A6]	h) == False		
					j) Emissions Fuel Level Low [Message $3FB]	j) == False		
					k) High Pres Fuel Pump Mode Management Enabled	k) == False		
					l) High Pres Fuel Pump Control Mode	l) == NOT Disabled Mode AND NOT Over Response Active Mode		
					m) Diagnostic Data OK	m) == TRUE		
					n) Timer - Diagnostic Enable	n) > 2.00 seconds		

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	3.00 counts (equivalent to 1,000.01 milliseconds) 1,000.01 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 If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII	>15,000.00 milliseconds > 8.41 Volts >= 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 OBDII: Run/Crank ignition voltage If EOBD: 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 >=9.00 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.
Control Module Communication Bus B Off	U0074	This DTC monitors for a BUS B off condition	Bus off failures equals or exceeds before the sample time of is reached	3.00 counts (equivalent to 1,000.01 milliseconds) 1,000.01 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 If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII	 >15,000.00 milliseconds > 8.41 Volts >= 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 OBDII: Run/Crank ignition voltage If EOBD: 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 >=9.00 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.
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 before the sample time of is reached	3.00 counts (equivalent to 1,000.01 milliseconds) 1,000.01 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 If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII	>15,000.00 milliseconds > 8.41 Volts >= 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 OBDII: Run/Crank ignition voltage If EOBD: 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 >=9.00 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 TCM	U0101	This DTC monitors for a loss of communication with the TCM.	Message is not received from controller for Message $01E: Message $026: Message $027: Message $02D: Message $02E: Message $031: Message $032: Message $0BB: Message $0CD: Message $216: Message $27A: Message $452: Message $459:	>418.00 milliseconds >418.00 milliseconds >418.00 milliseconds > 10,000.00 milliseconds >418.00 milliseconds >418.00 milliseconds > 10,000.00 milliseconds > 10,000.00 milliseconds > 10,000.00 milliseconds > 362.00 milliseconds > 10,000.00 milliseconds > 10,000.00	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.
				milliseconds				
				> 10,000.00 milliseconds	If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
						>= 9.00 Volts		
					If EOBD: Run/Crank ignition voltage	> 15,000.00 milliseconds		
					If Secure: Starter motor engaged for Or	> 8.41 Volts		
					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 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, NoSVS

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			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
						>= 9.00 Volts		
					If EOBD: Run/Crank ignition voltage	> 15,000.00 milliseconds		
					If Secure: Starter motor engaged for Or	> 8.41 Volts		
					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 Anti-Lock Brake System (ABS) Control Module	U0121	This DTC monitors for a loss of communication with the Anti-Lock Brake System (ABS) Control Module.	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:	> 475.00 milliseconds > 475.00 milliseconds > 425.00 milliseconds > 425.00 milliseconds > 437.50 milliseconds > 10,000.00 milliseconds > 10,000.00 milliseconds > 575.00 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 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	If calibratable low voltage disable mode is not Never Disabled			
				> 10,000.00 milliseconds	Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 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	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 Power Steering Control Module	U0131	This DTC monitors for a loss of communication with the Power Steering Control Module.	Message is not received from controller for 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	Type C, NoSVS

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			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds > 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 SADS	U0139	This DTC monitors for a loss of communication with the SADS.	Message is not received from controller for Message $24E:	> 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 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			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 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 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:	> 425.00 milliseconds	General Enable Criteria: All below criteria have been met for	>= 5,000.00 milliseconds	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips
			Message $202:	> 10,000.00 milliseconds	If message is on Bus A: U0073 not active			
			Message $203:	> 325.00 milliseconds	If message is on Bus B: U0074 not active			
			Message $204:	> 10,000.00 milliseconds	If message is on Bus S: U0076 not active			
			Message $205:		CAN channel is requesting full communications			
			Message $228:	> 10,000.00 milliseconds	Normal CAN transmission on Bus is enabled			
			Message $25E:	> 10,000.00 milliseconds	If bus type is Sensor Bus, sensor bus relay is on			
			Message $274:	> 10,000.00 milliseconds	Accessory mode to off mode not pending			
			Message $284:		Battery voltage	>11.00 Volts		
			Message $404:	> 10,000.00 milliseconds	Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
			Message $407:	> 325.00 milliseconds				
			Message $409:	> 900.00 milliseconds	Controller type: OBD Controller			
			Message $40A:	> 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 $40C: Message $413: Message $460: Message $461: Message $47E: Message $47F: Message $481: Message $49F: Message $4EB: Message $54D: 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 > 10,000.00 milliseconds > 10,000.00 milliseconds > 10,000.00 milliseconds > 2,000.00 milliseconds	If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII If OBDII: Run/Crank ignition voltage If EOBD: 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 >= 9.00 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.
				> 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.
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, NoSVS

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			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
						>= 9.00 Volts		
					If EOBD: Run/Crank ignition voltage	> 15,000.00 milliseconds		
					If Secure:	> 8.41 Volts		
					Starter motor engaged for 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 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 ACM1_Rsp	>= 1,250.00 milliseconds	General Enable Criteria: Diagnostic is enabled LIN channel is 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 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 If calibratable low voltage disable mode is not Never	Enabled Enabled >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	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.
					Disabled Low voltage disable mode: OBDII If OBDII: Run/Crank ignition voltage If EOBD: 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 >= 9.00 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.
Loss of Communication with Charge Air Cooler Electric Water Pump	U02A9	This DTC monitors for a loss of communication on the LIN bus with the Charge Air Cooler Electric Water Pump.	Message is not received from device for CWP_Rsp	>= 2,500.00 milliseconds	General Enable Criteria: Diagnostic is enabled LIN channel is 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 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 If calibratable low voltage disable mode is not Never Disabled	 Enabled Enabled Disabled >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	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.
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 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			
					If power mode = Accessory:	Disabled		
					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.
Invalid Data Received From Transmissio n 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 (CSIIM) 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			
			TG IP_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				
			TGI3_ARC:	8.00 fail counts out of 18.00 sample counts				
			TGI3_CS:	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 (CSIIM) 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 SIB	U0404	This DTC monitors for an error in communication with the SIB.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSllM) 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
			LS1ISP_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		
			LnrSnsrlInSec_Prtctd:	4.00 fail counts out of 10.00 sample counts	Accessory mode to off mode transition not pending			
			LS2ISP_ARC:	4.00 fail counts out of 10.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
			LnrSnsr2lnSec_Prtctd:	4.00 fail counts out of 10.00 sample counts	Controller type: OBD Controller			
			DISSP_ARC:	4.00 fail counts out of 10.00 sample counts				
			DscrlnSnsrSec_Prtctd:	4.00 fail counts out of 10.00 sample counts				
			EALUCSP_ARC:	4.00 fail counts out of 10.00 sample counts				
			ExtrnALUChkSec_Prtctd:	4.00 fail counts out of 10.00 sample counts				
			DISP_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				
			DISP-CS:	8.00 fail counts out of 18.00 sample counts				
			LSIP-ARC:	8.00 fail counts out of 18.00 sample counts				
			LSIP-CS:	8.00 fail counts out of 18.00 sample counts				
			EALUCPP—ARC:	3.00 fail counts out of 10.00 sample counts				
			ExtrnALUChkPri_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 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 (CSllM) 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: Battery voltage	>= 5,000.00 milliseconds >= 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_P rtctd:	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				
			BrkSys1nfoSts_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: BSSIP-ARC: BrkSysStsInfo-Prtctd:	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 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 (CSllM) 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		
			BdyGen1nfo3_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			
			SPMP_ARC:	3.00 fail counts out of 10.00 sample counts				
			SysPwrMode_P rtctd:	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				
			CCHI_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				
			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				
			CCCGLARC:	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 (CSIIM) 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 (CSIIM) 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, NoSVS
			IMUSR2_ARC:	4.00 fail counts out of 10.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
			IMUSR2_CS:	4.00 fail counts out of 10.00 sample counts	Battery voltage Accessory mode to off mode transition not pending	>= 11.00 volts		
			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 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 (CSIIM) of the following signals received over serial data is incorrect for: ACM1JnitStatARC:	 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.
Invalid Data Received from Charge Air Cooler Water Pump Motor	U05AA	This DTC monitors for an error in communication with the Charge Air Cooler Water Pump Motor.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSIIM) 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
			CACPmpARC:	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.
Lost Communication with Throttle Position Sensor 1	U0606	Detects a continuous or intermittent short low or short high or open fault in the TPS SENT Communication Circuit 1 by monitoring the voltage and failing the diagnostic when the voltage for the wave pulse is below or above state threshold as defined by SAE J2716 SENT Protocol. Detects a message fault in the TPS SENT Communication Circuit by monitoring the message pulse time and failing the diagnostic when the time for the pulse is below a low time threshold or above a high time threshold or if the message age limit is greater than a time threshold. This diagnostic only runs when battery voltage is high enough.	Voltage for wave pulse is below state threshold as defined by SAE J2716 SENT Protocol OR Voltage for wave pulse is above state threshold as defined by SAE J2716 SENT Protocol OR Message Pulse < Message Pulse > OR Message Age Limit >= OR Signal CRC fails	0.5 V OR 4.1 V OR 0.125977 ms 0.209991 ms OR 3.125 ms	Run/Crank voltage	> 6.41 Volts	79/159 counts; 57 counts continuous; 3.125 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.
Lost Communication with Throttle Position Sensor 2	U0607	Detects a continuous or intermittent short low or short high or open fault in the TPS SENT Communication Circuit 2 by monitoring the voltage and failing the diagnostic when the voltage for the wave pulse is below or above state threshold as defined by SAE J2716 SENT Protocol. Detects a message fault in the TPS SENT Communication Circuit by monitoring the message pulse time and failing the diagnostic when the time for the pulse is below a low time threshold or above a high time threshold or if the message age limit is greater than a time threshold. This diagnostic only runs when battery voltage is high enough.	Voltage for wave pulse is below state threshold as defined by SAE J2716 SENT Protocol OR Voltage for wave pulse is above state threshold as defined by SAE J2716 SENT Protocol OR Message Pulse < Message Pulse > OR Message Age Limit >= OR Signal CRC fails	0.5 V OR 4.1 V OR 0.125977 ms 0.209991 ms OR 3.125 ms	Run/Crank voltage	> 6.41 Volts	79/159 counts; 57 counts continuous; 3.125 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.
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 MAF1_Press_Rsp MAF1_TmpHum_Rsp	 >= 87.50 milliseconds >= 250.00 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 If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII If OBDII: Run/Crank ignition voltage	 Enabled Enabled >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts >=11.00 Volts	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.
					If EOBD: 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	>=9.00 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 Rail Pressure Sensor Bank 1	U0625	This DTC determines if the SENT signal shorted low, this is determined by monitoring the number pulses on the SENT signal line received at the ECU and the SENT Signal Line State always indicating low.	The number pulses on the SENT signal line SENT Signal Line State	<= 4 = Low	SENT Sensor Communication Circuit Diagnostic Enabled SENT power up delay	True >= 0.00 seconds Enabled when a code clear is not active or not exiting device control	400 failures out of 500 samples 6.25 ms per 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.
Cooling Fan 1 LIN Communication Failure	U0632	This DTC monitors for a loss of communication on the LIN bus 1 with Cooling Fan 1.	Message is not received from controller for CFM1_RSP	>= 2,500.00 milliseconds	General Enable Criteria:		LIN bus communication executes in 500ms loop	Type B, 2 Trips
					Diagnostic is enabled	Enabled		
					LIN channel is enabled	Enabled		
					LIN module is initialized Slave is calibrated as present			
					Engine is running Or Engine cooling fan operation is enabled via received CAN signal and propulsion system is active for	>=0.00 milliseconds		
					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 If calibratable low voltage disable mode is not Never Disabled			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 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.
Cooling Fan 2 LIN Communication Failure	U0633	This DTC monitors for a loss of communication on the LIN bus 1 with Cooling Fan 2.	Message is not received from controller for CFM2_RSP	>= 2,500.00 milliseconds	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Slave is calibrated as present Engine is running Or Engine cooling fan operation is enabled via received CAN signal and propulsion system is active for 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 If calibratable low voltage disable mode is not Never Disabled	 Enabled Enabled >=0.00 milliseconds >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	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.
					Low voltage disable mode: OBDII If OBDII: Run/Crank ignition voltage If EOBD: 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 >=9.00 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/ Supercharger Bypass Valve "A" Position Sensor	U0657	This DTC indicates a continuous communication fault on the electric CRV SENT interface. The diagnostic monitors the SENT message in respect to message pulses and timing validity. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	SENT Mesage Faults SENT Mesage age	> 0 ent >6.250 ms	Diagnostic enabled ***************************** Powertrain relay voltage ***************************** Engine does not crank Diagnostic system not disabled	True ***************************** >=11.0 Volts *****************************	10 failures out of 14 samples 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.
Lost Communication with Fuel Temperature Sensor A	U0670	This DTC determines if the SENT signal shorted low, this is determined by monitoring the number pulses on the SENT signal line received at the ECU and the SENT Signal Line State always indicating high.	The number pulses on the SENT signal line SENT Signal Line State	<= 4 = High	SENT Sensor Communication Circuit Diagnostic Enabled SENT power up delay	True >= 0.00 seconds Enabled when a code clear is not active or not exiting device control	400 failures out of 500 samples 6.25 ms per 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.
Lost Communication with Fuel Temperature Sensor B	U0671	This DTC determines if the SENT signal shorted low, this is determined by monitoring the number pulses on the SENT signal line received at the ECU and the SENT Signal Line State always indicating high.	The number pulses on the SENT signal line SENT Signal Line State	<= 4 = High	SENT Sensor Communication Circuit Diagnostic Enabled SENT power up delay	True >= 0.00 seconds Enabled when a code clear is not active or not exiting device control	400 failures out of 500 samples 6.25 ms per 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.
Cooling Fan 3 LIN Communication Failure	U067C	This DTC monitors for a loss of communication on the LIN bus with Cooling Fan 3.	Message is not received from device for CFM3_Rsp	>= 2,437.50 milliseconds	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Slave is calibrated as present Engine is running Or Engine cooling fan operation is enabled via received CAN signal and propulsion system is active for 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 If calibratable low voltage	 Enabled Enabled >=0.00 seconds >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	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.
					disable mode is not Never Disabled Low voltage disable mode: OBDII If OBDII: Run/Crank ignition voltage If EOBD: 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 >=9.00 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.
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.
Shifter Interface Board Module PT Private CAN Bus Enable Diagnostic Status	U100B	Detects if PT private CAN wake up wire is shorted to low or open circuited.	PT sensor bus wake up wire voltage	<= 1.5 Volts	Iginition Run/Crank wired signal =	Run or Run/Crank active (high level)	4.5 seconds in 5.5 second window	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 is .. b] Device feedback Faulted; c] Diagnostic system disabled; d] CAN serial data message $3C8 received	a] Enabled 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.
Lost Communication With Fuel Rail Pressure Sensor Bankl Sensor 2	U101B	This DTC determines if the SENT signal shorted low, this is determined by monitoring the number pulses on the SENT signal line received at the ECU and the SENT Signal Line State always indicating high.	The number pulses on the SENT signal line SENT Signal Line State	<= 4 = High	SENT Sensor Communication Circuit Diagnostic Enabled SENT power up delay	True >= 0.00 seconds Enabled when a code clear is not active or not exiting device control	400 failures out of 500 samples 6.25 ms per 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.
Invalid Data Received from Cooling Fan Motor 1	U1314	This DTC monitors for an error in communication with the Cooling Fan Motor 1.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSIIM) of the following signals received over serial data is incorrect for: PrplCoolFn1_ARC:	 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.
Invalid Data Received from Cooling Fan Motor 2	U1315	This DTC monitors for an error in communication with the Cooling Fan Motor 2.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSIIM) of the following signals received over serial data is incorrect for: PrplCoolFn2_ARC:	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.
Invalid Data Received from Cooling Fan Motor 3	U1316	This DTC monitors for an error in communication with the Cooling Fan Motor 3.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSIIM) of the following signals received over serial data is incorrect for: PrplCoolFn3_ARC:	 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.
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 (CSIIM) of the following signals received over serial data is incorrect for: PAM1TempHmdtyARC: PAMIPresARC:	 3.00 fail counts out of 10.00 sample counts 8.00 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.	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 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 (CSIIM) 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
			FTZMInfoIARC:	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		
			FTZMInfoI Chksm:	8.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending			
			FTZMInfoI 1ARC:	8.00 fail counts out of 18.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
			FTZMInfoI 1Chksm:	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				
			FTZMInfoI 2ARC:	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 module is initialized			
			LIN channel Wakeup Method:		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			
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					If OBDII:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 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			
						Enabled		
					LIN channel Wakeup Method:	Enabled		
					Diagnostic is enabled			
					LIN channel is enabled			
					LIN channel is requesting			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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	>= 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: The total number of diagnostic enabled slave nodes on LIN Bus 2 Or LIN channel Wakeup Method: LIN channel wakeup repetition counter	= Total number of slave nodes on LIN Bus 2 that have reported lost communications DTCs >=10.00 counts	Loss of Communication Method: Diagnostic is enabled LIN channel is enabled LIN module is initialized All below criteria have been met for LIN channel is requesting full communications 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 If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII If OBDII:	Enabled Enabled >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Dependent on bus loading.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 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			
						Enabled		
					LIN channel Wakeup Method:	Enabled		
					Diagnostic is enabled			
					LIN channel is enabled			
					LIN channel is requesting			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					full communications LIN module is initialized The following criteria have been enabled for: Accessory mode to off mode not pending Battery voltage	>= 5,000.00 milliseconds >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 LIN Bus 3 Off	U1347	This DTC monitors for a LIN bus 3 off condition.	Loss of Communication Method: The total number of diagnostic enabled slave nodes on LIN Bus 3 Or LIN channel Wakeup Method: LIN channel wakeup repetition counter	= Total number of slave nodes on LIN Bus 3 that have reported lost communications DTCs >= 10.00 counts	Loss of Communication Method: Diagnostic is enabled LIN channel is enabled LIN module is initialized The following criteria have been enabled for: LIN channel is requesting full communications 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 If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII If OBDII:	Enabled Enabled >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	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.
					Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 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 not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		
					LIN channel Wakeup Method:	Enabled		
					Diagnostic is enabled	Enabled		
					LIN channel is enabled			
					LIN channel is requesting			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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	>= 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.
Shifter Interface Board Received Invalid Data From Body Control Module	U137B	Detects invalid data coming from the BCM.	Invalid Data Received from BCM	Invalid MAC, Alive Rolling Count, or Protection Value	CAN Communication System Voltage	Enabled Voltage in Range	XofY threshold: 8/10	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Shifter Interface Board Received Invalid Data from Central Gateway Module	U137C	Detects invalid data coming from the CGM.	Invalid Data Received from CGM	Invalid MAC, Alive Rolling Count, or Protection Value	CAN Communication System Voltage	Enabled Voltage in Range	XofY threshold: 8/10	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Shifter Interface Board Received Invalid Data from ECM	U137D	Detects invalid data coming from the ECM.	Invalid Data Received from ECM	Invalid MAC, Alive Rolling Count, or Protection Value	CAN Communication System Voltage	Enabled Voltage in Range	XofY threshold: 8/10	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 Transmission Control Module on Engine Control Module LIN Bus 1	U1600	This DTC monitors for a loss of communication on the LIN bus 1 with Transmission Control Module on Engine Control Module	Message is not received from controller for TCM_RSP	>= 150.00 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 If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII If OBDII: Run/Crank ignition voltage If EOBD:	 Enabled Enabled >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts >=11.00 Volts >= 9.00 Volts	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.
					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	>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 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			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
						>= 9.00 Volts		
					If EOBD: 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.
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 Low voltage disable mode: OBDII If OBDII: Run/Crank ignition voltage If EOBD: 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 >= 9.00 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 Park Assist Module on CAN2	U160C	This DTC monitors for a loss of communication with the Park Assist Module on CAN2.	Message is not received from controller for Message $080:	>475.00 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, NoSVS

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			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
						>= 9.00 Volts		
					If EOBD: Run/Crank ignition voltage	> 15,000.00 milliseconds		
					If Secure: Starter motor engaged for Or	> 8.41 Volts		
					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 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 $0C4: Message $0CB: Message $0CC: Message $1E6: Message $2C1: Message $2D7: Message $2D9: Message $3C8: Message $3EB: Message $3EC: Message $3EE: Message $4C6:	> 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 B, 2 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			
				> 10,000.00 milliseconds	Low voltage disable mode: OBDII			
				> 10,000.00 milliseconds	If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
						>= 9.00 Volts		
					If EOBD: Run/Crank ignition voltage	> 15,000.00 milliseconds		
					If Secure: Starter motor engaged for Or	> 8.41 Volts		
					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.
Transmission Range Selector Control Module Lost Communication with Engine Control Module on Powertrain Sensor CAN Bus	U18C6	Detects that CAN serial data communication has been lost with the ECM.	Powertrain Sensor Bus Message $1E2 OR $1E8	Undetected	Ignition Run/Crank Voltage Ignition	11V<RC Volt < 32V = Run/Crank OR = Accessory	1.0 second	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Control Module Lost Communication with Engine Control Module on Powertrain Expansion CAN Bus	U18C7	Detects that CAN serial data communication has been lost with the ECM.	CAN frames sent from the ECM on CAN3 (Global B) or Powertrain Expansion (Global A) not received.	Undetected	CAN Communication System Voltage	Enabled In Range	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.
Lost Communication with Transmission Range Selector Control Module on Powertrain Sensor CAN Bus	U18D2	This DTC monitors for a loss of communication with the Transmission Range Selector Control Module on Powertrain Sensor CAN Bus.	Message is not received from controller for Message $1E4: Message $1EC: Message $2F3: Message $32D: Message $4C4:	> 1,000.00 milliseconds > 10,000.00 milliseconds > 10,000.00 milliseconds > 500.00 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			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
						>= 9.00 Volts		
					If EOBD: Run/Crank ignition voltage	> 15,000.00 milliseconds		
					If Secure: Starter motor engaged for Or	> 8.41 Volts		
					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 Transmission Range Selector Control Module on Powertrain Expansion CAN Bus	U18D3	This DTC monitors for a loss of communication with the Transmission Range Selector Control Module on Powertrain Expansion CAN Bus.	Message is not received from controller for Message $0BC: Message $0BD: Message $0C1: Message $0CF:	> 500.00 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			
					Low voltage disable mode: OBDII			
					If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
						>= 9.00 Volts		
					If EOBD: Run/Crank ignition voltage	> 15,000.00 milliseconds		
					If Secure: Starter motor engaged for Or	> 8.41 Volts		
					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_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.
Shifter Interface Board Key Table Not Provisioned	U1970	Detects when Key Slot Provision indicates security peripheral is not legitimate	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) The DTC can be also set upon receipt of ERC_KEY_EMPTY from the security peripheral (SECP).		CAN Communication =	Enabled	1) Monitored continuously while CAN frames are being transmitted and received. 2) Checked at ECU power-up. 3) Monitored while RID 0x0200: Provision Security Peripheral General Keys is being executed.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Shifter Interface Board Unable to Authenticate Serial Data Message	U1972	Detects error in MAC caused by Security Peripheral hardware	A Message Authentication Code results in failed verification based on the programmed key table.	Three consecutive failed authentication in a key slot	CAN Communication	= Enabled		Type B, 2 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	KeVIND_b_VI N_OFV_N P _EnableDTC	= 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.
Shifter Interface Board Lost Communication with Central Gateway Module	U2201	Detects that CAN serial data communication has been lost with the CGM on CAN 3.	CAN frames originating from the CGM not received.	Begins to mature when message has not arrived in 2.5x nominal transmit rage.	CAN Communication	= Enabled	10 seconds to set DTC	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 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 HVAC Display - Rear	U220A	This DTC monitors for a Central Gateway Module Lost Communication with HVAC Display - Rear 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 - Rear 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 - Rear	 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 Shifter Interface Board Module	U220D	This DTC monitors for a Central Gateway Module Lost Communication with Shifter Interface Board 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 Shifter Interface Board 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 SIB	 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.
Shifter Interface Board Lost Communication with Body Control Module	U2215	Detects loss of communication from the BCM on CAN2 (PDU routed from GCM to SIB on CAN3).	CAN frames sent from the BCM (PDU routed through the CGM) are not detected	Begins to mature when message has not arrived in 2.5x nominal transmit rage.	CAN Communication	= Enabled	10 seconds to set DTC	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Shifter Interface Board Lost Communication with Engine Control Module on CAN Bus 2	U2405	Detects loss of communication from the ECM on CAN2 (PDU routed from GCM to SIB on CAN3).	CAN frames sent from the ECM (PDU routed through the CGM) are not detected	Begins to mature when message has not arrived in 2.5x nominal transmit rage.	CAN Communication	= Enabled	10 seconds to set DTC	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.
Invalid Data Received From Transmission Control Module to Electronic Transmission Control Module on LIN BUS.	U250D	Detects if Range Command Echo from TCM matches current Range Command (For Internal ETRS only)	Check Range Command Echo vs Range Command when Range Command Poke is called	Range Command Echo # Range Command	Diagnostic Enable Calibration Recent Range Command Transition TCM LIN Node or Bus Fault Active	= TRUE = FALSE = FALSE	80 failures out of 100 samples 50 ms loop	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	KeVIND_b_Odo_VIN N P _EnableDTC	= 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 Configuratio n	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.	KeVIND_b_OdoVIN_Ena bleDTC	= 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	Diagnostc is 1.00 Battey Present = TRUE RunCrank Active = TRUE Starter Motor Engaged = FALSE	50.00 failures out of 63.00	Type C, NoSVS

Initial Supporting table - CalculatedPerfMaxIc1

Description: Maximum desired camshaft position for Intake CAM - Bank1

Value Units: Maximum desired camshaft position (degCam)
X Unit: Engine Oil Temperature (degC)
[1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17]
[-40 -28 -16 -4 8 20 32 44 56 68 80 92 104 116 128 140 152]
Y Units: Engine Speed (rpm)
[1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17]
[400 800 1200 1600 2000 2400 2800 3200 3600 4000 4400 4800 5200 5600 6000 6400 6800]

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
2	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
3	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
4	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
6	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
7	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
8	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
9	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
10	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
11	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
12	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
13	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
14	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
15	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
16	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
17	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0

Initial Supporting table - FastFailTempDiff

Description: EOT Sensor Cold Start Fast Fail Threshold

Value Units: Threshold between power-up engine oil temperature and power-up engine coolant temperature (Deg C)
X Unit: PowerUp coolant temperature (deg C)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	80.0	80.0	80.0	60.0	60.0	40.0	40.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0

Initial Supporting table - P0196_TotalAccumulatedFlow

Description: Total accumulated air consumed by engine since engine start as a function of powerup undefaulted Oil Temperature

Value Units: Minimum accumulated (total) air grams consumed by engine (gram)
X Unit: PowerUp coolant temperature (deg C)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	15,000	14,000	13,000	12,000	11,000	10,000	9,000	8,000	7,000	6,000	5,000	4,000	5,000	4,000	3,000	3,000	3,000

Initial Supporting table - P0521 P06DD_P06DE_OP_HiStatePressure

Description: Two Stage Oil Pump Oil Pressure in High State

Value Units: Nominal high state oil pressure (kPa)
X Unit: Engine oil temperature, °C

y/x	-7.0	0.0	20.0	40.0	60.0	80.0	100.0	110.0	120.0
1,000.0	454.3	472.9	505.3	433.0	405.4	354.9	303.6	258.3	203.4
1,500.0	488.6	500.7	522.5	466.1	445.3	411.6	398.2	378.4	316.8
2,000.0	513.3	511.9	498.8	447.3	435.1	421.3	414.8	415.3	360.3
2,500.0	541.1	526.2	483.0	437.8	424.3	410.4	407.4	425.2	383.1
3,000.0	579.3	553.8	492.3	455.2	433.1	419.3	411.6	431.4	399.7
3,500.0	629.1	594.1	516.3	477.9	434.3	417.0	397.6	413.7	395.3
4,000.0	629.1	594.1	516.3	492.0	435.0	424.6	398.1	409.6	400.6
4,500.0	629.1	594.1	516.3	505.6	436.4	411.9	386.7	397.8	387.2
5,000.0	629.1	594.1	516.3	499.4	446.9	417.4	400.7	401.9	372.4

Initial Supporting table - P0521 P06DD_P06DE_OP_LoStatePressure

Description: Two Stage Oil Pump Oil Pressure in Low State

Value Units: Nominal low state oil pressure (kPa)
X Unit: Engine oil temperature (deg C)

y/x	-7	0	20	40	60	80	100	110	120
1,000	361	335	300	300	285	270	244	224	198
1,500	379	351	318	316	298	284	278	274	256
2,000	403	372	335	322	301	285	285	289	270
2,500	432	397	349	324	309	298	296	305	280
3,000	445	409	358	329	312	301	305	322	295
3,500	445	409	358	336	313	302	309	334	302
4,000	445	409	358	344	315	309	320	347	305
4,500	445	409	358	355	315	311	328	355	301
5,000	445	409	358	371	316	308	325	348	286

Initial Supporting table - P06DD_P06DE_MaxEnableTorque_OP

Description: Two Stage Oil Pump Rationality Test Torque Max Enable Threshold

Value Units: Maximum engine torque (Nm)
X Unit: Engine speed (RPM)

y/x	1,000.0	1,250.0	1,500.0	1,750.0	2,000.0	2,250.0	2,500.0	2,750.0	3,000.0
1.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0

Initial Supporting table - P06DD_P06DE_MinEnableTorque_OP

Description: Two Stage Oil Pump Rationality Test Torque Min Enable Threshold

Value Units: Min engine torque (Nm)
X Unit: Engine speed (RPM)

y/x	1,000.0	1,250.0	1,500.0	1,750.0	2,000.0	2,250.0	2,500.0	2,750.0	3,000.0
1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - P06DD_P06DE_MinOilPressThresh

Description: Intrusive diagnostic minimum pressure limit that is a function of Engine Speed and Oil Temperature

Value Units: Minimum engine oil pressure threshold (kPa)
X Unit: Engine oil temperature (deg C)

y/x	-7	0	20	40	60	80	100	110	120
1,000	81	81	81	81	81	200	200	81	81
1,500	104	104	104	104	104	200	200	104	104
2,000	118	118	118	118	118	118	118	118	118
2,500	127	127	127	127	127	127	127	127	127
3,000	135	135	135	135	135	135	135	135	135
3,500	145	145	145	145	145	145	145	145	145
4,000	183	183	183	183	183	183	183	183	183
4,500	199	199	199	199	199	199	199	199	199
5,000	206	206	206	206	206	206	206	206	206

Initial Supporting table - P06DD P06DE_OP_StateChangeMin

Description: Minimum allowed pressure change on a Two Stage Oil Pump state change

Value Units: Min pressure change (kPa)
X Unit: Engine oil temperature (deg C)

y/x	-7.0	0.0	20.0	40.0	60.0	80.0	100.0	110.0	120.0
1,000.0	42.0	42.0	42.0	30.0	12.0	10.0	8.0	5.0	2.0
1,500.0	53.0	53.0	53.0	53.0	15.0	12.0	15.0	10.0	26.0
2,000.0	63.0	63.0	63.0	63.0	33.0	10.0	25.0	15.0	35.0
2,500.0	62.0	62.0	62.0	62.0	30.0	17.0	17.0	17.0	46.0
3,000.0	50.0	50.0	50.0	50.0	35.0	25.0	20.0	20.0	40.0
3,500.0	10.0	10.0	10.0	10.0	12.0	21.0	21.0	36.0	45.0
4,000.0	15.0	15.0	15.0	15.0	15.0	12.0	15.0	39.0	45.0
4,500.0	10.0	10.0	10.0	10.0	17.0	12.0	10.0	27.0	45.0
5,000.0	10.0	10.0	10.0	10.0	10.0	12.0	12.0	31.0	45.0

Initial Supporting table - P0128 Maximum Acculated Energy - Primary

Description: KtETHD_E_EOR_WrmUpEnrgyLimTestO

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	85.0
1.0	50,975.6	45,164.9	37,566.2	28,626.6	21,921.9	15,217.2	4,042.7

Initial Supporting table - P0128 Maximum Acculated Energy - Secondary

Description: KtETHD_E_EOR_WrmUpEnrgyLimTest1

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	85.0
1.0	44,992.4	39,532.1	32,391.8	23,991.4	17,691.1	11,390.8	890.3

Initial Supporting table - P0128 Maximum Acculated Energy - Tertiary

Description: KtETHD_E_EOR_WrmUpEnrgyLimTest2

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	85.0
1.0	44,992.4	39,532.1	32,391.8	23,991.4	17,691.1	11,390.8	890.3

Initial Supporting table - P01F0 - 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	0.29	0.33	0.50	0.75	1.00
-10.0	255.0	255.0	16.0	26.2	29.2
0.0	255.0	255.0	16.0	26.2	29.2
15.0	255.0	255.0	16.0	26.2	29.2
30.0	255.0	255.0	16.0	26.2	29.2
50.0	255.0	255.0	16.0	26.2	29.2

Initial Supporting table - P219A EWMA Coefficient

Description: The bank 1 EWMA coefficient used to filter the AFIM Variance Ratio.

Value Units: Unitless Scalar
X Unit: Unitless Scalar

y/x	-1.00	-0.50	0.00	0.50	1.00
1	0.05	0.10	0.15	0.10	0.05

Initial Supporting table - P219A EWMA Coefficient Opt Table

Description: The bank 1 EWMA coefficient used to filter the AFIM Variance Ratio while in Optional Mode, if used.

Value Units: Unitless Scalar
X Unit: Unitless Scalar

y/x	-1.00	-0.50	0.00	0.50	1.00
1.0	0.10	0.20	0.50	0.20	0.10

Initial Supporting table - P219A Quality Factor Bankl Table

Description: Bank 1 lookup table of Quality Factors used in the calculation of the Ratio for the2 current sample period

Value Units: Unitless Scalar
X Unit: Engine Speed (RPM)
Y Units: Air Per Cylinder (APC) (mg/cylinder)

y/x	500	550	600	800	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,700	1,800	1,950	2,100	2,250	2,400
120	0.00	0.00	0.00	0.00	1.00	1.00	0.90	0.85	0.80	0.85	0.95	1.00	0.95	0.95	1.00	0.85	0.90
150	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.85	0.90	0.90	1.00	0.95	0.95	1.00	1.00	0.95	1.00
180	0.00	0.00	0.00	0.00	0.80	1.00	0.90	0.85	1.00	0.80	1.00	0.85	1.00	1.00	1.00	1.00	1.00
210	0.00	0.00	0.00	0.00	1.00	1.00	0.95	0.80	0.80	0.95	1.00	0.85	0.90	0.95	1.00	0.95	0.95
240	0.00	0.00	0.00	0.00	0.90	0.95	0.90	0.90	0.90	0.85	0.90	0.85	0.90	0.95	1.00	0.95	0.95
270	0.00	0.00	0.00	0.00	0.90	0.90	0.80	0.85	0.80	0.80	0.85	0.80	0.90	0.90	0.95	0.95	0.95
300	0.00	0.00	0.00	0.00	0.80	0.80	0.80	0.85	0.80	0.80	0.85	0.80	0.80	0.90	0.85	0.85	0.95
325	0.00	0.00	0.00	0.00	0.85	0.85	0.85	0.85	0.80	0.80	0.85	0.85	0.85	0.90	0.95	0.85	0.95
350	0.00	0.00	0.00	0.00	0.85	0.90	0.90	0.85	0.85	0.85	0.95	0.90	0.90	1.00	1.00	0.85	1.00
375	0.00	0.00	0.00	0.00	0.90	0.90	0.95	0.80	0.80	0.85	1.00	0.95	0.90	1.00	1.00	1.00	1.00
400	0.00	0.00	0.00	0.00	1.00	0.90	1.00	0.85	0.80	0.85	0.90	0.80	0.95	1.00	1.00	1.00	1.00
430	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.85	1.00	0.95	0.85	0.97	1.00	1.00	1.00	1.00	1.00
460	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.90	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
500	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
550	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00
600	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00
650	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	0.00	0.00	0.00	0.00

Initial Supporting table - P219B EWMA Coefficient

Description: The bank 2 EWMA coefficient used to filter the AFIM Variance Ratio.

Value Units: Unitless Scalar
X Unit: Unitless Scalar

y/x	-1.00	-0.50	0.00	0.50	1.00
1.0	0.05	0.10	0.15	0.10	0.05

Initial Supporting table - P219B EWMA Coefficient Opt Mode

Description: The bank 2 EWMA coefficient used to filter the AFIM Variance Ratio while in Optional Mode, if used.

Value Units: Unitless Scalar
X Unit: Unitless Scalar

y/x	-1.00	-0.50	0.00	0.50	1.00
1.0	0.10	0.20	0.50	0.20	0.10

Initial Supporting table - P219B Quality Factor Bank2 Table

Description: Bank 2 lookup table of Quality Factors used in the calculation of the Ratio for the2 current sample period

Value Units: Unitless Scalar
X Unit: Engine Speed (RPM)
Y Units: Air Per Cylinder (APC) (mg/cylinder)

y/x	500	550	600	800	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,700	1,800	1,950	2,100	2,250	2,400
120	0.00	0.00	0.00	0.00	1.00	0.75	1.00	0.90	0.95	0.95	0.90	1.00	1.00	1.00	1.00	1.00	1.00
150	0.00	0.80	0.00	1.00	1.00	0.75	0.75	1.00	0.75	1.00	0.90	1.00	0.75	1.00	1.00	1.00	1.00
180	0.00	0.00	0.00	0.00	0.95	0.90	1.00	0.85	0.00	1.00	0.90	1.00	1.00	1.00	1.00	1.00	1.00
210	0.00	0.00	0.00	0.00	0.50	1.00	0.95	0.63	0.00	0.75	0.95	1.00	1.00	1.00	1.00	1.00	1.00
240	0.00	0.00	0.00	0.00	0.00	0.90	0.80	0.50	0.00	0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
270	0.00	0.00	0.00	0.00	0.50	0.90	0.95	0.63	0.50	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00
300	0.00	0.00	0.00	0.00	0.50	0.75	0.90	0.75	0.63	0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00
325	0.00	0.00	0.00	0.00	0.85	1.00	0.75	0.75	0.75	0.90	0.90	1.00	1.00	1.00	1.00	1.00	1.00
350	0.00	0.00	0.00	0.00	0.95	0.80	1.00	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
375	0.00	0.00	0.00	0.00	1.00	0.85	1.00	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
400	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
430	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
460	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
500	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
550	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00
600	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00
650	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	0.00	0.00	0.00	0.00

Initial Supporting table - PmpPerf: Tabel to estimate the expected 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	1,000	2,000	3,000	4,000	5,000	6,000	7,000
-40	0	1	1	3	5	7	10
0	0	0	1	3	4	7	9
40	0	0	1	2	4	6	9
80	0	0	1	2	3	5	7
120	0	0	1	1	3	4	7

Initial Supporting table - P0330_OpenCktThrshMax2 (20kHz)

Description: Max threshold table for the 20 KHz portion of the open circuit diagnostic for sensor 2. The lookup into this table will be filtered to define the max threshold for the filtered intensity. To fail, the filtered intensity needs to fall between this cal and the min cal filters.

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.877	0.832	0.822	0.820	0.803	0.799	0.807	0.807	0.797	0.736	0.664	0.605	0.545	0.545	0.545	0.545	0.545

Initial Supporting table - P0330_OpenCktThrshMax2 (NN)

Description: Max threshold table for the Normal Noise for sensor 2. The lookup into this table will be filtered to define the max threshold for the filtered intensity. To fail, the filtered intensity needs to fall between this cal and the min cal filters.

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500
1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

y/x	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Initial Supporting table - P0330_OpenCktThrshMin2 (20 kHz)

Description: Min threshold table for the Normal Noise portion of the open circuit diagnostic. The lookup into this table will be filtered to define the max threshold for the filtered intensity. To fail, the filtered intensity needs to fall between this cal and the max cal filters.

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400

Initial Supporting table - P0330_OpenCktThrshMin2 (NN)

Description: Min threshold table for the Normal Noise portion of the open circuit diagnostic for sensor 2. The lookup into this table will be filtered to define the max threshold or the filtered intensity. To fail, the filtered intensity needs to fall between this cal and the max cal filters.

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Initial Supporting table - P0331_AbnormalLo2

Description: The low limit (no Hi limit, left for excessive knock) for sensor 2 for the performance diagnostic, abnormal noise; used for per sensor and per cyl performance diagnostics. The lookup in this table as a function of RPM and APC is then filtered using KeKNKD_k_PerfAbnFilter (KeKNKD_k_PerfCylAbnFilter for per cyl), and then this filtered quantity VaKNKD_k_PerfAbnFiltlLimitLo (VaKNKD_k_PerfCylAbnFiltlLimitLo for per cyl) becomes the actual limit. The code will immediately set if the filtered intensity goes below the filtered threshold

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.060	0.067	0.068	0.069	0.072	0.075	0.077	0.079	0.081	0.093	0.100	0.146	0.191	0.222	0.246	0.268	0.268

Initial Supporting table - P0331_AbnormalLoAFM_2

Description: The low limit for AFM mode (no Hi limit, left for excessive knock) for sensor 2 for the performance diagnostic, abnormal noise; used for per sensor and per cyl performance diagnostics. The lookup in this table as a function of RPM and APC is then filtered using KeKNKD_k_PerfAbnFilter (KeKNKD_k_PerfCylAbnFilter for per cyl), and then this filtered quantity VaKNKD_k_PerfAbnFiltlLimitLo (VaKNKD_k_PerfCylAbnFiltlLimitLo for per cyl) becomes the actual limit. The code will immediately set if the filtered intensity goes below the filtered threshold

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.060	0.067	0.068	0.069	0.072	0.075	0.077	0.079	0.081	0.098	0.131	0.193	0.252	0.292	0.324	0.352	0.352

Initial Supporting table - P06B7_OpenTestCktMax2

Description: Max threshold table for the 20 KHz for the test circuit diagnostic for sensor 2. The lookup into this table will be filtered to define the max threshold for the filtered intensity. To fail, the filtered intensity needs to fall between this cal and the min cal filters.

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.055	0.055	0.059	0.061	0.066	0.068	0.084	0.113	0.133	0.189	0.303	0.303	0.303	0.303	0.303	0.303	0.303

Initial Supporting table - P06B7_OpenTestCktMin2

Description: Min threshold table for the 20 KHz for the test circuit diagnostic for sensor 2. The lookup into this table will be filtered to define the max threshold for the filtered intensity. To fail, the filtered intensity needs to fall between this cal and the max cal filters.

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.020	0.020	0.020	0.020	0.020	0.023	0.023	0.033	0.041	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047

Initial Supporting table - P10BA: Pump On Speed Diag Delay

Description: CAC Pump Speed Diagnostic Enable Delay Time

Value Units: Sec
X Unit: DegC
Y Units: Sec

y/x	-40.0	0.0	40.0	80.0	120.0
1.0	60.0	20.0	10.0	5.0	5.0

Initial Supporting table - P10BA: Pump On Speed Error Limit

Description: CAC Pump Speed Error Limit

Value Units: RPM
X Unit: RPM
Y Units: RPM

y/x	1,000.0	2,000.0	3,000.0	4,000.0	5,000.0	6,000.0	7,000.0
1.0	750.0	1,000.0	1,200.0	1,400.0	1,600.0	1,800.0	2,000.0

Initial Supporting table - P>129F 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	-675.0	-675.0	-675.0	-675.0	-675.0
2,000.0	-675.0	-675.0	-675.0	-675.0	-675.0
3,000.0	-675.0	-675.0	-675.0	-675.0	-675.0
4,000.0	-675.0	-675.0	-675.0	-675.0	-675.0
5,000.0	-675.0	-675.0	-675.0	-675.0	-675.0
6,000.0	-675.0	-675.0	-675.0	-675.0	-675.0
7,000.0	-1,200.0	-1,200.0	-1,200.0	-1,200.0	-1,200.0

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	675.0	675.0	675.0	675.0	675.0
2,000.0	675.0	675.0	675.0	675.0	675.0
3,000.0	675.0	675.0	675.0	675.0	675.0
4,000.0	675.0	675.0	675.0	675.0	675.0
5,000.0	675.0	675.0	675.0	675.0	675.0
6,000.0	675.0	675.0	675.0	675.0	675.0
7,000.0	1,200.0	1,200.0	1,200.0	1,200.0	1,200.0

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	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
1.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
3.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
4.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
6.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
7.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
9.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
10.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
12.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
13.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
15.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
16.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
18.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
19.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
21.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
22.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
24.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
25.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
27.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
28.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
30.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
31.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
33.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
34.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
36.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
37.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
39.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
40.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
42.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
43.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
45.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00

Initial Supporting table -P3187_Threshold

46.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
48.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00

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	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
1.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
3.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
4.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
6.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
7.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
9.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
10.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
12.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
13.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
15.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
16.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
18.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
19.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
21.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
22.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
24.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
25.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
27.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
28.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
30.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
31.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
33.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
34.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
36.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
37.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
39.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
40.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
42.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
43.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
45.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00

Initial Supporting table - P3188_Threshold

46.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
48.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00

Initial Supporting table - Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests

Description: This table describes the adaptive (Block Learn) cells in which to enable the Post (Secondary) Oxygen sensor response tests.
Note: When the table column heading matches the calibration value below it, that individual cell is enabled.

The cell numbers in the table are defined as:
CeFADR_e_CellOO_PurgOnAirMode5= 0,
CeFADR_e_Cell01_PurgOnAirMode4 = 1,
CeFADR_e_Cell02_PurgOnAirMode3 = 2,
CeFADR_e_Cell03_PurgOnAirMode2 = 3,
CeFADR_e_Cell04_PurgOnAirMode1 = 4,
CeFADR_e_Cell05_PurgOnAirModeO= 5,
CeFADR_e_Cell06_PurgOnIdle = 6,
CeFADR_e_Cell07_PurgOnDecel = 7,
CeFADR_e_Cell08_PurgOffAirMode5 = 8,
CeFADR_e_Cell09_PurgOffAirMode4 = 9,
CeFADR_e_Cell10_PurgOffAirMode3 = 10,
CeFADR_e_Cell11_PurgOffAirMode2 = 11,
CeFADR_e_Cell12_PurgOffAirMode1 = 12,
CeFADR_e_Cell13_PurgOffAirModeO= 13,
CeFADR_e_Cell14_PurgOffIdle = 14,
CeFADR_e_Cell15_PurgOffDecel = 15

Value Units: Block Learn cell number
X Unit: Block Learn cell number

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	7	7	7	7	7	7	7	7	15	15	15	15	15	15	15	15

Initial Supporting table - Multiple DTC Use Green Sensor Delay Criteria - Limit

Description: This Calibration is the acculmulated airflow limit above which the Green condition is expired
Used for: P0133, P013A, P013B, P013C, P013D, P013E, P013F, P014A, P014B, P0153, P015A, P015B, P015C, P015D, P1133, P1153, P2270, P2271, P2272 and P2273.
Note: This feature is only enabled when the vehicle is new and cannot be enabled in service.

Value Units: Grams
X Unit: Acculmulated Engine Airflow

y/x	CiOXYR_O2_Bank1_Sensor1	CiOXYR_O2_Bank1_Sensor2	CiOXYR_O2_Bank2_Sensor1	CiOXYR_O2_Bank2_Sensor2
1	120,000	120,000	120,000	120,000

Initial Supporting table - P0011_CamPosErrorLimIc1

Description: Maximum Intake Cam 1 phase error as a function of engine speed and engine oil temperature.

Value Units: Maximum Intake Cam 1 phase error (degCAM)
X Unit: Engine Oil Temperature (degC)
Y Units: Engine Speed (rpm)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
800	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
1,200	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
1,600	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
2,000	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
2,400	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
2,800	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
3,200	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
3,600	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
4,000	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
4,400	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
4,800	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
5,200	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
5,600	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
6,000	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
6,400	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
6,800	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0

Initial Supporting table - P0011_P0021_P05CC_P05CD_EngOilPressEnbllc

Description: Delay time before the oil pressure enable flag is set assuming all the oil pressure enable criteria are met

Value Units: Time (sec)
X Unit: Engine Coolant Temperature (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	45	45	45	45	30	30	25	25	20	15	5	2	2	2	2	1	1

Initial Supporting table - P0011_P0021_P05CC_P05CD_HiEngSpdHiDsbllc

Description: Minimum engine speed to disable Intake cam

Value Units: Engine Speed (rpm)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000

Initial Supporting table - P0011_P0021_P05CC_P05CD_HiEngSpdLoEnbIlc

Description: Maximum engine speed to enable Intake cam - works as hysteresis.

Value Units: Engine Speed (rpm)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,800

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoPresHiEnbllc

Description: Intake cam is enabled when oil pressure exceeds this value

Value Units: Engine Speed (rpm)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoPresLoDsbllc

Description: Intake cam is disabled when oil pressure falls below this value

Value Units: Engine Oil Pressure (kPa)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoRpmHiEnbllc

Description: Intake cam is enabled when engine speed exceeds this value.

Value Units: Engine Speed (rpm)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	1,300	1,300	1,300	1,200	1,200	1,200	1,200	1,200	1,150	1,050	875	775	775	775	775	800	800

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoRpmLoDsbllc

Description: Intake cam is disabled when engine speed is below this value.

Value Units: Engine Speed (rpm)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	1,100	1,100	1,100	1,000	1,000	1,000	1,000	1,000	1,000	975	800	725	725	725	725	775	775

Initial Supporting table - P0011_P0021_P05CC_P05CD_P0014_P0024_P05CE_P05CF_ColdStartEngRunning

Description: Engine running time must be greater than this threshold during a cold start to enable cam phasing

Value Units: Time (sec)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	30	30	30	14	14	14	14	14	8	7	6	6	6	6	6	4	4

Initial Supporting table - P0011_P05CC_StablePositionTimeIc1

Description: Minimum time for Intake Cam 1 phase position to be stable to enable performance diagnostic.

Value Units: Minimum time (sec)
X Unit: Engine Oil Temperature (degC)
Y Units: Engine Speed (rpm)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
3,200	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
6,400	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
9,600	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
12,800	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
16,000	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
19,200	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
22,400	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
25,600	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
28,800	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
32,000	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
35,200	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
38,400	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
41,600	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
44,800	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
48,000	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
51,200	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
54,400	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4

Initial Supporting table - P0014_P0024_P05CE_P05CF_EngOilPressEnblEc

Description: Delay time before the oil pressure enable flag is set assuming all the oil pressure enable criteria are met

Value Units: Time (sec)
X Unit: Engine Coolant Temperature (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0014_P0024_P05CE_P05CF_HiEngSpdHiDsblEc

Description: Exhaust cam is disabled when engine speed exceeds this value

Value Units: Engine Speed (rpm)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0014_P0024_P05CE_P05CF_HiEngSpdLoEnblEc

Description: Exhaust cam is enabled when engine speed remains below this value

Value Units: Engine Speed (rpm)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0014_P0024_P05CE_P05CF_LoPresHiEnblEc

Description: Exhaust cam is enabled when oil pressure exceeds this value

Value Units: Engine Oil Pressure (kPa)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180

Initial Supporting table - P0014_P0024_P05CE_P05CF_LoPresLoDsblEc

Description: Exhaust cam is disabled when oil pressure falls below this value

Value Units: Engine Oil Pressure (kPa)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125

Initial Supporting table - P0014_P0024_P05CE_P05CF_LoRpmHiEnblEc

Description: Exhaust cam is enabled when engine speed exceeds this value.

Value Units: Engine Speed (rpm)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	1,300	1,300	1,300	1,200	1,200	1,200	1,200	1,200	1,150	1,050	875	775	775	775	775	800	800

Initial Supporting table - P0014_P0024_P05CE_P05CF_LoRpmLoDsblEc

Description: Exhaust cam is disabled when engine speed is below this value.

Value Units: Engine Speed (rpm)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750

Initial Supporting table - P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold

Description: P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold

Value Units: Engine Run Time- Seconds
X Unit: Oil Temperature- C

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	300.0	300.0	160.0	18.0	18.0	18.0	18.0	10.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

Initial Supporting table - P0016-0019 Mid-Park Phaser Delay

Description: P0016-0019 Mid-Park Phaser Park Delay. Total delay is twice the calibration value as both 'hi' side and 'lo' side park check sequences are delayed by the stated calibration values

Value Units: Time - seconds
X Unit: Oil Temperature - degC

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

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	20.0	30.0	45.0	60.0	75.0	90.0	105.0	120.0
1.0	0.0	4.0	6.0	6.8	7.3	7.8	8.0	8.0	8.0

Initial Supporting table - P0071: OAT Performance Drive Equilibrium Engine Running

Description: OAT Performance Diagnostic counter increment for determining OAT-IAT equilibrium 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	20.0	30.0	45.0	60.0	75.0	90.0	105.0	120.0
0.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
15.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
25.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
35.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
45.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
55.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
65.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
75.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
85.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5

Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAPI Residual Weight Factor based on RPM

Value Units: Weight Factor (Unitless)
X Unit: Engine Speed (RPM)

y/x	100	400	900	1,400	1,800	2,200	2,600	3,000	3,400	3,800	4,200	4,600	5,000	5,400	5,800	6,200	6,800
1	0.893	1.000	1.000	1.000	1.000	1.000	1.000	0.826	1.000	1.000	1.000	1.000	1.000	1.000	0.864	0.000	0.000

Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP2 Residual Weight Factor based on RPM

Value Units: Weight Factor (Unitless)
X Unit: Engine Speed (RPM)

y/x	100	400	900	1,400	1,800	2,200	2,600	3,000	3,400	3,800	4,200	4,600	5,000	5,400	5,800	6,200	6,800
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000

Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP3 Residual Weight Factor based on RPM

Value Units: Weight Factor (Unitless)
X Unit: Engine Speed (RPM)

y/x	100	400	900	1,400	1,800	2,200	2,600	3,000	3,400	3,800	4,200	4,600	5,000	5,400	5,800	6,300	6,800
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P0236_P1101 TPS Residual Weight Factor based on RPM

Value Units: Weight Factor (Unitless)
X Unit: Engine Speed (RPM)

y/x	100	400	900	1,400	1,800	2,200	2,600	3,000	3,400	3,800	4,200	4,600	5,000	5,400	5,800	6,300	6,800
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000

Initial Supporting table - P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost

Description: P0101_P0106_P0121_P012B_P1101 Boost Residual Weight Factor based on % of Boost

Value Units: Weight Factor (Unitless)
X Unit: Boost Percentage (%)

y/x	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Initial Supporting table -P0101, P0106, P0121, P012B, P1101: SCIAP1 Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P1101 SCIAP1 Residual Weight Factor based on RPM

Value Units: Weight Factor (Unitless)
X Unit: Engine Speed (RPM)

y/x	100	400	900	1,400	1,800	2,200	2,600	3,000	3,400	3,800	4,200	4,600	5,000	5,400	5,800	6,200	6,800
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000

Initial Supporting table - P0101, P0106, P0121, P012B, P1101: SCIAP2 Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P1101 SCIAP2 Residual Weight Factor based on RPM

Value Units: Weight Factor (Unitless)
X Unit: Engine Speed (RPM)

y/x	100	400	900	1,400	1,800	2,200	2,600	3,000	3,400	3,800	4,200	4,600	5,000	5,400	5,800	6,300	6,800
1	1.000	0.700	0.750	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000

Initial Supporting table - P0101, P0106, P0121, P012B, P1101: Supercharger Intake Flow Rationality Diagnostic Failure Matrix

Description: Supercharger Intake Flow Rationality Diagnostic Failure Matrix - This table describes combinations of individual model failures that will set P0101, P0106, P012B, P0121 and P1101 on supercharged applications.

Value Units: Boolean
X Unit: Unitless (See top line for heading information)
Y Units: Unitless

y/x	1	2	3	4	5	6	7
1	TPS Model Failure	MAF Model Failure	MAPI Model Failure	MAP2 Model Failure	SCIAP1 Model Failure	SCIAP2 Model Failure	DTC Set
2	F	F	F	F	F	F	No DTC
3	F	F	F	F	F	T	No DTC
4	F	F	F	F	T	F	No DTC
5	F	F	F	F	T	T	P012B
6	F	F	F	T	F	F	No DTC
7	F	F	F	T	F	T	P1101
8	F	F	F	T	T	F	P1101
9	F	F	F	T	T	T	P1101
10	F	F	T	F	F	F	No DTC
11	F	F	T	F	F	T	P1101
12	F	F	T	F	T	F	P1101
13	F	F	T	F	T	T	P1101
14	F	F	T	T	F	F	P0106
15	F	F	T	T	F	T	P1101
16	F	F	T	T	T	F	P1101
17	F	F	T	T	T	T	P1101
18	F	T	F	F	F	F	No DTC
19	F	T	F	F	F	T	P0101
20	F	T	F	F	T	F	No DTC
21	F	T	F	F	T	T	P0101 & P012B
22	F	T	F	T	F	F	P1101
23	F	T	F	T	F	T	P0101
24	F	T	F	T	T	F	P1101
25	F	T	F	T	T	T	P0101 & P012B
26	F	T	T	F	F	F	P1101
27	F	T	T	F	F	T	P1101
28	F	T	T	F	T	F	P1101
29	F	T	T	F	T	T	P1101
30	F	T	T	T	F	F	P1101
31	F	T	T	T	F	T	P1101

Initial Supporting table - P0101, P0106, P0121, P012B, P1101: Supercharger Intake Flow Rationality Diagnostic Failure Matrix

32	F	T	T	T	T	F	P1101
33	F	T	T	T	T	T	P1101
34	T	F	F	F	F	F	P0121
35	T	F	F	F	F	T	No DTC
36	T	F	F	F	T	F	P0121
37	T	F	F	F	T	T	P1101
38	T	F	F	T	F	F	P1101
39	T	F	F	T	F	T	P1101
40	T	F	F	T	T	F	P1101
41	T	F	F	T	T	T	P1101
42	T	F	T	F	F	F	P0121
43	T	F	T	F	F	T	P1101
44	T	F	T	F	T	F	P0121
45	T	F	T	F	T	T	P1101
46	T	F	T	T	F	F	P1101
47	T	F	T	T	F	T	P1101
48	T	F	T	T	T	F	P1101
49	T	F	T	T	T	T	P1101
50	T	T	F	F	F	F	P0121
51	T	T	F	F	F	T	P1101
52	T	T	F	F	T	F	P0121
53	T	T	F	F	T	T	P1101
54	T	T	F	T	F	F	P1101
55	T	T	F	T	F	T	P1101
56	T	T	F	T	T	F	P1101
57	T	T	F	T	T	T	P1101
58	T	T	T	F	F	F	P0121
59	T	T	T	F	F	T	P1101
60	T	T	T	F	T	F	P0121
61	T	T	T	F	T	T	P1101
62	T	T	T	T	F	F	P1101
63	T	T	T	T	F	T	P1101
64	T	T	T	T	T	F	P1101
65	T	T	T	T	T	T	P1101

Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P0236_P1101 TIAP Residual Weight Factor based on RPM

Value Units: Weight Factor (Unitless)
X Unit: Engine Speed (RPM)

y/x	100	400	900	1,400	1,800	2,200	2,600	3,000	3,400	3,800	4,200	4,600	5,000	5,400	5,800	6,300	6,800
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Initial Supporting table - P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit

Description: Exit Catalyst Warm-up mode if Engine Run Time is greater than this value. This table is based on percent ethanol (x-axis) and catmon's NormRatio_EWMA value (y-axis). The NormRatio_EWMA value determines the state of the catalyst. Typically, NormRatio_EWMA values below 0.35 (0 is bad and 1 is good) represent catalysts that have degraded. The emission performance of these degraded catalysts can be improved by extending catalyst light off of GetE85R_Pct_FFS_CompAtEngFloat.

y/x	0	25	50	75	100
0.000	33	33	33	33	33
0.125	33	33	33	33	33
0.250	33	33	33	33	33
0.375	33	33	33	33	33
0.500	33	33	33	33	33
0.625	22	22	22	22	22
0.750	22	22	22	22	22
0.875	22	22	22	22	22
1.000	22	22	22	22	22

Initial Supporting table - P1400_CatalystLightOffExtendedEngineRunTimeExit

Description: Exit Catalyst Warm-up mode if Engine Run Time is greater than this value. This table is based on percent ethanol (x-axis) and catmon's NormRatio_EWMA value (y-axis). The NormRatio_EWMA value determines the state of the catalyst. Typically, NormRatio_EWMA values below 0.35 (0 is bad and 1 is good) represent catalysts that have degraded. The emission performance of these degraded catalysts can be improved by extending catalyst light off of GetE85R_Pct_FFS_CompAtEngFloat.

y/x	0	25	50	75	100
0.000	33	33	33	33	33
0.125	33	33	33	33	33
0.250	33	33	33	33	33
0.375	33	33	33	33	33
0.500	33	33	33	33	33
0.625	22	22	22	22	22
0.750	22	22	22	22	22
0.875	22	22	22	22	22
1.000	22	22	22	22	22

Initial Supporting table - P1400_ColdStartDiagnosticDelayBasedOnEngineRunTime

Description: Quality weight-based on engine run time. This allows adjustment of the weighting factors at various engine run times in order to prevent the updating of the cumulative quality timer or to change the value of the average qualified residual energy calculation to prevent false Fails of the diagnostic under circumstances inappropriate to update the calculation of the average qualified residual value.

y/x	0	3	3	4	5	10	15	20	30
1	0	0	1	1	1	1	1	1	1

Initial Supporting table - P1400_ColdStartDiagnosticDelayBasedOnEngineRunTimeCalAxis

Description: This is the x-axis for the KtCSED_K_TimeWght calibration table. Refer to the description for KtCSED_K_TimeWght for details.

y/x	1	2	3	4	5	6	7	8	9
1	0	3	3	4	5	10	15	20	30

Initial Supporting table - P1400_EngineSpeedResidual_Table

Description: This 1x17 table of engine exhaust flow values is used to calculate both the desired and the actual engine exhaust flow based on desired and actual engine speed. The desired engine exhaust flow is gathered from the desired engine speed (VeSPDR_n_EngDsrd). The value used for the actual engine exhaust flow is based on the actual engine RPM value.

y/x	650	725	750	785	800	850	900	950	1,000	1,040	1,080	1,100	1,150	1,175	1,200	1,300	1,500
1	2	2	5	7	7	7	7	7	10	11	12	12	12	12	12	12	12

Initial Supporting table - P1400_SparkResidual_Table

Description: Predicted engine-out energy potential based on either the desired cold start spark advance value or the actual spark advance value. ExhEngyPerlInitMass calibration is used to calculate both desired exhaust energy and actual energy. The desired and actual exhaust energy per unit mass values are used in part to calculate the desired exhaust energy per unit time and actual exhaust energy per unit time. Both desired and actual go into the residual exhaust energy per unit time calculation.

y/x	-7	-5	-2	-1	3	5	10	12	15
1	1.13	1.13	1.13	1.00	1.00	1.00	1.00	0.63	0.63

Initial Supporting table - P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est

Description: P0101_P0106_P010B_P0121_P012B_P0236_P1101 MAF1 Residual Weight Factor based on MAF Est

Value Units: Weight Factor (Unitless)
X Unit: Estimated Engine Air Flow (Grams/Second)

y/x	0	50	75	100	140	160	180	200	250	300	340	380	420	460	500	550	600
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Initial Supporting table -P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM

Description: P0101_P0106_P010B_P0121_P012B_P0236_P1101 MAF1 Residual Weight Factor based on RPM

Value Units: Weight Factor (Unitless)
X Unit: Engine Speed (RPM)

y/x	100	400	900	1,400	1,800	2,200	2,600	3,000	3,400	3,800	4,200	4,600	5,000	5,400	5,800	6,200	6,800
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.978	0.865	0.863	0.000

Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606 PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	5	5	5	3	5	3	5	3

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	5	3	5	3	5	5	5	5

Initial Supporting table - P0606 PSW Sequence Sample f(Loop Time)

Description: Sample threshold for PSW per operating loop.

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	4	4	4	4	4	4	4

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	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
12	0.64	0.64	0.64	0.64	0.64	0.64	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
16	0.55	0.55	0.55	0.55	0.55	0.57	0.58	0.60	0.63	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
20	0.41	0.41	0.41	0.41	0.41	0.44	0.47	0.50	0.58	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
24	0.30	0.30	0.30	0.30	0.30	0.36	0.41	0.47	0.56	0.63	0.61	0.61	0.61	0.61	0.61	0.61	0.61
30	0.20	0.20	0.20	0.20	0.20	0.29	0.38	0.47	0.53	0.57	0.56	0.58	0.59	0.59	0.59	0.59	0.59
40	0.10	0.10	0.10	0.10	0.10	0.23	0.37	0.50	0.47	0.46	0.50	0.55	0.60	0.60	0.60	0.60	0.60
60	0.10	0.10	0.10	0.10	0.10	0.23	0.37	0.50	0.47	0.46	0.50	0.55	0.60	0.60	0.60	0.60	0.60
100	0.10	0.10	0.10	0.10	0.10	0.23	0.37	0.50	0.47	0.46	0.50	0.55	0.60	0.60	0.60	0.60	0.60

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	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	-0.50	-0.50	-0.50	-0.50	-0.50	-0.55	-0.59	-0.64	-0.68	-0.69	-0.62	-0.56	-0.50	-0.50	-0.50	-0.50	-0.50
12	-0.63	-0.63	-0.63	-0.63	-0.63	-0.64	-0.66	-0.67	-0.66	-0.71	-0.77	-0.75	-0.71	-0.71	-0.71	-0.71	-0.71
16	-0.83	-0.83	-0.83	-0.83	-0.83	-0.80	-0.77	-0.74	-0.65	-0.75	-0.93	-0.93	-0.93	-0.93	-0.93	-0.93	-0.93
20	-1.00	-1.00	-1.00	-1.00	-1.00	-0.94	-0.87	-0.81	-0.69	-0.75	-0.92	-0.92	-0.92	-0.92	-0.92	-0.92	-0.92
24	-1.21	-1.21	-1.21	-1.21	-1.21	-1.05	-0.90	-0.74	-0.64	-0.73	-0.91	-0.91	-0.91	-0.91	-0.91	-0.91	-0.91
30	-1.32	-1.32	-1.32	-1.32	-1.32	-1.14	-0.95	-0.76	-0.67	-0.74	-0.91	-0.91	-0.91	-0.91	-0.91	-0.91	-0.91
40	-1.33	-1.33	-1.33	-1.33	-1.33	-1.19	-1.06	-0.92	-0.79	-0.78	-0.90	-0.90	-0.90	-0.90	-0.90	-0.90	-0.90
60	-1.33	-1.33	-1.33	-1.33	-1.33	-1.19	-1.06	-0.92	-0.79	-0.78	-0.90	-0.90	-0.90	-0.90	-0.90	-0.90	-0.90
100	-1.33	-1.33	-1.33	-1.33	-1.33	-1.19	-1.06	-0.92	-0.79	-0.78	-0.90	-0.90	-0.90	-0.90	-0.90	-0.90	-0.90

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	4	4	4	4	4	4	4	4	4

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	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

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	4	4	4	4	4	4	4	4	4

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	500	600	700	800	900	1,000	1,100	1,200
12	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
16	0.75	0.69	0.75	0.75	0.75	0.73	0.71	0.75	0.75
18	0.75	0.60	0.70	0.62	0.67	0.67	0.65	0.69	0.54
20	0.75	0.64	0.75	0.75	0.75	0.70	0.71	0.75	0.67
24	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
30	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
40	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
60	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
98	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75

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	500	600	700	800	900	1,000	1,100	1,200
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
18	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
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
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	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
12	0.75	0.75	0.75	0.75	0.75	1.00	1.00	1.00	1.00	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
16	0.61	0.56	0.52	0.50	0.47	0.38	0.29	0.28	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
18	0.42	0.52	0.63	0.57	0.51	0.47	0.43	0.37	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
20	0.54	0.54	0.54	0.54	0.55	0.53	0.52	0.43	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
24	0.58	0.60	0.62	0.56	0.49	0.50	0.51	0.42	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
30	0.60	0.62	0.64	0.67	0.70	0.57	0.43	0.37	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
40	0.52	0.55	0.58	0.56	0.53	0.45	0.37	0.35	0.32	0.35	0.35	0.39	0.40	0.40	0.40	0.40	0.40
60	0.40	0.43	0.46	0.42	0.38	0.38	0.37	0.35	0.30	0.28	0.32	0.33	0.38	0.38	0.38	0.38	0.38
98	0.39	0.36	0.34	0.30	0.26	0.29	0.32	0.31	0.28	0.25	0.31	0.28	0.37	0.37	0.37	0.37	0.37

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	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	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	0.97	0.94	0.86	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
18	1.00	1.00	1.00	1.00	1.00	0.94	0.89	0.83	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
20	0.91	0.95	1.00	1.00	1.00	0.94	0.88	0.82	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
24	0.80	0.88	0.95	0.96	0.97	1.00	1.03	0.92	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
30	0.71	0.78	0.86	0.86	0.87	0.93	0.99	0.89	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
40	0.70	0.70	0.70	0.70	0.70	0.72	0.74	0.73	0.70	0.70	0.70	0.70	0.71	0.71	0.71	0.71	0.71
60	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
98	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70

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	11.2	11.2	11.2	11.2	5.6	4.8	4.8	4.8
10	11.2	11.2	11.2	11.2	5.6	4.8	4.8	4.8
20	11.2	11.2	7.3	5.6	5.6	4.8	4.8	4.8
30	11.2	11.2	5.6	5.6	5.6	4.8	4.8	4.8
40	5.6	5.6	5.6	5.6	5.6	4.8	4.8	4.8
50	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
60	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
70	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
80	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
90	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
100	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8

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
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
20	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
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 - ClyBeforeAFM_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
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
20	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
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 - 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_CombModes Max	CeCMBR_i_CombModes Max	CeCMBRJ_CombModes Max	CeCMBRJJDombModes Max	CeCMBRJ_CombModes Max	CeCMBRJ_CombModes Max

CombustModeIdleTbl - Part 2

y/x	6	7	8	9	10	11
1	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBRJ_CombModes Max	CeCMBRJJDombModes Max	CeCMBRJ_CombModes Max	CeCMBRJ_CombModes Max

CombustModeIdleTbl - Part 3

y/x	12	13	14	15	16	
1	CeCMBRJCombModes Max	CeCMBRJCombModes Max	CeCMBRJCombModes Max	CeCMBRJCombModes Max	CeCMBRJCombModes Max	

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	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	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	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	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	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	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	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	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	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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

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	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
12	0	0	0	0	0	0	1	1	1	0	0	0	-1	-1	-1	-1	-1
16	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	500	600	700	800	900	1,000	1,100	1,200
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
20	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
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	500	600	700	800	900	1,000	1,100	1,200
8	0.00	0.00	-0.07	-0.14	-0.13	-0.14	-0.21	-0.23	0.13
12	0.00	0.00	0.00	-0.08	-0.08	-0.15	-0.10	-0.08	-0.11
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	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
30	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
40	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
60	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
98	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25

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
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
98	1	1	1	1	1	1	1	1	1

Initial Supporting table - CylBeforeAFM_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
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
20	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
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 - 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	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
3	1,820	1,400	920	595	420	310	200	189	156	107	61	51	34
6	1,690	1,300	900	585	410	300	195	182	150	104	59	48	31
8	1,820	1,400	950	585	410	300	195	182	150	104	59	48	31
10	2,080	1,600	1,050	635	485	330	200	202	163	107	72	50	34
12	2,340	1,800	1,150	650	500	350	230	228	176	111	78	55	38
14	2,925	2,250	1,250	725	550	450	275	273	208	124	98	63	43
16	3,250	2,500	1,350	825	630	500	325	338	228	150	111	73	52
18	3,575	2,750	1,400	900	660	560	380	390	260	182	117	76	56
20	3,900	3,000	1,600	1,000	715	585	425	442	273	202	130	91	65
22	5,493	4,225	2,210	1,365	975	826	585	468	286	221	143	104	72
24	5,915	4,550	2,340	1,430	1,040	891	637	494	312	234	167	111	78
26	6,338	4,875	2,470	1,495	1,105	962	683	520	338	267	182	124	85
30	6,760	5,200	2,730	1,560	1,235	1,092	787	585	436	299	215	150	98
40	8,450	6,500	3,250	1,950	1,560	1,424	1,053	813	572	390	273	182	137
60	11,830	9,100	4,550	2,470	2,210	2,080	1,573	1,222	878	572	410	286	215
78	15,210	11,700	5,850	2,990	2,782	2,665	2,035	1,580	1,144	728	546	358	280
97	18,590	14,300	7,150	3,510	3,380	3,328	2,555	1,983	1,469	910	683	455	358

CylModeDecel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
3	26	21	16	13	13	13	12	11	9	9	8	7	7
6	24	18	16	12	12	12	12	11	9	9	8	7	7
8	24	18	16	12	12	12	12	11	9	9	8	7	7
10	28	21	16	13	12	12	9	8	8	8	7	7	7
12	30	24	20	16	12	11	7	7	7	7	7	7	7
14	35	26	22	17	15	13	8	5	7	7	7	6	6
16	39	30	25	18	16	13	9	6	6	7	5	5	5
18	43	33	26	21	17	16	11	6	6	5	5	4	4
20	50	37	30	24	18	17	11	7	6	5	5	4	4
22	55	39	31	26	22	18	12	7	7	5	5	4	4
24	63	43	35	28	24	20	12	8	7	5	5	4	4

Initial Supporting table - CylModeDecel

26	69	46	39	30	26	21	12	9	7	5	5	4	4
30	78	59	46	39	29	24	15	9	7	5	5	4	4
40	104	72	59	50	39	29	20	13	8	5	5	5	5
60	156	124	104	85	65	46	24	16	11	9	7	5	5
78	202	163	137	111	85	65	29	20	13	11	9	9	9
97	254	208	169	137	104	85	34	24	15	12	11	10	10

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	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
3	1,820	1,400	920	585	400	300	200	189	156	100	61	47	31
6	1,690	1,300	900	575	390	290	195	182	150	98	59	44	29
8	1,820	1,400	950	575	390	290	195	182	150	98	59	44	29
10	2,080	1,600	1,050	625	465	320	200	189	156	100	72	46	31
12	2,340	1,800	1,150	650	500	350	220	215	163	98	72	50	34
14	2,925	2,250	1,250	725	550	450	275	273	195	111	91	59	42
16	3,250	2,500	1,350	825	630	500	325	338	228	137	104	69	52
18	3,575	2,750	1,400	900	660	560	380	390	260	176	111	69	52
20	3,900	3,000	1,600	1,000	715	585	425	442	273	195	117	85	59
22	5,493	4,225	2,210	1,365	975	826	585	468	286	215	130	98	65
24	5,915	4,550	2,340	1,430	1,040	891	637	494	312	228	154	104	72
26	6,338	4,875	2,470	1,495	1,105	962	683	520	338	260	169	117	78
30	6,760	5,200	2,730	1,560	1,235	1,092	787	585	436	293	202	143	91
40	8,450	6,500	3,250	1,950	1,560	1,424	1,053	813	559	390	260	176	130
60	11,830	9,100	4,550	2,470	2,210	2,080	1,573	1,222	865	559	403	280	208
78	15,210	11,700	5,850	2,990	2,782	2,665	2,035	1,580	1,131	702	540	351	273
97	18,590	14,300	7,150	3,510	3,380	3,328	2,555	1,983	1,469	897	676	449	351

CylModeJerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
3	24	18	16	12	11	0	0	0	0	0	0	0	0
6	21	16	13	11	9	0	0	0	0	0	0	0	0
8	20	16	13	11	9	0	0	0	0	0	0	0	0
10	25	17	13	11	9	0	0	0	0	0	0	0	0
12	26	20	17	12	9	0	0	0	0	0	0	0	0
14	33	24	20	16	13	0	0	0	0	0	0	0	0
16	39	28	22	17	15	0	0	0	0	0	0	0	0
18	38	30	24	18	16	0	0	0	0	0	0	0	0
20	46	34	26	20	16	0	0	0	0	0	0	0	0
22	50	37	28	22	18	0	0	0	0	0	0	0	0
24	57	39	31	24	20	0	0	0	0	0	0	0	0

Initial Supporting table - CylModeJerk

26	63	39	33	26	22	0	0	0	0	0	0	0	0
30	72	52	39	33	26	0	0	0	0	0	0	0	0
40	98	65	52	43	37	0	0	0	0	0	0	0	0
60	150	117	98	78	59	0	0	0	0	0	0	0	0
78	195	156	130	104	78	0	0	0	0	0	0	0	0
97	247	202	163	130	98	0	0	0	0	0	0	0	0

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
8	30	10	5	3	3	3	3	3	3
12	30	15	5	3	3	3	3	3	3
16	30	15	8	3	3	3	3	3	3
20	125	55	25	3	3	3	3	3	3
24	175	100	50	3	3	3	3	3	3
30	275	150	75	14	3	3	3	3	3
40	325	175	100	25	15	7	5	3	3
60	375	200	120	40	30	12	10	7	7
98	475	250	160	60	50	25	20	17	17

Initial Supporting table - CeacCylInversionJerk

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
8	100	25	10	5	5	3	3	3	3
12	250	80	30	18	10	3	3	3	3
16	350	150	100	35	16	5	3	3	3
20	600	300	185	75	20	15	5	4	4
24	800	450	230	100	30	19	14	5	5
30	950	600	350	115	45	25	18	12	12
40	1,025	650	450	200	90	40	30	20	20
60	1,100	700	475	225	100	50	35	25	25
98	1,250	800	535	275	120	70	45	40	40

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	6,200	6,200	6,200	6,200	6,200	6,200	6,200

EngineOverSpeedLimit - Part 2

y/x	CeTGRR_e_TransGr10	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	6,200	4,000	4,000	4,000	6,200	6,200	

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 differant combustion modes (enumeration)
X Unit: Current Combustion Mode (enumeration)

InfrequentRegen - Part 1

y/x	0	1	2	3	4	5
1	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max

InfrequentRegen - Part 2

y/x	6	7	8	9	10	11
1	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max

InfrequentRegen - Part 3

y/x	12	13	14	15	16	
1	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	CeCMBR_i_CombModes Max	

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 - P00C6 - High Pressure Pump Control Mode timeout

Description: High Pressure Pump Control Mode timeout

Value Units: Time (Seconds)
X Unit: Coolant Temperature (Deg C)

y/x	-40	-35	-30	-25	-20	-10	0	8	16	20	24	32	40	66	80	90	112
1	10.0	10.0	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

P00C6 - maximum acceptable counts of fuel rail pressure below KtFHPD_p_HPS_PressFallLoThrsh after High Pressure Start

Description: The maximum acceptable counts of fuel rail pressure below KtFHPD_p_HPS_PressFallLoThrsh after High Pressure Start (HPS) is executed but before engine is in run mode.

Value Units: maximum acceptable counts of fuel rail pressure below KtFHPD_p_HPS_PressFallLoThrsh after High Pressure Start (Count)
X Unit: Coolant Temperature (Deg C)
Y Units: Ethanol Precent (%)

y/x	-40	-35	-30	-25	-20	-10	0	8	16	20	24	32	40	66	80	90	112
0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
13	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
25	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
38	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
50	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
63	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
75	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
88	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
100	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

Initial Supporting table - P00C6 - Minimum acceptable value of fuel rail pressure after High Pressure Start

Description: The minimum acceptable value of fuel rail pressure after High Pressure Start (HPS) is executed. This ensures the pressure does not fall off drastically after High Pressure Start (HPS) is executed, but before engine is in run mode.

Value Units: Minimum acceptable value of fuel rail pressure after High Pressure Start (Mpa)
X Unit: Coolant Temperature (Deg C)
Y Units: Ethanol Precent (%)

y/x	-40	-35	-30	-25	-20	-10	0	8	16	20	24	32	40	66	80	90	112
0	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
13	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
25	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
38	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
50	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
63	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
75	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
88	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
100	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6

Initial Supporting table - P00C6 - Minimum pressure in MPa that will exit High Pressure Start mode and allow fuel delivery

Description: This calibration is the minimum pressure in MPa that will exit High Pressure Start mode and allow fuel delivery

Value Units: Minimum pressure in MPa that will exit High Pressure Start mode and allow fuel delivery
X Unit: Coolant Temperature (Deg C)
Y Units: Ethanol Precent (%)

y/x	-40	-35	-30	-25	-20	-10	0	8	16	20	24	32	40	66	80	90	112
0	14.0	14.0	14.0	11.0	10.0	6.0	3.9	3.9	3.9	3.9	3.9	3.9	2.8	2.5	2.0	2.0	2.0
13	14.0	14.0	14.0	11.0	10.0	6.0	3.9	3.9	3.9	3.9	3.9	3.9	2.8	2.5	2.0	2.0	2.0
25	14.0	14.0	14.0	12.0	8.0	7.0	5.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
38	14.0	14.0	14.0	13.0	10.0	8.6	6.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
50	14.0	14.0	14.0	13.0	10.0	8.6	6.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
63	14.0	14.0	14.0	13.0	10.0	8.6	6.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
75	14.0	14.0	14.0	13.0	10.0	8.6	6.0	5.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
88	14.0	14.0	14.0	13.0	10.0	8.6	7.0	6.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
100	14.0	14.0	14.0	13.0	10.0	8.6	7.5	7.0	6.0	5.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0

Initial Supporting table - P0420_BestFailingOSCTableB1

Description: This table is a 9x17 table of baseline Best Failing (e.g. threshold converter) OSC times for catalyst Bank 1. The axis' for this table include the average airflow and the catalyst temperature. After OSC is measured for a specific temp and airflow,the BestFailing OSC value is found within this table for the measured temp and airflow and is used along with the OSC_TimeRaw (and the WorstPassing value) to calculate the Normalized Ratio for that specific test. The values in this table are based on the measured OSC for the identified BPU converter that is used for MIL illumination across the specific temp and airflow range for a given program.

y/x	6.66	7.43	8.19	8.95	9.71	10.47	11.23	11.99	12.75	13.52	14.28	15.04	15.80	16.56	17.32	18.08	18.84
550.00	0.88	0.79	0.78	0.76	0.70	0.67	0.65	0.60	0.58	0.54	0.53	0.49	0.46	0.44	0.46	0.48	0.30
593.00	0.88	0.79	0.78	0.76	0.70	0.67	0.65	0.60	0.58	0.54	0.53	0.49	0.46	0.44	0.46	0.48	0.30
637.00	0.88	0.79	0.78	0.76	0.70	0.67	0.65	0.60	0.58	0.54	0.53	0.49	0.46	0.44	0.46	0.48	0.30
681.00	0.88	0.79	0.78	0.76	0.70	0.67	0.65	0.60	0.58	0.54	0.53	0.49	0.46	0.44	0.46	0.48	0.30
725.00	0.88	0.79	0.78	0.76	0.70	0.67	0.65	0.60	0.58	0.54	0.53	0.49	0.46	0.44	0.46	0.48	0.30
768.00	0.88	0.79	0.78	0.76	0.70	0.67	0.65	0.60	0.58	0.54	0.53	0.49	0.46	0.44	0.46	0.48	0.30
812.00	0.88	0.79	0.78	0.76	0.70	0.67	0.65	0.60	0.58	0.54	0.53	0.49	0.46	0.44	0.46	0.48	0.30
856.00	0.88	0.79	0.78	0.76	0.70	0.67	0.65	0.60	0.58	0.54	0.53	0.49	0.46	0.44	0.46	0.48	0.30
900.00	0.88	0.79	0.78	0.76	0.70	0.67	0.65	0.60	0.58	0.54	0.53	0.49	0.46	0.44	0.46	0.48	0.30

Initial Supporting table - P0420_WorstPassingOSCTableB1

Description: This table is a 9x17 table of WorstPassing (e.g. 120k) OSC times for catalyst Bank 1. The axis' for this table include the average airflow and the catalyst temperature. After OSC is measured for a specific temp and airflow, the WorstPassing OSC value is found within this table for the measured temp and airflow and is used along with the OSC_TimeRaw (and the BestFailing OSC value) to calculate the Normalized Ratio for that specific test.The values in this table are based on the measured OSC for the WPA part across the temp and airflow range.

y/x	6.66	7.43	8.19	8.95	9.71	10.47	11.23	11.99	12.75	13.52	14.28	15.04	15.80	16.56	17.32	18.08	18.84
550.00	1.18	1.15	1.08	1.06	1.00	0.93	0.87	0.85	0.78	0.71	0.70	0.68	0.65	0.64	0.60	0.59	0.50
593.00	1.18	1.15	1.08	1.06	1.00	0.93	0.87	0.85	0.78	0.71	0.70	0.68	0.65	0.64	0.60	0.59	0.50
637.00	1.18	1.15	1.08	1.06	1.00	0.93	0.87	0.85	0.78	0.71	0.70	0.68	0.65	0.64	0.60	0.59	0.50
681.00	1.18	1.15	1.08	1.06	1.00	0.93	0.87	0.85	0.78	0.71	0.70	0.68	0.65	0.64	0.60	0.59	0.50
725.00	1.18	1.15	1.08	1.06	1.00	0.93	0.87	0.85	0.78	0.71	0.70	0.68	0.65	0.64	0.60	0.59	0.50
768.00	1.18	1.15	1.08	1.06	1.00	0.93	0.87	0.85	0.78	0.71	0.70	0.68	0.65	0.64	0.60	0.59	0.50
812.00	1.18	1.15	1.08	1.06	1.00	0.93	0.87	0.85	0.78	0.71	0.70	0.68	0.65	0.64	0.60	0.59	0.50
856.00	1.18	1.15	1.08	1.06	1.00	0.93	0.87	0.85	0.78	0.71	0.70	0.68	0.65	0.64	0.60	0.59	0.50
900.00	1.18	1.15	1.08	1.06	1.00	0.93	0.87	0.85	0.78	0.71	0.70	0.68	0.65	0.64	0.60	0.59	0.50

Initial Supporting table - P0430_BestFailingOSCTableB2

Description: This table is a 9x17 table of baseline Best Failing (e.g. threshold converter) OSC times for catalyst Bank 2. The axis' for this table include the average airflow and the catalyst temperature. After OSC is measured for a specific temp and airflow,the BestFailing OSC value is found within this table for the measured temp and airflow and is used along with the OSC_TimeRaw (and the WorstPassing value) to calculate the Normalized Ratio for that specific test. The values in this table are based on the measured OSC for the identified BPU converter that is used for MIL illumination across the specific temp and airflow range for a given program.

y/x	6.66	7.43	8.19	8.95	9.71	10.47	11.23	11.99	12.75	13.52	14.28	15.04	15.80	16.56	17.32	18.08	18.84
550.00	0.88	0.79	0.78	0.76	0.70	0.67	0.65	0.60	0.58	0.54	0.53	0.49	0.46	0.44	0.46	0.48	0.30
593.00	0.88	0.79	0.78	0.76	0.70	0.67	0.65	0.60	0.58	0.54	0.53	0.49	0.46	0.44	0.46	0.48	0.30
637.00	0.88	0.79	0.78	0.76	0.70	0.67	0.65	0.60	0.58	0.54	0.53	0.49	0.46	0.44	0.46	0.48	0.30
681.00	0.88	0.79	0.78	0.76	0.70	0.67	0.65	0.60	0.58	0.54	0.53	0.49	0.46	0.44	0.46	0.48	0.30
725.00	0.88	0.79	0.78	0.76	0.70	0.67	0.65	0.60	0.58	0.54	0.53	0.49	0.46	0.44	0.46	0.48	0.30
768.00	0.88	0.79	0.78	0.76	0.70	0.67	0.65	0.60	0.58	0.54	0.53	0.49	0.46	0.44	0.46	0.48	0.30
812.00	0.88	0.79	0.78	0.76	0.70	0.67	0.65	0.60	0.58	0.54	0.53	0.49	0.46	0.44	0.46	0.48	0.30
856.00	0.88	0.79	0.78	0.76	0.70	0.67	0.65	0.60	0.58	0.54	0.53	0.49	0.46	0.44	0.46	0.48	0.30
900.00	0.88	0.79	0.78	0.76	0.70	0.67	0.65	0.60	0.58	0.54	0.53	0.49	0.46	0.44	0.46	0.48	0.30

Initial Supporting table - P0430_WorstPassingOSCTableB2

Description: This table is a 9x17 table of WorstPassing (e.g. 120k) OSC times for catalyst Bank 2. The axis' for this table include the average airflow and the catalyst temperature. After OSC is measured for a specific temp and airflow, the WorstPassing OSC value is found within this table for the measured temp and airflow and is used along with the OSC_TimeRaw (and the BestFailing OSC value) to calculate the Normalized Ratio for that specific test.The values in this table are based on the measured OSC for the WPA part across the temp and airflow range.

y/x	6.66	7.43	8.19	8.95	9.71	10.47	11.23	11.99	12.75	13.52	14.28	15.04	15.80	16.56	17.32	18.08	18.84
550.00	1.18	1.15	1.08	1.06	1.00	0.93	0.87	0.85	0.78	0.71	0.70	0.68	0.65	0.64	0.60	0.59	0.50
593.00	1.18	1.15	1.08	1.06	1.00	0.93	0.87	0.85	0.78	0.71	0.70	0.68	0.65	0.64	0.60	0.59	0.50
637.00	1.18	1.15	1.08	1.06	1.00	0.93	0.87	0.85	0.78	0.71	0.70	0.68	0.65	0.64	0.60	0.59	0.50
681.00	1.18	1.15	1.08	1.06	1.00	0.93	0.87	0.85	0.78	0.71	0.70	0.68	0.65	0.64	0.60	0.59	0.50
725.00	1.18	1.15	1.08	1.06	1.00	0.93	0.87	0.85	0.78	0.71	0.70	0.68	0.65	0.64	0.60	0.59	0.50
768.00	1.18	1.15	1.08	1.06	1.00	0.93	0.87	0.85	0.78	0.71	0.70	0.68	0.65	0.64	0.60	0.59	0.50
812.00	1.18	1.15	1.08	1.06	1.00	0.93	0.87	0.85	0.78	0.71	0.70	0.68	0.65	0.64	0.60	0.59	0.50
856.00	1.18	1.15	1.08	1.06	1.00	0.93	0.87	0.85	0.78	0.71	0.70	0.68	0.65	0.64	0.60	0.59	0.50
900.00	1.18	1.15	1.08	1.06	1.00	0.93	0.87	0.85	0.78	0.71	0.70	0.68	0.65	0.64	0.60	0.59	0.50

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	500	600	700	800	900	1,000	1,100	1,200
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	0.78	0.73	0.85	0.78	0.79	0.83	0.88	0.77
16	0.95	0.82	0.77	0.87	0.96	0.95	0.87	0.82	0.88
20	0.92	0.85	0.80	0.88	0.95	0.96	0.97	0.93	0.90
24	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
30	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
40	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
60	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
98	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90

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	500	600	700	800	900	1,000	1,100	1,200
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
20	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
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	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	0.90	0.89	0.88	0.86	0.85	0.78	0.72	0.79	0.93	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
12	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.89	0.86	0.89	0.88	0.75	0.78	0.78	0.78	0.78	0.78
16	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.85	0.84	0.76	0.69	0.69	0.69	0.69	0.69
20	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.85	0.87	0.73	0.75	0.75	0.75	0.75	0.75
24	0.90	0.90	0.90	0.90	0.90	0.89	0.88	0.89	0.90	0.90	0.85	0.81	0.75	0.75	0.75	0.75	0.75
30	0.90	0.90	0.90	0.90	0.90	0.88	0.85	0.87	0.90	0.90	0.90	0.79	0.80	0.80	0.80	0.80	0.80
40	0.90	0.90	0.90	0.84	0.78	0.73	0.68	0.71	0.79	0.81	0.90	0.83	0.90	0.90	0.90	0.90	0.90
60	0.90	0.90	0.90	0.75	0.59	0.57	0.56	0.62	0.75	0.63	0.85	0.69	0.90	0.90	0.90	0.90	0.90
98	0.70	0.80	0.90	0.70	0.51	0.50	0.50	0.56	0.68	0.66	0.81	0.72	0.85	0.85	0.85	0.85	0.85

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	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	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	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	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	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	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	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	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	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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - Random_SCD_Decel

Description: Used for P0300 - P0308, Mulitplier to SCDJDecel 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	500	600	700	800	900	1,000	1,100	1,200
8	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
12	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
16	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
20	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
24	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
30	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
40	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
60	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
98	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10

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	500	600	700	800	900	1,000	1,100	1,200
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
20	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
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 - RandomAFM_Decl

Description: Used for P0300 - P0308, Mulitplierto 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
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
20	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
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 ▪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
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
20	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
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 - 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	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
12	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
16	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
20	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
24	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
30	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
40	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
60	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
98	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15

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	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	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	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	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	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	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	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	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	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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomRevModDecl

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	6,500	7,000
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
20	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
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 - 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	900	1,100	1,400	1,800	2,200	2,600	3,000	4,000	5,000
1	1.00	1.31	1.17	1.08	1.17	1.00	1.00	1.00	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	7,000
3	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	202	117	72	65	59	39	29	29
6	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	202	117	72	65	59	39	29	29
8	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	202	117	65	65	59	39	29	29
10	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	202	117	65	59	52	39	29	29
12	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	169	124	65	59	46	39	29	29
14	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	202	143	91	59	46	39	29	29
16	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	228	163	104	65	46	39	29	29
18	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	247	176	117	72	52	39	29	29
20	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	273	189	130	78	52	42	34	34
22	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	306	195	137	85	52	47	42	42
24	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	338	215	143	91	52	47	42	42
26	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	390	254	156	104	72	47	42	42
30	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	455	293	195	130	91	47	42	42
40	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	520	390	247	163	111	73	68	68
60	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	650	520	286	195	130	104	98	98
78	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	715	618	364	234	156	130	124	124
97	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	780	683	455	273	182	156	150	150

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	7	7	7	7	7	7	7

Initial Supporting table - SCD_Decel

Description: Used for P0300-P0308 Crankshaft decel threshold. SCD mode uses smaller windows nearTDC. 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	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
3	683	525	320	220	165	115	85	60	48	32,767	32,767	32,767	32,767
6	650	500	300	215	160	115	80	55	46	32,767	32,767	32,767	32,767
8	683	525	350	220	160	115	80	55	45	32,767	32,767	32,767	32,767
10	780	600	420	260	185	125	85	62	50	32,767	32,767	32,767	32,767
12	943	725	450	275	210	135	100	70	50	32,767	32,767	32,767	32,767
14	1,105	850	500	300	240	170	125	90	60	32,767	32,767	32,767	32,767
16	1,300	1,000	575	400	265	200	150	100	70	32,767	32,767	32,767	32,767
18	1,560	1,200	675	450	300	220	165	120	95	32,767	32,767	32,767	32,767
20	1,820	1,400	775	500	340	240	190	140	110	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
26	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
78	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 - 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	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
3	683	525	320	220	165	115	85	55	48	32,767	32,767	32,767	32,767
6	650	500	300	215	155	115	80	53	46	32,767	32,767	32,767	32,767
8	683	525	350	220	155	115	80	53	45	32,767	32,767	32,767	32,767
10	780	600	410	260	180	120	80	58	48	32,767	32,767	32,767	32,767
12	943	725	450	275	210	135	95	65	50	32,767	32,767	32,767	32,767
14	1,105	850	500	300	240	170	125	90	60	32,767	32,767	32,767	32,767
16	1,300	1,000	575	400	265	200	150	100	70	32,767	32,767	32,767	32,767
18	1,560	1,200	675	450	300	220	165	120	95	32,767	32,767	32,767	32,767
20	1,820	1,400	775	500	340	240	190	140	110	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
26	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
78	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 - 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	900	1,100	1,400	1,800	2,200	2,600	3,000	4,000	5,000
1	1.17	1.23	1.50	1.65	1.42	1.97	2.00	2.00	2.00
1	1.17	1.23	1.50	1.65	1.42	1.97	2.00	2.00	2.00
1	1.17	1.23	1.50	1.65	1.42	1.97	2.00	2.00	2.00
1	1.10	1.14	1.54	1.28	1.25	1.15	1.43	1.43	1.43
2	1.97	2.00	2.00	1.44	1.39	1.67	1.67	1.67	1.67
2	1.92	1.41	1.39	1.63	1.54	1.80	1.83	1.83	1.83
2	1.88	1.41	1.57	1.47	1.59	2.00	2.00	2.00	2.00
3	2.00	1.67	1.83	1.47	1.59	2.00	2.00	2.00	2.00
5	2.00	1.67	1.83	1.47	1.59	2.00	2.00	2.00	2.00

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	0.40002	0.42004	0.43994	0.45996	0.47998	0.50000	0.52002	0.54004	0.56006	0.57996	0.59998	0.62000	0.64001	0.66003	0.68005	0.69995	0.71997

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	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
65	0.50	0.50	0.50	0.50	0.50	0.50	0.70	0.70	0.80	0.80	0.80	0.30	0.50
75	0.50	0.50	0.50	0.50	0.50	0.50	0.70	0.70	0.80	0.80	0.80	0.30	0.50
85	0.50	0.50	0.50	0.50	0.50	0.50	0.70	0.70	0.80	0.80	0.80	0.30	0.50
95	0.50	0.50	0.50	0.50	0.50	0.50	0.70	0.70	0.80	0.80	0.80	0.30	0.50
105	0.50	0.50	0.50	0.50	0.50	0.50	0.70	0.70	0.80	0.80	0.80	0.30	0.50

ZeroTorqueAFM - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
65	0.40	0.30	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
75	0.40	0.30	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
85	0.40	0.30	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
95	0.40	0.30	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
105	0.40	0.30	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20

Initial Supporting table - iZeroTorqueEngLoad

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	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
65	-2.80	-2.80	-2.50	-1.80	-1.50	-1.30	-1.00	-0.60	0.00	0.00	0.00	0.00	0.00
75	-2.80	-2.80	-2.50	-1.80	-1.50	-1.30	-1.00	-0.60	0.00	0.00	0.00	0.00	0.00
85	-2.80	-2.80	-2.50	-1.80	-1.50	-1.30	-1.00	-0.60	0.00	0.00	0.00	0.00	0.00
95	-2.80	-2.80	-2.50	-1.80	-1.50	-1.30	-1.00	-0.60	0.00	0.00	0.00	0.00	0.00
105	-2.80	-2.80	-2.50	-1.80	-1.50	-1.30	-1.00	-0.60	0.00	0.00	0.00	0.00	0.00

ZeroTorqueEngLoad - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
65	0.00	0.00	0.00	0.00	0.00	0.00	3.53	7.07	10.60	14.14	17.67	21.20	28.27
75	0.00	0.00	0.00	0.00	0.00	0.00	3.53	7.07	10.60	14.14	17.67	21.20	28.27
85	0.00	0.00	0.00	0.00	0.00	0.00	3.53	7.07	10.60	14.14	17.67	21.20	28.27
95	0.00	0.00	0.00	0.00	0.00	0.00	3.53	7.07	10.60	14.14	17.67	21.20	28.27
105	0.00	0.00	0.00	0.00	0.00	0.00	3.53	7.07	10.60	14.14	17.67	21.20	28.27

Initial Supporting table - Closed Loop Enable Clarification - KaFCLP_U_SlphrIntglOfst_Thrsh

Description: Integral Offset voltage thresholds (bank and cell specific cals) used with KeFCLP_Pct_CatAccuSlphrPostDsbl to check for sulphur poisoning.

Value Units: millivolts
X Unit: Post Catalyst Number

y/x	CiOXYR_O2_PostCat1	CiOXYR_O2_PostCat2
CiFCLP_Decel	1,000	1,000
CiFCLP_Idle	1,000	1,000
CiFCLP_Cruise	1,000	1,000
CiFCLP_LightAccel	1,000	1,000
CiFCLP_HeavyAccel	1,000	1,000

Initial Supporting table - Closed Loop Enable Clarification - KcFCLP_Cnt_O2RdyCyclesThrsh

Description: Number of times a post oxygen sensor value must be in range before declaring it ready

Value Units: Time (events * 12.5 milliseconds)

y/x	1
1	10

Initial Supporting table - Closed Loop Enable Clarification - KcFULC_O2_SensorReadyEvents

Description: Number of times a pre oxygen sensor value must be in range before declaring it ready

Value Units: Time (events * 12.5 milliseconds)

y/x	1
1	10

Initial Supporting table - Closed Loop Enable Clarification - KeEOSD U RichThrsh

Description: The oxygen sensor voltage above which a sensor will be considered failing during a Rich Test.

Value Units: Volts

y/x	1
1	1,050

Initial Supporting table - Closed Loop Enable Clarification - KeFCLP dm IntegrationAirflowMax

Description: Maximum allowed estimated airflow for post O2 integral terms to be updated.

Value Units: Grams per Second

y/x	1
1	512

Initial Supporting table - Closed Loop Enable Clarification - KeFCLP Pct CatAccuSlphrPostDsbl

Description: Sulphur percent threshold above which post integral learning is disabled if the threshold criteria KaFCLP_U_SlphrIntglOfst_Thrsh is also met.

Value Units: Percent

y/x	1
1	75

Initial Supporting table - Closed Loop Enable Clarification - KeFCLP T IntegrationCatalystMax

Description: Maximum allowed estimated catalytic converter temperature for post O2 integral terms to be updated.

Value Units: Celcius

y/x	1
1	950

Initial Supporting table - Closed Loop Enable Clarification - KeFCLP_T_IntegrationCatalystMin

Description: Minimum allowed estimated catalytic converter temperature to begin using post O2 integration correction terms. Converter temperature must remain above this threshold to ramp-in the post O2 integration adjustments. Once the ramp-in has started, a converter temperature below this threshold will freeze the ramp-in multiplier. Post O2 integration will not be allowed below this converter temperature

Value Units: Celcius

y/x	1
1	500

Initial Supporting table - Closed Loop Enable Clarification - KeFULC_T_WRAF_SensorReadyThrsh

Description: Pumping cell temperature threshold above which the wideband oxygen sensor will be considered ready for use

Value Units: Degrees Celcius

y/x	1
1	700

Initial Supporting table - Closed Loop Enable Clarification - KeWRSC T HtrCntrlCL

Description: WRAF heater temperature enabling threshold fortransition from Open Loop to Closed Loop

Value Units: Degrees Celcius

y/x	1
1	628

Initial Supporting table - Closed Loop Enable Clarification - KeWRSI T PumpCurrentEnable

Description: WRAF heater temperature threshold for enabling the sensor pump current

Value Units: Degrees Celcius

y/x	1
1	628

Initial Supporting table - Closed Loop Enable Clarification - KfFCLL T AdaptiveLoCoolant

Description: LTM learning is inhibited if the engine coolant temperature is below this calibration.

Value Units: Degrees Celcius

y/x	1
1	37

Initial Supporting table - Closed Loop Enable Clarification - KfFCLP_U_O2ReadyThrshLo

Description: Voltage limit checked against when determining if a post converter oxygen sensor is in range

Value Units: millivolts

y/x	1
1	1,100

Initial Supporting table - Closed Loop Enable Clarification - KfFULC_U_O2_SensorReadyThrshLo

Description: Voltage limit checked against when determining if a pre converter oxygen sensor is in range

Value Units: millivolts

y/x	1
1	1,795

Initial Supporting table - Closed Loop Enable Clarification - KtFCLL p AdaptiveLowMAP Limit

Description: Long term fuel learning is disabled below this MAP limit as a function of barometric pressure.

Value Units: KPa
X Unit: KPa

y/x	65	70	75	80	85	90	95	100	105
1	20.0	20.0	20.0	20.0	20.0	21.0	22.0	22.0	22.0

Initial Supporting table - Closed Loop Enable Clarification - KtFCLP t PostIntglDisableTime

Description: Disable integral offset after engine start for this amount of time as a function of start up coolant temperature.

Value Units: Time in seconds
X Unit: Degrees Celcius

y/x	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
1	750.0	750.0	409.0	409.0	400.0	240.0	240.0	240.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Initial Supporting table - Closed Loop Enable Clari-fication- ftFCLPftFPostIntglRampInTime

Description: Time required to ramp integral offset to desired value as a function of start up coolant temperature.

Value Units: Time in seconds
X Unit: Degrees Celcius

y/x	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
1	60.0	60.0	60.0	60.0	60.0	30.0	30.0	30.0	30.0	30.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0

Initial Supporting table - Closed Loop Enable Clarification - KtFSTA_t_ClosedLoopAutostart

Description: Engine run time following an autostart, as a function of begin run coolant, which must be exceeded to enable CLOSED LOOP.

Value Units: Time in seconds
X Unit: Degrees Celcius

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
0	360.0	300.0	240.0	180.0	130.0	50.0	40.0	35.0	20.0	10.0	10.0	10.0	10.0	25.0	25.0	25.0	25.0
25	360.0	300.0	240.0	180.0	130.0	50.0	40.0	35.0	20.0	10.0	10.0	10.0	10.0	25.0	25.0	25.0	25.0
50	360.0	300.0	240.0	180.0	130.0	50.0	40.0	35.0	20.0	10.0	10.0	10.0	10.0	25.0	25.0	25.0	25.0
75	360.0	300.0	240.0	180.0	130.0	50.0	40.0	35.0	20.0	10.0	10.0	10.0	10.0	25.0	25.0	25.0	25.0
100	360.0	300.0	240.0	180.0	130.0	50.0	40.0	35.0	20.0	10.0	10.0	10.0	10.0	25.0	25.0	25.0	25.0

Initial Supporting table - Closed Loop Enable Clarification - KtFSTA_t_ClosedLoopTime

Description: Engine run time, as a function of startup coolant temperature, which must be exceeded to enable CLOSED LOOP.

Value Units: Time in seconds
X Unit: Degrees Celcius

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
0	360.0	300.0	240.0	180.0	130.0	70.0	70.0	70.0	70.0	20.0	20.0	20.0	20.0	25.0	25.0	25.0	25.0
25	360.0	300.0	240.0	180.0	130.0	70.0	70.0	70.0	70.0	20.0	20.0	20.0	20.0	25.0	25.0	25.0	25.0
50	360.0	300.0	240.0	180.0	130.0	70.0	70.0	70.0	70.0	20.0	20.0	20.0	20.0	25.0	25.0	25.0	25.0
75	360.0	300.0	240.0	180.0	130.0	70.0	70.0	70.0	70.0	20.0	20.0	20.0	20.0	25.0	25.0	25.0	25.0
100	360.0	300.0	240.0	180.0	130.0	70.0	70.0	70.0	70.0	20.0	20.0	20.0	20.0	25.0	25.0	25.0	25.0

Initial Supporting table - P0442 Volatility Time as a Function of Estimate of Ambient Temperature

Description: EONV volatility time as a function of estimated ambient temperature

Value Units: Volatility time (seconds)
X Unit: Estimated Ambient Temperature (Deg C)

y/x	-10	-4	1	7	13	18	24	29	35	41	46	52	58	63	69	74	80
1	45	45	45	45	49	57	105	173	340	500	500	500	500	500	500	500	500

Initial Supporting table - P0442 Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature

Description: Maximum engine off time before vehicle off time as a function of estimated ambient temperature (EAT)

Value Units: Maximum Engine Off Time Before Vehicle Off Time (seconds)
X Unit: Estimated Ambient Temperature (Deg C)

y/x	-10	-4	1	7	13	18	24	29	35	41	46	52	58	63	69	74	80
1	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30

Initial Supporting table - P0442 EONV Pressure Threshold (Pascals)

Description: EONV pressure threshold as a function of fuel level and estimated ambient temperature (EAT)

Value Units: EONV Pressure Threshold (Pascals)
X Unit: Fuel Level (percent) from 0 to 100 with step size 6.25
Y Units: Estimated Ambient Temperature (deg C) from -10 to 80 with step size 5.625

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	-373.6	-362.0	-350.3	-338.6	-326.9	-315.3	-303.6	-291.9	-280.2	-268.5	-256.9	-245.2	-233.5	-221.8	-210.2	-198.5	-186.8
2	-373.6	-362.0	-350.3	-338.6	-326.9	-315.3	-303.6	-291.9	-280.2	-268.5	-256.9	-245.2	-233.5	-221.8	-210.2	-198.5	-186.8
3	-373.6	-362.0	-350.3	-338.6	-326.9	-315.3	-303.6	-291.9	-280.2	-268.5	-256.9	-245.2	-233.5	-221.8	-210.2	-198.5	-186.8
4	-373.6	-362.0	-350.3	-338.6	-326.9	-315.3	-303.6	-291.9	-280.2	-268.5	-256.9	-245.2	-233.5	-221.8	-210.2	-198.5	-186.8
5	-373.6	-362.0	-350.3	-338.6	-326.9	-315.3	-303.6	-291.9	-280.2	-268.5	-256.9	-245.2	-233.5	-221.8	-210.2	-198.5	-186.8
6	-373.6	-362.0	-350.3	-338.6	-326.9	-315.3	-303.6	-291.9	-280.2	-268.5	-256.9	-245.2	-233.5	-221.8	-210.2	-198.5	-186.8
7	-373.6	-362.0	-350.3	-338.6	-326.9	-315.3	-303.6	-291.9	-280.2	-268.5	-256.9	-245.2	-233.5	-221.8	-210.2	-198.5	-186.8
8	-373.6	-362.0	-350.3	-338.6	-326.9	-315.3	-303.6	-291.9	-280.2	-268.5	-256.9	-245.2	-233.5	-221.8	-210.2	-198.5	-186.8
9	-373.6	-362.0	-350.3	-338.6	-326.9	-315.3	-303.6	-291.9	-280.2	-268.5	-256.9	-245.2	-233.5	-221.8	-210.2	-198.5	-186.8
10	-373.6	-362.0	-350.3	-338.6	-326.9	-315.3	-303.6	-291.9	-280.2	-268.5	-256.9	-245.2	-233.5	-221.8	-210.2	-198.5	-186.8
11	-373.6	-362.0	-350.3	-338.6	-326.9	-315.3	-303.6	-291.9	-280.2	-268.5	-256.9	-245.2	-233.5	-221.8	-210.2	-198.5	-186.8
12	-373.6	-362.0	-350.3	-338.6	-326.9	-315.3	-303.6	-291.9	-280.2	-268.5	-256.9	-245.2	-233.5	-221.8	-210.2	-198.5	-186.8
13	-373.6	-362.0	-350.3	-338.6	-326.9	-315.3	-303.6	-291.9	-280.2	-268.5	-256.9	-245.2	-233.5	-221.8	-210.2	-198.5	-186.8
14	-373.6	-362.0	-350.3	-338.6	-326.9	-315.3	-303.6	-291.9	-280.2	-268.5	-256.9	-245.2	-233.5	-221.8	-210.2	-198.5	-186.8
15	-373.6	-362.0	-350.3	-338.6	-326.9	-315.3	-303.6	-291.9	-280.2	-268.5	-256.9	-245.2	-233.5	-221.8	-210.2	-198.5	-186.8
16	-373.6	-362.0	-350.3	-338.6	-326.9	-315.3	-303.6	-291.9	-280.2	-268.5	-256.9	-245.2	-233.5	-221.8	-210.2	-198.5	-186.8
17	-373.6	-362.0	-350.3	-338.6	-326.9	-315.3	-303.6	-291.9	-280.2	-268.5	-256.9	-245.2	-233.5	-221.8	-210.2	-198.5	-186.8

Initial Supporting table - P0496 Purge Valve Leak Test Engine Vacuum Test Time (Cold Start) as a Function of Fuel Level

Description: Purge valve leak test engine vacuum test time as a function of fuel level

Value Units: Purge Valve Leak Test Engine Vacuum Test Time (seconds)
X Unit: Fuel Level (percent)

y/x	0	6	12	19	25	31	37	44	50	56	62	69	75	81	87	94	100
1	54	53	51	50	49	48	46	45	44	43	42	40	39	38	37	36	34

Initial Supporting table - P057B KtBRKI_K_CmpltTestPointWeight

Description:

y/x	0.000	0.010	0.025	0.033	0.050	0.250	0.500	0.750	1.000
1	0	0	0	1	1	1	1	1	1

Initial Supporting table - P057B KtBRKI_K_FastTestPointWeight

Description:

y/x	0.000	0.010	0.025	0.033	0.050	0.250	0.500	0.750	1.000
1	0	0	0	1	1	1	1	1	1

Initial Supporting table - DFCO_CoolEnblHi_Temp

Description:

y/x	-40	0	25
1	30.0	30.0	45.0

Initial Supporting table - DFCO_DelayAfterStart_Time

Description:

y/x	-30	-10	20	60	90
1	20.0	15.0	10.0	8.0	5.0

Initial Supporting table - DFCO_DsblLo_Vehicle_Speed

Description:

y/x	CeTCOR_e_NonEcoMode	CeTCOR_e_EcoMode
CeTGRR_e_TransGr1	0	0
CeTGRR_e_TransGr2	0	0
CeTGRR_e_TransGr3	0	0
CeTGRR_e_TransGr4	0	0
CeTGRR_e_TransGr5	0	0
CeTGRR_e_TransGr6	0	0
CeTGRR_e_TransGr9	0	0
CeTGRR_e_TransGr10	0	0
CeTGRR_e_TransGrNeut	0	0
CeTGRR_e_TransGrRvrs	0	0
CeTGRR_e_TransGrPark	0	0
CeTGRR_e_TransGr7	0	0
CeTGRR_e_TransGr8	0	0

Initial Supporting table - DFCO_EnblHi_Vehicle_Speed

Description:

y/x	CeTCOR_e_NonEcoMode	CeTCOR_e_EcoMode
CeTGRR_e_TransGr1	15.0	15.0
CeTGRR_e_TransGr2	26.0	26.0
CeTGRR_e_TransGr3	30.0	30.0
CeTGRR_e_TransGr4	0.0	0.0
CeTGRR_e_TransGr5	0.0	0.0
CeTGRR_e_TransGr6	0.0	0.0
CeTGRR_e_TransGr9	0.0	0.0
CeTGRR_e_TransGr10	0.0	0.0
CeTGRR_e_TransGrNeut	0.0	0.0
CeTGRR_e_TransGrRvrs	510.0	510.0
CeTGRR_e_TransGrPark	0.0	0.0
CeTGRR_e_TransGr7	0.0	0.0
CeTGRR_e_TransGr8	0.0	0.0

Initial Supporting table - DFCO EngSpdEnblOfst

Description:

y/x	-2,150	-1,850	-1,450	-1,200	-850	-450	-225	-100	0
1	100	100	100	100	100	75	25	0	0

Initial Supporting table - P0068_Delta MAF Threshold f(TPS)

Description: Table of delta MAF values as a function of desired throttle position. The output of this table provides a delta MAF that if the measured minus the estimated MAF exceeds, is considered a fail.

Value Units: Delta MAF Values (dm)
X Unit: Desired Throttle Position (Pct)

y/x	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00	100.00
1.00	41.66	25.48	47.84	69.23	255.00	255.00	255.00	255.00	255.00

Initial Supporting table - P0068_Delta MAP Threshold f(TPS)

Description: Table of delta MAP values as a function of desired throttle position. The output of this table provides a delta MAP that if the measured minus the estimated MAP exceeds, is considered a fail.

Value Units: Delta MAP Values (kPa)
X Unit: Desired Throttle Position (Pct)

y/x	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00	100.00
1.00	23.61	10.94	14.38	14.72	255.00	255.00	255.00	255.00	255.00

Initial Supporting table - P0068_Maximum MAF f(RPM)

Description: Table of maximum MAF values vs. engine speed. This is the maximum MAF the engine can see under all ambient conditions.

Value Units: Delta MAF Values (dm)
X Unit: Engine Speed (RPM)

y/x	600.00	1,400.00	2,200.00	3,000.00	3,800.00	4,600.00	5,400.00	6,200.00	7,000.00
1.00	38.28	104.38	191.73	285.43	393.89	492.32	511.99	511.99	511.99

Initial Supporting table - P0068_Maximum MAF f(Volts)

Description: Table of maximum MAF values vs. system voltage. The output of the air meter is clamped to lower values as system voltage drops off.

Value Units: Delta MAF Values (dm)
X Unit: System Voltage (V)

y/x	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00
1.00	69.70	180.36	376.20	511.99	511.99	511.99	511.99	511.99	511.99

Initial Supporting table - P0326_P0331_AbnormalNoise_Thresh_AFM

Description: Fail threshold for the Knock Performance Abnormal Noise Diagnostic when engine IS in AFM mode

Value Units: Filtered background engine noise. Unit-less term from the Knock Detection Fast Fourier Transform (FFT) for a selected frequency range.
X Unit: Engine Speed (RPM)
Y Units: N/A

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.065	0.072	0.073	0.074	0.077	0.083	0.085	0.090	0.098	0.140	0.235	0.313	0.354	0.378	0.378	0.378	0.378

Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

Value Units: Max Time for Last Seed Timeout (ms)
X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606 PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

Value Units: Fail threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	5	5	5	3	5	3	5	3

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	5	3	5	3	5	5	5	5

Initial Supporting table - P0606 PSW Sequence Sample f(Loop Time)

Description: Sample threshold for PSW per operating loop.

Value Units: Sample threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	4	4	4	4	4	4	4

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	8.699	9.000	9.199	10.000

Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

Value Units: Max Time for Last Seed Timeout (ms)
X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606 PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

Value Units: Fail threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	5	5	5	3	5	3	5	3

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	5	3	5	3	5	5	5	5

Initial Supporting table - P0606 PSW Sequence Sample f(Loop Time)

Description: Sample threshold for PSW per operating loop.

Value Units: Sample threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	4	4	4	4	4	4	4

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	0.00	50.00	100.00	150.00	200.00	300.00
1.00	10.94	10.94	10.94	10.94	10.94	10.94

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.

Value Units: External Load Table for SPDR (Nm)
X Unit: Engine Oil Temperature (deg C)
Y Units: Engine Speed (RPM)

y/x	-40.00	-20.00	-10.00	0.00	50.00	90.00
375.00	627.30	676.26	676.53	643.79	364.70	317.87
475.00	434.83	474.02	473.13	533.85	208.36	174.49
575.00	420.13	455.72	454.59	512.13	195.82	162.96
675.00	401.75	432.85	431.42	484.98	180.15	148.54
775.00	355.49	367.19	370.79	408.74	131.69	96.30
875.00	338.95	338.29	337.11	366.13	112.26	85.15
950.00	363.92	335.75	330.57	341.65	165.73	109.32
1,050.00	343.04	314.66	311.64	329.27	197.71	132.56
1,150.00	305.65	315.31	279.40	307.42	223.16	166.21
1,400.00	292.09	305.02	268.72	274.06	236.72	210.79
1,650.00	225.00	225.00	225.00	225.00	225.00	225.00
1,900.00	150.00	150.00	150.00	150.00	150.00	150.00
2,150.00	-102.00	-102.00	-102.00	-102.00	-102.00	-102.00
2,500.00	-105.57	-105.57	-105.57	-105.57	-105.57	-105.57
3,500.00	-115.77	-115.77	-115.77	-115.77	-115.77	-115.77
4,500.00	-124.18	-124.18	-124.18	-124.18	-124.18	-124.18
6,400.00	-142.80	-142.80	-142.80	-142.80	-142.80	-142.80

Initial Supporting table - P0191 - High fail limit of fuel control due to high pressure sensor skewed High

Description: High fail limit of fuel control due to high pressure sensor skewed High error as Function of desired pressure

Value Units: Ratio
X Unit: Desired Pressure (Mpa)

y/x	1.50	3.00	4.00	15.00	20.00	25.00	27.50	32.00	36.00
1.00	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.09	1.05

Initial Supporting table - P0191 - Low fail limit of fuel control due to pressure sensor skewed low

Description: Low fail limit of fuel control due to pressure sensor skewed low error as Function of desired pressure

Value Units: Ratio
X Unit: Desired Pressure (Mpa)

y/x	1.50	3.00	4.00	15.00	20.00	25.00	27.50	32.00	36.00
1.00	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.92	0.95

Initial Supporting table - P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time

Description: Maximum injector closing time function of measured fuel rail pressure

Value Units: Injector Closing Time (us)
X Unit: Measrured Fuel Rail Pressure (MPa)

y/x	0.40	1.00	2.00	4.00	6.00	8.00	10.00	11.00	12.00	14.00	15.00	16.00	17.00	19.00	20.00	21.00	24.00
1.00	227	232	207	181	165	144	125	119	112	104	98	88	84	76	73	69	57

Initial Supporting table - P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude

Description: Maximum injector opening Magnitude voltage function of measured fuel rail pressure

Value Units: Opening Magnitude Voltage
X Unit: Measrured Fuel Rail Pressure (MPa)

y/x	0.40	1.00	2.00	4.00	6.00	8.00	10.00	11.00	12.00	14.00	15.00	16.00	17.00	19.00	20.00	21.00	24.00
1.00	846	841	920	896	888	873	862	859	855	846	837	823	821	835	825	819	809

Initial Supporting table - P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time

.

Description: Minimum injector closing time function of measured fuel rail pressure

Value Units: Injector Closing Time (us)
X Unit: Measrured Fuel Rail Pressure (MPa)

y/x	0.40	1.00	2.00	4.00	6.00	8.00	10.00	11.00	12.00	14.00	15.00	16.00	17.00	19.00	20.00	21.00	24.00
1.00	227	232	207	181	165	144	125	119	112	104	98	88	84	76	73	69	57

Initial Supporting table - P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude

Description: Minimum injector opening Magnitude voltage function of measured fuel rail pressure

Value Units: Opening Magnitude Voltage
X Unit: Measrured Fuel Rail Pressure (MPa)

y/x	0.40	1.00	2.00	4.00	6.00	8.00	10.00	11.00	12.00	14.00	15.00	16.00	17.00	19.00	20.00	21.00	24.00
1.00	246	241	320	296	288	273	262	259	255	246	237	223	221	235	225	219	209

P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width

Description: Minimum injection pulse width function of measured fuel rail pressure where the voltage feedback measured from the analog to digital converter is rationalized

Value Units: Pulse Width (ms)
X Unit: Measrured Fuel Rail Pressure (MPa)

y/x	0.40	1.00	2.00	4.00	6.00	8.00	10.00	11.00	12.00	14.00	15.00	16.00	17.00	19.00	20.00	21.00	24.00
1.00	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

Initial Supporting table - P0494_LIN_Threshold

Description: Tabulated LIN Fan1 Speed Low Limits

Value Units: rpm
X Unit: Commanded LIN Fan1 Speed rpm
Y Units: Sensed LIN Fan1 Speed Lower Limit rpm

y/x	0	625	626	2,140	2,141	2,142	2,143	2,144	2,145	2,146	2,147	2,148	2,149	2,150	2,151	2,152	2,153
1	0	425	425	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940

Initial Supporting table - P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit

Description: Minimum Small Pulse Compensation Fail Limit function of Pulse Width and Pressure

Value Units: Minimum Small Pulse Compensation Fail Limit (ms)
X Unit: Measrured Fuel Rail Pressure (MPa)
Y Units: Injection Pulse With (ms)

P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit - Part 1

y/x	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.04	0.04
0.40	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
1.00	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
2.00	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
4.00	-0.03	-0.04	-0.04	-0.05	-0.05	-0.05	-0.06	-0.06	-0.07	-0.07	-0.07
6.00	-0.03	-0.04	-0.04	-0.05	-0.05	-0.05	-0.06	-0.06	-0.07	-0.07	-0.07
8.00	-0.03	-0.04	-0.04	-0.05	-0.05	-0.05	-0.06	-0.06	-0.07	-0.07	-0.07
10.00	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06	-0.06	-0.06	-0.07	-0.07	-0.08
11.00	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06	-0.06	-0.06	-0.07	-0.07	-0.08
12.00	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06	-0.06	-0.06	-0.07	-0.07	-0.08
14.00	-0.04	-0.04	-0.05	-0.05	-0.05	-0.06	-0.06	-0.07	-0.07	-0.07	-0.08
15.00	-0.04	-0.04	-0.05	-0.05	-0.06	-0.06	-0.06	-0.07	-0.07	-0.08	-0.08
16.00	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06	-0.06	-0.06	-0.07	-0.07
17.00	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06	-0.06	-0.06	-0.07	-0.07
19.00	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06	-0.06	-0.06	-0.07
20.00	-0.03	-0.03	-0.04	-0.04	-0.05	-0.05	-0.05	-0.06	-0.06	-0.07	-0.07
21.00	-0.03	-0.03	-0.04	-0.04	-0.05	-0.05	-0.05	-0.06	-0.06	-0.07	-0.07
24.00	-0.05	-0.05	-0.06	-0.06	-0.06	-0.07	-0.07	-0.08	-0.08	-0.08	-0.09

P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit - Part 2

y/x	0.04	0.05	0.05	0.06	0.06	0.06	0.07	0.07	0.08	0.08	0.10
0.40	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
1.00	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
2.00	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
4.00	-0.08	-0.08	-0.09	-0.09	-0.09	-0.10	-0.10	-0.11	-0.11	-0.11	-0.13
6.00	-0.08	-0.08	-0.09	-0.09	-0.09	-0.10	-0.10	-0.11	-0.11	-0.11	-0.13
8.00	-0.08	-0.08	-0.09	-0.09	-0.09	-0.10	-0.10	-0.11	-0.11	-0.11	-0.13
10.00	-0.08	-0.08	-0.09	-0.09	-0.10	-0.10	-0.10	-0.11	-0.11	-0.12	-0.14
11.00	-0.08	-0.08	-0.09	-0.09	-0.10	-0.10	-0.10	-0.11	-0.11	-0.12	-0.14
12.00	-0.08	-0.08	-0.09	-0.09	-0.10	-0.10	-0.10	-0.11	-0.11	-0.12	-0.14
14.00	-0.08	-0.09	-0.09	-0.09	-0.10	-0.10	-0.11	-0.11	-0.11	-0.12	-0.14
15.00	-0.08	-0.09	-0.09	-0.10	-0.10	-0.10	-0.11	-0.11	-0.12	-0.12	-0.14

Initial Supporting table - P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit

16.00	-0.08	-0.08	-0.08	-0.09	-0.09	-0.10	-0.10	-0.10	-0.11	-0.11	-0.13
17.00	-0.08	-0.08	-0.08	-0.09	-0.09	-0.10	-0.10	-0.10	-0.11	-0.11	-0.13
19.00	-0.07	-0.08	-0.08	-0.08	-0.09	-0.09	-0.10	-0.10	-0.10	-0.11	-0.13
20.00	-0.07	-0.08	-0.08	-0.09	-0.09	-0.09	-0.10	-0.10	-0.11	-0.11	-0.13
21.00	-0.07	-0.08	-0.08	-0.09	-0.09	-0.09	-0.10	-0.10	-0.11	-0.11	-0.13
24.00	-0.09	-0.10	-0.10	-0.10	-0.11	-0.11	-0.12	-0.12	-0.12	-0.13	-0.15

P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit - Part 3

y/x	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	1.00	1.50
0.40	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
1.00	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
2.00	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
4.00	-0.18	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
6.00	-0.18	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
8.00	-0.18	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
10.00	-0.19	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
11.00	-0.19	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
12.00	-0.19	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
14.00	-0.19	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
15.00	-0.19	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
16.00	-0.18	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
17.00	-0.18	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
19.00	-0.18	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
20.00	-0.18	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
21.00	-0.18	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
24.00	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20

Initial Supporting table - P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit

Description: Maximum Small Pulse Compensation Fail Limit function of Pulse Width and Pressure

Value Units: Maximum Small Pulse Compensation Fail Limit (ms)
X Unit: Measrured Fuel Rail Pressure (MPa)
Y Units: Injection Pulse With (ms)

P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit - Part 1

y/x	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.04	0.04
0.40	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
1.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
2.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
4.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
6.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
8.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
10.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
11.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
12.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
14.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
15.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
16.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
17.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
19.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
20.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
21.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
24.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20

P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit - Part 2

y/x	0.04	0.05	0.05	0.06	0.06	0.06	0.07	0.07	0.08	0.08	0.10
0.40	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
1.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
2.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
4.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
6.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
8.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
10.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
11.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
12.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
14.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
15.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20

Initial Supporting table - P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit

16.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
17.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
19.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
20.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
21.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
24.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20

P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit - Part 3

y/x	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	1.00	1.50
0.40	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
1.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
2.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
4.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
6.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
8.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
10.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
11.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
12.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
14.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
15.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
16.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
17.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
19.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
20.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
21.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
24.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20

Initial Supporting table - P10BA: Pump On Speed Diag Delay

Description: CAC Pump Speed Diagnostic Enable Delay Time

Value Units: Sec
X Unit: DegC
Y Units: Sec

y/x	-40.0	0.0	40.0	80.0	120.0
1.0	60.0	20.0	10.0	5.0	5.0

Initial Supporting table - P10BA: Pump On Speed Error Limit

Description: CAC Pump Speed Error Limit

Value Units: RPM
X Unit: RPM
Y Units: RPM

y/x	1,000.0	2,000.0	3,000.0	4,000.0	5,000.0	6,000.0	7,000.0
1.0	750.0	1,000.0	1,200.0	1,400.0	1,600.0	1,800.0	2,000.0

Initial Supporting table - P228C P2C1F - High Pressure Pump Control (HPC) fail threshold of pressure too low

Description: The High Pressure Pump Control (HPC) fail threshold of pressure too low test as a function of desired fuel pressure.

Value Units: Pressure Error - Desired pressure - Actual Pressure (Mpa)
X Unit: Desired Pressure (Mpa)

y/x	2	3	4	15	20	25	28	32	36
1	0	2	3	3	3	3	3	3	3

Initial Supporting table - P228D P2C20 - High Pressure Pump Control (HPC) fail threshold for pressure too high

Description: The High Pressure Pump Control (HPC) fail threshold for pressure too high test as a function of desired fuel pressure.

Value Units: Pressure Error - Desired pressure - Actual Pressure (Mpa)
X Unit: Desired Pressure (Mpa)

y/x	1.50	3.00	4.00	15.00	20.00	25.00	27.50	32.00	36.00
1	-5.00	-5.00	-5.00	-5.00	-5.00	-5.00	-5.00	-5.00	-5.00

P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F - kaFULO_n...

Description: Max Engine Speed to allow Multipulse function of injector energy profile

Value Units: Max Engine Speed to allow Multipulse
X Unit: Injector Energy Profile
Y Units: Multipulse Mode (0 = Double Pulse, 1 = Triple Pulse)

y/x	0	1	2	3
0	3,600	3,600	3,600	3,600
1	3,000	3,000	3,000	3,000

P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude

Description: Opening Magnitude threshold to detect missing injection pulse

Value Units: Opening Magnitude Voltage
X Unit: Measured Fuel Rail Pressure

y/x	0.40	1.00	2.00	4.00	6.00	8.00	10.00	11.00	12.00	14.00	15.00	16.00	17.00	19.00	20.00	21.00	24.00
1.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Initial Supporting table - P2CB9_LIN_Threshold

Description: Tabulated LIN Fan2 Speed Low Limits

Value Units: rpm
X Unit: Commanded LIN Fan2 Speed rpm
Y Units: Sensed LIN Fan2 Speed Lower Limit rpm

y/x	0	625	626	2,500	2,501	2,502	2,503	2,504	2,505	2,506	2,507	2,508	2,509	2,510	2,511	2,512	2,513
1	0	425	425	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300

Initial Supporting table - P2CBB_LIN_Threshold

Description: Tabulated LIN Fan3 Speed Low Limits

Value Units: rpm
X Unit: Commanded LIN Fan3 Speed rpm
Y Units: Sensed LIN Fan3 Speed Lower Limit rpm

y/x	0	925	926	2,800	2,801	2,802	2,803	2,804	2,805	2,806	2,807	2,808	2,809	2,810	2,811	2,812	2,813
1	0	725	725	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600

Initial Supporting table - Shutter 1 AC OFF - Open / Close Commands

Description: Open / Close Commands for Shutter 1 - AC OFF

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4	5	6	7	8	9
0	0	100	100	100	100	100	100	100	100	100
1	0	100	100	100	100	100	100	100	100	100
2	0	100	100	100	100	100	100	100	100	100
3	0	100	100	100	100	100	100	100	100	100
4	0	100	100	100	100	100	100	100	100	100
5	0	100	100	100	100	100	100	100	100	100
6	0	100	100	100	100	100	100	100	100	100
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Shutter 1 AC OFF - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 1 - AC OFF Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	0	11	12	13	17	18	28	29	80	100

Initial Supporting table - Shutter 1 AC OFF - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 1 - AC OFF Table

Value Units: KPH

y/x	1	2	3	4	5	6	7	8	9	10
1	0	48	70	130	200	201	202	203	204	205

Initial Supporting table - Shutter 1 AC ON - Open / Close Commands

Description: Open / Close Commands for Shutter 1 - AC ON

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4	5	6	7	8	9
0	0	100	100	100	100	100	100	100	100	100
1	0	100	100	100	100	100	100	100	100	100
2	0	100	100	100	100	100	100	100	100	100
3	0	100	100	100	100	100	100	100	100	100
4	0	100	100	100	100	100	100	100	100	100
5	0	100	100	100	100	100	100	100	100	100
6	0	100	100	100	100	100	100	100	100	100
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Shutter 1 AC ON - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 1 - AC ON Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	0	11	12	13	17	18	28	29	80	100

Initial Supporting table - Shutter 1 AC ON - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 1 - AC ON Table

Value Units: KPH

y/x	1	2	3	4	5	6	7	8	9	10
1	0	48	70	130	200	201	202	203	204	205

Initial Supporting table - Shutter 2 AC OFF - Open / Close Commands

Description: Open / Close Commands for Shutter 2 - AC OFF

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Shutter 2 AC OFF - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 2 - AC OFF Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	0	11	12	13	17	18	28	29	80	100

Initial Supporting table - Shutter 2 AC OFF - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 2 - AC OFF Table

Value Units: KPH

y/x	1	2	3	4	5	6	7	8	9	10
1	0	55	70	95	110	120	140	150	180	200

Initial Supporting table - Shutter 2 AC ON - Open / Close Commands

Description: Open / Close Commands for Shutter 2 - AC ON

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Shutter 2 AC ON - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 2 - AC ON Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	0	11	12	13	17	18	28	29	80	100

Initial Supporting table - Shutter 2 AC ON - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 2 - AC ON Table

Value Units: KPH

y/x	1	2	3	4	5	6	7	8	9	10
1	0	55	70	95	110	120	140	150	180	200

Initial Supporting table - Minimum Non-Purge Samples for Purge Vapor Fuel

Description: Number of Fuel Trim Monitor sample counts required to allow the Purge Vapor Fuel value to inhibit the Intrusive Rich test

Value Units: Sample Counts per loop rate of 100ms (divide by 10 to get seconds)
X Unit: Long Term Fuel Trim Cell I.D. (no units) (Only PurgeOff cells are used)

Minimum Non-Purge Samples for Purge Vapor Fuel - Part 1

y/x	CeFADR_e_CellOO_PurgOnAirMode5	CeFADR_e_Cell01_PurgOnAirMode4	CeFADR_e_Cell02_PurgOnAirMode3	CeFADR_e_Cell03_PurgOnAirMode2
1	65,535	65,535	65,535	65,535

Minimum Non-Purge Samples for Purge Vapor Fuel - Part 2

y/x	CeFADR_e_Cell04_PurgOnAirMode1	CeFADR_e_Cell05_PurgOnAirMode0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel
1	65,535	65,535	65,535	65,535

Minimum Non-Purge Samples for Purge Vapor Fuel - Part 3

y/x	CeFADR_e_Cell08_PurgOffAirMode5	CeFADR_e_Cell09_PurgOffAirMode4	CeFADReCelHOPurgOffAirMode3	CeFADR_e_Cell1 1_PurgOffAirMode2
1	100	100	100	100

Minimum Non-Purge Samples for Purge Vapor Fuel - Part 4

y/x	CeFADR_e_Cell12_PurgOffAirMode1	CeFADR_e_Cell13_PurgOffAirMode0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
1	100	100	100	100

Initial Supporting table - P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage

Description: Identifies which Long Term Fuel Trim Cell I.D.s are used for diagnosis. Only cells identified as "CeFADD_e_NonSelectedCell" are not used for diagnosis.

P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 1

y/x	CeFADR_e_CellOO_PurgOnAirMode 5	CeFADR_e_Cell01_PurgOnAirMode 4	CeFADR_e_Cell02_PurgOnAirMode 3	CeFADR_e_Cell03_PurgOnAirMode 2
1	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell

P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 2

y/x	CeFADR_e_Cell04_PurgOnAirMode 1	CeFADR_e_Cell05_PurgOnAirMode 0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel
1	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell

P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 3

y/x	CeFADR_e_Cell08_PurgOffAirMode 5	CeFADR_e_Cell09_PurgOffAirMode 4	CeFADR_e_Cell10_PurgOffAirMode 3	CeFADR_e_Cell11_PurgOffAirMode 2
1	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell

P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 4

y/x	CeFADR_e_Cell12_PurgOffAirMode 1	CeFADR_e_Cell13_PurgOffAirMode 0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
1	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell

Initial Supporting table - Startup Engine Coolant adjusment to Minimum accumulation time

Description: Time offset added to the minimum accumulation time based on Startup Coolant.

Value Units: Counts (10 counts equals 1 second)
X Unit: Degree C

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	500	500	500	500	300	0	0	0	0	0	0	0	0	0	0	0	0

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	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
3	1,467	1,222	925	575	400	292	228	166	125	85	77	37	20
6	1,467	1,222	925	575	400	299	217	161	125	85	78	37	20
8	1,487	1,239	925	600	425	320	225	164	121	85	78	38	22
10	1,608	1,340	1,007	675	475	350	225	169	119	86	79	44	27
12	1,755	1,463	1,111	750	526	380	250	188	147	87	80	50	32
14	1,876	1,563	1,241	850	609	440	314	216	188	90	82	60	38
16	2,023	1,686	1,339	950	705	496	371	255	223	99	88	70	42
18	2,164	1,804	1,459	1,065	807	565	430	295	262	120	96	80	50
20	2,319	1,932	1,576	1,174	928	633	489	341	295	146	112	90	58
22	2,440	2,033	1,666	1,288	1,064	700	547	387	328	172	128	98	66
24	2,574	2,145	1,761	1,410	1,200	768	605	434	361	198	144	108	73
26	2,674	2,229	1,837	1,533	1,336	835	664	480	394	224	161	117	81
28	2,762	2,302	1,936	1,644	1,472	903	722	526	426	250	177	127	88
30	2,869	2,391	2,018	1,755	1,608	970	780	572	459	276	193	136	95
32	2,956	2,464	2,112	1,863	1,743	1,038	839	618	492	302	209	146	101
34	3,050	2,542	2,185	1,991	1,879	1,105	897	665	525	329	225	155	108
36	3,111	2,592	2,269	2,145	2,015	1,173	955	711	557	355	241	165	114

RufCyl_Decel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
3	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

Initial Supporting table - RufCyl Decel

26	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
28	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
32	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
34	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
36	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 - 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	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
3	1,800	1,500	925	575	400	250	166	145	140	80	42	26	18
6	1,800	1,500	925	575	400	250	168	145	135	80	42	26	18
8	1,920	1,600	946	600	425	270	181	151	127	80	44	26	18
10	2,160	1,800	1,044	675	467	312	211	163	128	81	49	32	21
12	2,365	1,971	1,148	750	570	376	250	181	142	87	58	40	27
14	2,599	2,166	1,257	850	658	429	314	205	162	99	68	52	32
16	2,828	2,357	1,358	950	739	492	367	235	187	115	81	64	38
18	3,067	2,556	1,472	1,060	824	543	423	270	218	132	97	73	45
20	3,301	2,751	1,555	1,158	907	596	477	314	261	149	112	82	52
22	3,535	2,946	1,639	1,252	989	635	531	363	300	171	128	91	61
24	3,769	3,141	1,722	1,346	1,072	685	585	413	335	193	143	100	69
26	4,002	3,335	1,805	1,440	1,155	740	639	463	363	215	159	109	78
28	4,236	3,530	1,889	1,534	1,237	790	693	513	392	238	174	118	87
30	4,470	3,725	1,972	1,624	1,320	840	747	563	418	260	189	127	95
32	4,704	3,920	2,055	1,694	1,403	904	801	613	449	282	205	136	101
34	4,938	4,115	2,139	1,769	1,485	968	855	662	480	304	220	145	108
36	5,172	4,310	2,222	1,828	1,568	1,031	909	712	518	326	236	155	114

RufCyl_Jerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
3	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

Initial Supporting table - RufCyl Jerk

26	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
28	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
32	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
34	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
36	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 - RufSCDDecel

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	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
3	683	525	320	220	165	115	85	60	48	32,767	32,767	32,767	32,767
6	650	500	300	215	160	115	80	55	46	32,767	32,767	32,767	32,767
8	683	525	350	220	160	115	80	55	45	32,767	32,767	32,767	32,767
10	780	600	420	260	185	125	85	62	50	32,767	32,767	32,767	32,767
12	943	725	450	275	210	135	100	70	50	32,767	32,767	32,767	32,767
14	1,105	850	500	300	240	170	125	90	60	32,767	32,767	32,767	32,767
16	1,300	1,000	575	400	265	200	150	100	70	32,767	32,767	32,767	32,767
18	1,560	1,200	675	450	300	220	165	120	95	32,767	32,767	32,767	32,767
20	1,820	1,400	775	500	340	240	190	140	110	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
26	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
28	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
32	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
34	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
36	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	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
3	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

Initial Supporting table - RufSCD Decel

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
26	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
28	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
32	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
34	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
36	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 - RufSCDJerk

Description: Used for P0300-P0308. Crankshaft jerk 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.

Value Units: Delta time per cylinder (usee)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufSCD_Jerk - Part 1

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
3	683	525	320	220	165	115	85	55	48	32,767	32,767	32,767	32,767
6	650	500	300	215	155	115	80	53	46	32,767	32,767	32,767	32,767
8	683	525	350	220	155	115	80	53	45	32,767	32,767	32,767	32,767
10	780	600	410	260	180	120	80	58	48	32,767	32,767	32,767	32,767
12	943	725	450	275	210	135	95	65	50	32,767	32,767	32,767	32,767
14	1,105	850	500	300	240	170	125	90	60	32,767	32,767	32,767	32,767
16	1,300	1,000	575	400	265	200	150	100	70	32,767	32,767	32,767	32,767
18	1,560	1,200	675	450	300	220	165	120	95	32,767	32,767	32,767	32,767
20	1,820	1,400	775	500	340	240	190	140	110	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
26	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
28	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
32	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
34	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
36	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	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
3	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

Initial Supporting table - RufSCD Jerk

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
26	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
28	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
32	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
34	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
36	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 - MisfireJMEP _BinID_Load__Axis

Description: Cylinder LOAD for defining Y AXIS in Misfire_IMEP_BinlD_versus_Speed_and_Load

Value Units: Indicated Mean Effective Pressure
X Unit: Bin ID row number

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	50	125	175	225	275	325	375	425	475	525	600	700	825	975	1,175	1,425	1,675

Initial Supporting table - Misfire_IMEP_BinID_RPM_Axis

Description: Cylinder RPM for defining the X AXIS in Misfire_IMEP_BinID_versus_Speed_and_Load

Value Units: RPM
X Unit: BinID Column number

y/x	1	2	3	4	5	6	7	8	9
1	775	1,075	1,325	1,575	1,825	2,075	2,325	2,575	3,000

Initial Supporting table - Misfire_IMEP_BinID_vs_RPM_Load

Description: Misfire calibrations used with Crankshaft Based IMEP (Indicated Mean Effective Pressure) estimatimation do not interpolate versus speed and load. Instead they use unique calibrations within each small speed load "bin". Each Bin has has its own "bin ID". This Bin ID keeps all the Crank Based IMEP estimate calculations and various Misfire calibrations synchronized while minimzing through put. Each speed load range defines a unique "Bin ID" in this Bin ID table. The BinID tables Y axis is cylinder load, and X axis is rpm as defined in Misfire_IMEP_BinID_Load_Axis and Misfire_IMEP_BinID_RPM_Axis tables

Value Units: Bin ID
X Unit: RPM range
Y Units: Cylinder Load Range

y/x	0	1	2	3	4	5	6	7	8
0	0	17	34	51	68	85	102	119	136
1	1	18	35	52	69	86	103	120	137
2	2	19	36	53	70	87	104	121	138
3	3	20	37	54	71	88	105	122	139
4	4	21	38	55	72	89	106	123	140
5	5	22	39	56	73	90	107	124	141
6	6	23	40	57	74	91	108	125	142
7	7	24	41	58	75	92	109	126	143
8	8	25	42	59	76	93	110	127	144
9	9	26	43	60	77	94	111	128	145
10	10	27	44	61	78	95	112	129	146
11	11	28	45	62	79	96	113	130	147
12	12	29	46	63	80	97	114	131	148
13	13	30	47	64	81	98	115	132	149
14	14	31	48	65	82	99	116	133	150
15	15	32	49	66	83	100	117	134	151
16	16	33	50	67	84	101	118	135	152

Initial Supporting table - Misfire_IMEP_Thresh_vs_BinID

Description: Crankshaft Indicated Mean Effective Pressure (IMEP) Estimate that below which will be considered misfire. Misfire calibrations used with Crankshaft Based IMEP (Indicated Mean Effective Pressure) estimatimation do not interpolate versus speed and load. Instead they use unique calibrations within each small speed load region or "bin". Each Bin has has its own "BinID". This BinID keeps all the Crank Based IMEP estimate calculations and various Misfire calibrations synchronized while minimzing through put. Each speed load range defines a unique "Bin ID" in this Bin ID table.
The BinID table's Y axis is cylinder load, and X axis is rpm as defined in Misfire_IMEP_BinID_Load_Axis and Misfire_IMEP_BinID_RPM_Axis tables

Value Units: KPa
XUnit: BinID

Misfire_IMEP_Thresh_vs_BinID - Part 1

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255

Misfire_IMEP_Thresh_vs_BinID - Part 2

y/x	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
1	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255

Misfire_IMEP_Thresh_vs_BinID - Part 3

y/x	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
1	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255

Misfire_IMEP_Thresh_vs_BinID - Part 4

y/x	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67
1	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255

Misfire_IMEP_Thresh_vs_BinID - Part 5

y/x	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84
1	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255

Misfire_IMEP_Thresh_vs_BinID - Part 6

y/x	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101
1	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255

Misfire_IMEP_Thresh_vs_BinID - Part 7

y/x	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
1	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255

Misfire_IMEP_Thresh_vs_BinID - Part 8

y/x	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135
1	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255

Misfire_IMEP_Thresh_vs_BinID - Part 9

y/x	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152

Initial Supporting table - Misfire_IMEP_Thresh_vs_BinID

1	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255

Initial Supporting table - P0324_PerCyl_ExcessiveKnock_Threshold

Description: Fail threshold for the Knock Performance per-cylinder Excessive Knock Diagnostic

Value Units: Filtered Knock Intensity. Unit-less term scaled from 0.0 (no knock) to 5.0 (maximum/large knock)
X Unit: Engine Speed (RPM)
Y Units: N/A

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

Initial Supporting table - P0325_P0330_OpenCktThrshMax (20 kHz)

Description: Knock Open Circuit Diagnostic Maximum Threshold when using the 20 kHz method (see "OpenMethod" description)

Value Units: Unit-less, filtered term from the Knock Detection Fast Fourier Transform (FFT) for the 20 kHz frequency range.
X Unit: Engine Speed (RPM).
Y Units: N/A

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	4.3008	4.2559	4.1602	4.2363	4.1582	4.2637	4.2148	4.0137	3.9863	3.7070	2.5000	2.3164	2.1348	2.1348	2.1348	2.1348	2.1348

Initial Supporting table - P0325_P0330_OpenCktThrshMax (Normal Noise)

Description: Knock Open Circuit Diagnostic Minimum Threshold when using the Normal Noise method (see "OpenMethod" description): When using the Normal Noise method (see "OpenMethod" description).

Value Units: Filtered background engine noise. Unit-less term from the Knock Detection Fast Fourier Transform (FFT) for a selected frequency range.
X Unit: Engine Speed (RPM)
Y Units: N/A

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	2.1504	2.1504	2.1504	2.1504	2.1504	2.1504	2.1504	2.1504	2.1504	2.1523	1.9961	1.8145	1.6309	1.6309	1.6309	1.6309	1.6309

Initial Supporting table - P0325_P0330_OpenCktThrshMin (20 kHz)

Description: Knock Open Circuit Diagnostic Minimum Threshold when using the 20 kHz method (see "OpenMethod" description)

Value Units: Unit-less, filtered term from the Knock Detection Fast Fourier Transform (FFT) for the 20 kHz frequency range.
X Unit: Engine (RPM)
Y Units: N/A

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	1.9043	1.8965	1.8887	1.8906	1.8770	1.9336	1.9375	1.8848	1.9238	1.7793	1.4961	1.1719	1.1719	1.1719	1.1719	1.1719	1.1719

Initial Supporting table - P0325_P0330_OpenCktThrshMin (Normal Noise)

Description: Knock Open Circuit Diagnostic Minimum Threshold when using the Normal Noise method (see "OpenMethod" description): When using the Normal Noise method (see "OpenMethod" description).

Value Units: Filtered background engine noise. Unit-less term from the Knock Detection Fast Fourier Transform (FFT) for a selected frequency range.
X Unit: Engine Speed (RPM)
Y Units: N/A

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	1.7168	1.7168	1.7168	1.7168	1.7168	1.7168	1.7168	1.7168	1.7168	1.5566	1.3945	1.2813	1.2793	1.2793	1.2793	1.2793	1.2793

Initial Supporting table - P0325_P0330_OpenMethod_2

Description: Defines which Knock Open Circuit Diagnostic method to use.

Value Units: Identifies one of two diagnostic methods (either 20 kHz or Normal Noise) used (as a function of engine speed) for Open Circuit detection
X Unit: Engine Speed Index, 500 to 8500 (RPM) by 500 rpm increments (Index 0, 1, 2.…16 = 500, 1000, 1500…. 8500 RPM)
Y Units: N/A

P0325_P0330_OpenMethod_2 - Part 1

y/x	0	1	2	3	4
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz

P0325_P0330_OpenMethod_2 - Part 2

y/x	5	6	7	8	9
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_None

P0325_P0330_OpenMethod_2 - Part 3

y/x	10	11	12	13	14
1	CeKNKD_e_Open_None	CeKNKD_e_Open_None	CeKNKD_e_Open_None	CeKNKD_e_Open_None	CeKNKD_e_Open_None

P0325_P0330_OpenMethod_2 - Part 4

y/x	15	16			
1	CeKNKD_e_Open_None	CeKNKD_e_Open_None			

Initial Supporting table - P0326_P0331_AbnormalNoise_CylsEnabled

Description: Specifies which cylinders will be used for the Abnormal Noise portion of the performance diagnostics (1 = cylinder used, 0 = cylinder not used)

Value Units: Boolean that indicates which engine cylinders are being used for the per-sensor Knock Performance diagnostic (0 = not used, 1 = used)
X Unit: Cylinder number in firing order (i.e. Cyl 0 = first cylinder in firing order, Cyl 1 = second cylinder in firing order...)
Y Units: N/A

y/x	0	1	2	3	4	5	6	7
1	1	1	1	1	1	1	1	1

Initial Supporting table - P0326_P0331_AbnormalNoise_Threshold

Description: Fail threshold for the Knock Performance Abnormal Noise Diagnostic when engine is NOT in AFM mode

Value Units: Filtered background engine noise. Unit-less term from the Knock Detection Fast Fourier Transform (FFT) for a selected frequency range.
X Unit: Engine Speed (RPM)
Y Units: N/A

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.065	0.072	0.073	0.074	0.077	0.083	0.085	0.090	0.093	0.106	0.171	0.231	0.267	0.283	0.287	0.287	0.287

Initial Supporting table - P06B6_P06B7_OpenTestCktThrshMax

Description: Knock Open Circuit Minimum Threshold for Internal Circuit Diagnostic. Used only when the 20 kHz method is being used (see "OpenMethod" description). The Open Test Circuit ensures that the internal circuit used to generate the 20 kHz signal for the Open Circuit diags (P0325, P0330) is within range.

Value Units: Unit-less, filtered term from the Knock Detection Fast Fourier Transform (FFT) for the 20 kHz frequency range.
X Unit: Engine Speed (RPM)
Y Units: N/A

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.141	0.141	0.141	0.150	0.279	0.279	0.391	0.500	0.609	0.609	0.609	0.609	0.609	0.609	0.609	0.609	0.609

Initial Supporting table - P06B6_P06B7_OpenTestCktThrshMin

Description: Knock Open Circuit Minimum Threshold for Internal Circuit Diagnostic. Used only when the 20 kHz method is being used (see "OpenMethod" description). The Open Test Circuit ensures that the internal circuit used to generate the 20 kHz signal for the Open Circuit diags (P0325, P0330) is within range.

Value Units: Unit-less, filtered term from the Knock Detection Fast Fourier Transform (FFT) for the 20 kHz frequency range.
X Unit: Engine Speed (RPM).
Y Units: N/A

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.090	0.094	0.098	0.100	0.189	0.158	0.182	0.330	0.293	0.295	0.318	0.402	0.402	0.402	0.402	0.402	0.402

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
GPS Signal Not Plausible	B1B44	Monitors if the recieved GPS location is plausible. Upon fault detection the emissions neutral default action action of disabling adaptive cruise and or SuperCruise will occur.	The diagnostic sub function shall record a failure if all of the following conditions are met: The Enable Criteria have be satisfied AND The values within the Redundant GPS Array do not exactly match a sample within the Primary GPS Array	If the primary measurement for the following signals do not match the redundant version of these below signals: -Lower Global Time Stamp -Heading -Elevation -Longitude -Latitude -Signal Acquisition Time -Calendar Year -Calendar Day -Time of Day -Mode -2D Absolute Position Error Estimate -Absolute Heading Error Estimate -Location Usable	Primary Precise Positioning System Data Group Communication Fault Active Redundant Precise Positioning System Data Burst Group Communication Fault Active Primary Precise Positioning System Data Group Data Recieved value changed from the previous excecution cycle Diagnostic System Disabled is FALSE Vehicle Power Mode K_Integrity_Diagnostic_Enable is TRUE	= FALSE = FALSE = FALSE = ACCESSORY, RUN or PROPULSION = TRUE	Continous	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
GPS Signal - Vehicle Speed not Plausible	B1B46	Monitors if the recieved GPS speed is plausible. Upon fault detection the emissions neutral default action action of disabling adaptive cruise and or SuperCruise will occur.	The diagnostic sub function shall record a failure if all of the following conditions are met: The Enable Criteria have be satisfied AND There is a difference between the host vehicle GNSS calculated vehicle speed, and the vehicle speed calculated via the vehicle wheel speed sensors	abs(host vehicle GNSS calculated vehicle speed - the vehicle speed calculated via the vehicle wheel speed sensors) > K_LimitThreahold	Diagnostic System Disabled Vehicle Power Mode Primary Precise Positioning System Mode Primary Precise Positioning System Location Usable Primary Precise Positioning System Data Group Communication Fault Active Primary Precise Positioning System Data Group Data Recieved GPS Time Drift Diagnostic Fault Active GPS Integrity Diagnostic Fault Active Host Vehicle Velocity Invalidity Host Vehicle Yaw Rate Invalidity is FALSE	= FALSE = ACCESSORY, RUN or PROPULSION = GNSS and RTX and DR, or GNSS and RTX and DR and MM = TRUE = FALSE = TRUE = FALSE = FALSE = FALSE = FALSE	Continous	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lateral Acceleration Sensor	C0061	Monitors for faults of the High Performance IMU Upon fault detection the emissions neutral default action action of disabling adaptive cruise and or SuperCruise will occur.	The diagnostic sub function shall record a failure if all of the following conditions are met: The Enable Criteria have been satisfied AND HP IMU Lateral Acceleration Correlation Status is Unknown or Not Correlated	HP IMU Lateral Acceleration Correlation Status is Unknown or Not Correlated	K_Communications_Fault_Pending HP IMU Lateral Acceleration Correlation Status Loss of Communication Fault Active HP IMU Lateral Acceleration Correlation Status Failed Safety Fault Active HP IMU Lateral Acceleration Correlation Status Availability Indication HP IMU Lateral Acceleration Correlation Status Failed Safety Indication HP IMU Common Diagnostic Enable Lateral Acceleration Correlation Diagnostic Communication Enable HP IMU Signal Diagnostic Enable Manufactures Enable Counter (MEC) K_Lateral_Acceleration_Diagnostic_Enable	= FALSE = FALSE = FALSE = Available = FALSE = TRUE = TRUE = TRUE = 0 =TRUE	Continous	Safety Emissions Neutral Diagnostics - Special Type C
			The diagnostic sub function shall record a	■HPIMU Primary Lateral Acceleration	K_Communications_Fault_Pending	= FALSE	Continous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			failure if all of the following conditions are met: The Enable Criteria have been satisfied AND any of the following are True: ■HPIMU Primary Lateral Acceleration Invalidity is Determined Invalid ■HPIMU Secondary Lateral Acceleration Invalidity is Determined Invalid	Invalidity is Determined Invalid OR HP IMU Secondary Lateral Acceleration Invalidity is Determined Invalid	HP IMU Primary Lateral Acceleration Loss of Communication Fault Active HP IMU Primary Lateral Acceleration Availability Indication HP IMU Primary Lateral Acceleration Failed Safety Fault Active HP IMU Primary Lateral Acceleration Failed Safety Indication HP IMU Secondary Lateral Acceleration Loss of Communication Fault Active HP IMU Secondary Lateral Acceleration Availability Indication HP IMU Secondary Lateral Acceleration Failed Safety Fault Active HP IMU Secondary Lateral Acceleration Failed Safety Indication HP IMU Common Diagnostic Enable HP IMU Signal Diagnostic Enable Lateral Acceleration	= FALSE = Available = FALSE = FALSE = FALSE =Available = FALSE = FALSE =TRUE =TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Invalid Diagnostic Communication Enable Manufactures Enable Counter (MEC) K_Lateral_Acceleration_Diagnostic_Enable	=TRUE =0 =TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Longitudinal Acceleration Sensor	C0062	Monitors for faults of the High Performance IMU Upon fault detection the emissions neutral default action action of disabling adaptive cruise and or SuperCruise will occur.	The diagnostic sub function shall record a failure if all of the following conditions are met: The Enable Criteria have been satisfied AND HP IMU Longitudinal Acceleration Correlation Status is Unknown or Not Correlated	HP IMU Longitudinal Acceleration Correlation Status is Unknown or Not Correlated	K_Communications_Fault_Pending HP IMU Longitudinal Acceleration Correlation Status Loss of Communication Fault Active HP IMU Longitudinal Acceleration Correlation Status Failed Safety Fault Active HP IMU Longitudinal Acceleration Correlation Status Availability Indication HP IMU Longitudinal Acceleration Correlation Status Failed Safety Indication HP IMU Common Diagnostic Enable Longitudinal Acceleration Correlation Diagnostic Communication Enable HP IMU Signal Diagnostic Enable Manufactures Enable Counter (MEC) K_Longitudinal_Acceleration_Diagnostic_Enable	= FALSE = FALSE = FALSE = Available = FALSE = TRUE = TRUE = TRUE = 0 =TRUE	Continous	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			The diagnostic sub function shall record a failure if all of the following conditions are met: The Enable Criteria have been satisfied AND any of the following are True: ■HPIMU Primary Longitudinal Acceleration Invalidity is Determined Invalid ■HPIMU Secondary Longitudinal Acceleration Invalidity is Determined Invalid	■HPIMU Primary Longitudinal Acceleration Invalidity is Determined Invalid OR HP IMU Secondary Longitudinal Acceleration Invalidity is Determined Invalid	K_Communications_Fault _Pending HP IMU Primary Longitudinal Acceleration Loss of Communication Fault Active HP IMU Primary Longitudinal Acceleration Availability Indication HP IMU Primary Longitudinal Acceleration Failed Safety Fault Active HP IMU Primary Longitudinal Acceleration Failed Safety Indication HP IMU Secondary Longitudinal Acceleration Loss of Communication Fault Active HP IMU Secondary Longitudinal Acceleration Availability Indication HP IMU Secondary Longitudinal Acceleration Failed Safety Fault Active HP IMU Secondary Longitudinal Acceleration Failed Safety Indication HP IMU Common Diagnostic Enable HP IMU Signal Diagnostic Enable	= FALSE = FALSE = Available = FALSE = FALSE = FALSE =Available = FALSE = FALSE =TRUE =TRUE	Continous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Longitudinal Acceleration Invalid Diagnostic Communication Enable	=TRUE		
					Manufactures Enable Counter (MEC)	=0		
					K_Longitudinal _Acceleration_Diagnostic _Enable	=TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Yaw Rate Sensor	C0063	Monitors for faults of the High Performance IMU Upon fault detection the emissions neutral default action action of disabling adaptive cruise and or SuperCruise will occur.	The diagnostic sub function shall record a failure if all of the following conditions are met: The Enable Criteria have been satisfied AND HP IMU Yaw Rate Correlation Status is Unknown or Not Correlated	HP IMU]Yaw Rate Correlation Status is Unknown or Not Correlated	K_Communications_Fault_Pending HP IMU Yaw Rate Correlation Status Loss of Communication Fault Active HP IMU Yaw Rate Correlation Status Failed Safety Fault Active HP IMU Yaw Rate Correlation Status Availability Indication HP IMU Yaw Rate Correlation Status Failed Safety Indication HP IMU Common Diagnostic Enable Yaw Rate Correlation Diagnostic Communication Enable HP IMU Signal Diagnostic Enable Manufactures Enable Counter (MEC) K_Yaw_Rate_Diagnostic_Enable	= FALSE = FALSE = FALSE = Available = FALSE = TRUE = TRUE = TRUE = 0 =TRUE	Continous	Safety Emissions Neutral Diagnostics - Special Type C
			The diagnostic sub function shall record a	■HPIMU Primary Yaw Rate Invalidity is	K_Communications_Fault_Pending	= FALSE	Continous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			failure if all of the following conditions are met: The Enable Criteria have been satisfied AND any of the following are True: ■HPIMU Primary Yaw Rate Invalidity is Determined Invalid ■HPIMU Secondary Yaw Rate Invalidity is Determined Invalid	Determined Invalid OR HP IMU Secondary Yaw Rate Invalidity is Determined Invalid	HP IMU Primary Yaw Rate Loss of Communication Fault Active HP IMU Primary Yaw Rate Availability Indication HP IMU Primary Yaw Rate Failed Safety Fault Active HP IMU Primary Yaw Rate Failed Safety Indication HP IMU Secondary Yaw Rate Loss of Communication Fault Active HP IMU Secondary Yaw Rate Availability Indication HP IMU Secondary Yaw Rate Failed Safety Fault Active HP IMU Secondary Yaw Rate Failed Safety Indication HP IMU Common Diagnostic Enable HP IMU Signal Diagnostic Enable Yaw Rate Invalid Diagnostic	= FALSE = Available = FALSE = FALSE = FALSE =Available = FALSE = FALSE =TRUE =TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Communication Enable	=TRUE		
					Manufactures Enable Counter (MEC)	=0		
					K_Yaw_Rate_Diagnostic_ Enable	=TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Inertial Sensor	C0520	Monitors for controller faults of the High Performance IMU Upon fault detection the emissions neutral default action action of disabling adaptive cruise and or SuperCruise will occur.	The diagnostic sub function shall record a failure if all of the following conditions are met: The Enable Criteria have been satisfied AND HP IMU Initialization Complete is False	HP IMU Initialization Timer > K_HP_IMU—Initialization_Delay	Diagnostic System Disabled Vehicle Power Mode Initialization Complete Diagnostic Communication Enable ■K_Common_Diag_Enable K_Communications_Fault_Pending HP IMU Initialization Complete Loss of Communication Fault Active HP IMU Initialization Complete Availability Indication HP IMU Initialization Complete Failed Safety Fault Active HP IMU Initialization Complete Failed Safety Indication HP IMU Reset Occurred Loss of Communication Fault Active HP IMU Reset Occurred Availability Indication is Available HP IMU Reset Occurred Failed Safety Fault Active	= FALSE = Propulsion = TRUE = TRUE = FALSE = FALSE = Active = FALSE = FALSE = FALSE = Active = FALSE	Continous	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					HP IMU Reset Occurred Failed Safety Indication	= FALSE		
			The diagnostic sub function shall record a failure if all of the following conditions are met: The Enable Criteria have been satisfied and any of the following are TRUE: ■HPIMU Static Offset Calibration Status is Not Calibrated All of the following are TRUE: HP Inertial Sensor Static Offset Box Swap Detected is TRUE HP Inertial Sensor Serial Number Received Value does not equal 0	See malfunction criteria	K_Communications_Fault _Pending HP IMU Static Offset Calibration Status Loss of Communication Fault Active HP IMU Static Offset Calibration Status Availability Indication is HP IMU Static Offset Calibration Status Failed Safety Fault Active HP IMU Static Offset Calibration Status Failed Safety Indication is FALSE HP IMU Common Diagnostic Enable Static Offset Calibration Diagnostic Communication Enable i Manufactures Enable Counter (MEC) is equal to 0 K_Common_Diag_Enable	= FALSE = FALSE = Available = FALSE = FALSE = TRUE = TRUE = 0 = TRUE	Continous	
			The diagnostic sub function shall record a failure if all of the following conditions are met:	See malfunction criteria	K_Communications_Fault -Pending HP IMU Orientation Calibration Status Loss of	= FALSE	Continous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			The Enable Criteria have been satisfied and any of the following are TRUE: HP IMU Orientation Calibration Status is not equal to K_Platform_Orientation All of the following are TRUE: HP Inertial Sensor Orientation Box Swap Detected is TRUE HP Inertial Sensor Serial Number Received Value does not equal 0		Communication Fault Active HP IMU Orientation Calibration Status Availability Indication is HP IMU Orientation Calibration Status Failed Safety Fault Active HP IMU Orientation Calibration Status Failed Safety Indication is FALSE HP IMU Common Diagnostic Enable Orientation Calibration Status Diagnostic Communication Enable Manufactures Enable Counter (MEC) is equal to 0 K_Common_Diag_Enable	= FALSE = Available = FALSE = FALSE = TRUE = TRUE = 0 = TRUE		
			The diagnostic sub function shall record a failure if all of the following conditions are met: The Enable Criteria have been satisfied and any of the following are True: HP IMU Primary Temperature Invalidity is set to TRUE	See malfunction criteria	K_Communications_Fault_Pending HP IMU Primary Temperature Status Loss of Communication Fault Active HP IMU Primary Temperature Status Availability Indication is HP IMU Primary	= FALSE = FALSE = Available	Continous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			HP IMU Secondary Temperature Invalidity is set to TRUE		Temperature Status Failed Safety Fault Active	= FALSE		
					HP IMU Primary Temperature Status Failed Safety Indication	= FALSE		
					HP IMU Common Diagnostic Enable	= TRUE		
					Primary Temperature Status Diagnostic Communication Enable	= TRUE		
					HP IMU Secondary Temperature Status Loss of Communication Fault Active	= FALSE		
					HP IMU Secondary Temperature Status Availability Indication is	= Available		
					HP IMU Secondary Temperature Status Failed Safety Fault Active	= FALSE		
					HP IMU Secondary Temperature Status Failed Safety Indication is FALSE	=FALSE		
					HP IMU Common Diagnostic Enable	=TRUE		
					Secondary Temperature Status Diagnostic Communication Enable	=TRUE		
					Manufactures Enable Counter (MEC) is equal to 0	= 0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					K_Common_Diag_Enable	= TRUE		
			The diagnostic sub function shall record a failure if all of the following conditions are met: The Enable Criteria have been satisfied HP IMU Low Voltage Detected is TRUE	Voltage <6V	K_Communications_Fault_Pending HP IMU Low Voltage Loss of Communication Fault Active HP IMU Low Voltage Status Availability Indication is HP IMU Low Voltage Status Failed Safety Fault Active HP IMU Low Voltage Status Failed Safety Indication HP IMU Common Diagnostic Enable K_Common_Diag_Enable Low Voltage Diagnostic Communication Enable i	= FALSE = FALSE = Available = FALSE = FALSE = TRUE = TRUE =TRUE	Continous	

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 system. The DTC is set at 9V, however the emissions neutral default action of disabling adaptive cruise control will not occur until 5V (the voltage at which the CAN bus will fail). This is done to ensure safety critical features can operate at low voltage.	Run Crank voltage low and high	Battery Voltage <= 9.0 Volts	Run/Crank Starter motor status Diagnostic Engine RPM	= Active = Not Engaged = Enabled >= 600.0 RPM	2.5 seconds out of a 3 seconds window Diagnoistic runs every 100 ms	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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. Upon fault detection the emissions neutral default action action of disabling adaptive cruise and of SuperCruise will occur	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.	Safety Emissions Neutral Diagnostics - Special Type C
			The Primary Processor's Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations.	5 failures detected via Error Correcting Code			Diagnostic runs continuously via the flash hardware.	
			The Primary Processor's calculated checksum does not match the stored checksum value for a selected subset of the calibrations.	2 consecutive failures detected .			Diagnostic runs continuously. Will report a detected fault within 200 ms.	
				In all cases, the failure count is cleared when controller shuts down				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Not Programmed	P0602	Indicates the EOCM needs to be programmed. Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	This DTC is set via calibration, when KelDND_b_NoStartCal	=TRUE	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	Diagnoistic System is not in State of Reset.	1 second	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	Static NVM region error detected during initialization				Diagnostic runs at controller power up.	Safety Emissions Neutral Diagnostics - Special Type C
			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. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	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 >=	3 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	Safety Emissions Neutral Diagnostics - Special Type C
			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 >=	3 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. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	Time new seed not received exceeded			always running	0.400 seconds	Safety Emissions Neutral Diagnostics - Special Type C
			MAIN processor receives seed in wrong order			always running	3 / 17 counts intermittent. 50 ms/count in the ECM main processor	
			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	
			Safety critical software is not executed in proper order.	>= 1 incorrect sequence.		Test is Enabled: 1 (If 0, this test is disabled)	Fail Table, f(Loop Time). See supporting tables: **P0606_PSW Sequence Fail f (Loop Time)** / Sample Table, f (Loop Time)See supporting tables: **P0606_PSW Sequence Sample f(Loop Time)** counts 50 ms/count in	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal ECM Processor Integrity Performance	P0607	Indicates that the ECM has detected an internal processor integrity performance. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	Performs the failure diagnostic for the offline and online BIST results.			Test is enabled: 1 . (If 0, this test is disabled)	3 counts background task/ count in the ECM main processor	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	HWIO reports that writing to NVM (at shutdown) will not succeed				Diagnostic runs at controller power up.	Type D, SDA Safety Emissions Neutral Diagnostics - Special Type C
			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.
Control Module Processor Serial Peripheral Interface Bus	P30D6	This diagnostic monitors for board level SPI errors between processors Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	Failure is determined through the HWIOAPPL SPI Bus network status	8 errors out of a 16 sample window	K_Internal_Control_Module_Processor_SPIBUS3_Enable Vehicle Power Mode When the diagnostic system is not in a short term/state of reset Run crank ignition OR battery is in range AND The specified length of time has passed with the diagnostic enable criteria met	= TRUE = RUN or PROPULSION 9 < V < 16 After 0.00050 seconds	0.05 seconds out of a 0.1 seconds window	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Processor Serial Peripheral Interface Bus 3	P30D8	This diagnostic monitors for board level SPI errors between processors Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	Failure is determined through the HWIOAPPL SPI Bus network status	8 errors out of a 16 sample window	K_Internal_Control_Module_Processor_SPIBUS3_Enable Vehicle Power Mode When the diagnostic system is not in a short term/state of reset Run crank ignition OR battery is in range AND The specified length of time has passed with the diagnostic enable criteria met	= TRUE = RUN or PROPULSION 9 < V < 16 After 0.00050 seconds	0.05 seconds out of a 0.1 seconds window	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Processor Serial Peripheral Interface Bus 4	P30D9	This diagnostic monitors for board level SPI errors between processors. Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	Failure is determined through the HWIOAPPL SPI Bus network status	8 errors out of a 16 sample window	K_Internal_Control_Module_Processor_SPIBUS3_Enable Vehicle Power Mode When the diagnostic system is not in a short term/state of reset Run crank ignition OR battery is in range AND The specified length of time has passed with the diagnostic enable criteria met	= TRUE = RUN or PROPULSION 9 < V < 16 After 0.00050 seconds	0.05 seconds out of a 0.1 seconds window	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	= True Boolean		Type D, SDA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication on CAN Bus 2 Off	U0073	A bus off condition has been detected for the CAN 2 Bus. Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	This DTC monitors for a BUS off condition onCAN Bus	A failure is detected for 3 counts for 1000 ms	Vehicle Power Mode EOCM Operational Condition Diagnoistic Enabled Supply Voltage	= RUN = EOCM Comm Active State = True 9 > V > 16V	3 seconds out of a 5 seconds window Diagnoistic runs every 1000 ms	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication on CAN Bus 1 Off	U0075	A bus off condition has been detected for the CAN 1 Bus. Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	This DTC monitors for a BUS off condition on CAN Bus	A failure is detected for 3 counts for 1000 ms	Vehicle Power Mode EOCM Operational Condition Diagnoistic Enabled Supply Voltage	= RUN = EOCM Comm Active State = True 9 > V > 16V	3 seconds out of a 5 seconds window Diagnoistic runs every 1000 ms	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication on CAN Bus 8 Off	U007E	A bus off condition has been detected for the CAN 8 Bus. Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	This DTC monitors for a BUS off condition on GM HS CAN Bus	A failure is detected for 3 counts for 1000 ms	Vehicle Power Mode EOCM Operational Condition Diagnoistic Enabled Supply Voltage	= RUN = EOCM Comm Active State = True 9 > V > 16V	3 seconds out of a 5 seconds window Diagnoistic runs every 1000 ms	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Transmission Control Module	U0101	This DTC monitors for a loss of communication with the tranmission. Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	Message not Recieved from Controller for: TrnsEstGrAuth TrnsShftLvrPstnAuth TEGP_TransCmndGrAuth	 >0.050 seconds > 0.050 seconds > 0.050 seconds	Vehicle Supply Voltage ECU Operating Conditions: U010100_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Interial Sesnsor	U0125	This DTC monitors for a loss of communication with the tranmission. Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	Message not Recieved from Controller for: HPIDGJnitCmplt HPIDG_LoVltgDtd HPIDG_OrntnCalSts HPIDG-PriTemp HPIDG_RstOcc HPIDG_SecTemp HPIDG_StcOfstCalSts HPIDG_LatAccelCorrSts HPIDP_LatAccel HPIDS_LatAccel HPIDG_LngAccelCorrSts HPIDP_LngAccel HPIDS_LngAccel HPIDP_YawAccel HPIDS_YawAccel HPIDG_YawRateCorrSts HPIDP_YawRate HPIDS_YawRate	 >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds	Vehicle Supply Voltage ECU Operating Conditions: U012500_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Power Steering Control Module	U0131	This DTC monitors for a loss of communication with the power steering system. Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	Message not Recieved from Controller for: DASTP_StrTrqAuth SteeringTorqueOverlayDeliveredAuth SteeringRequestDeliveredStatusAuth EPSTTDP_TotTorqDlvdAuth ArbitratedSteeringFeatureRequestActiveAuth SteeringWheelHandsOffDetectionConfidenceLevelAuth SteeringWheelHandsOffDetectionModeAuth SWHOP_StAuth SWIP_StrgWhlAngAuth SWIP_StrgWhlAngCalStsAuth SWIP_StrgWhlAngGradAuth	 > 0.05 seconds > 0.25 seconds > 0.25 seconds >0.05 seconds > 0.25 seconds > 0.25 seconds > 0.25 seconds > 0.25 seconds > 0.05 seconds > 0.05 seconds > 0.05 seconds	Vehicle Supply Voltage ECU Operating Conditions: U013100_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Body Control Module	U0140	This DTC monitors for a loss of communication with the Body Control Module. Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	Message not Recieved from Controller for: DayNightStatusAuth BrkPedInitTrvlAchvdAuth BrkPdlPosAuth CP_CruzSecSwStatAuth HSP_DrvAlrtTypCstCurrSetValAuth HapticSeatActiveAuth HSP_HptcStOprtlStsAuth HSP_HptcStPrsntAuth TeenDrvActAuth TransportStorageLogisticsModeActivation VMMP_StatAuth	 > 0.25 seconds > 0.05 seconds > 0.05 seconds > 0.05 seconds >2.50 seconds >2.50 seconds >2.50 seconds >2.50 seconds >2.50 seconds >2.50 seconds >2.50 seconds	Vehicle Supply Voltage ECU Operating Conditions: U014000_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communciation with Restraints Control Module	U0151	This DTC monitors for a loss of communication with the restrains control module. Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	Message not Recieved from Controller for: LLDP_LatAccelAuth LLDP_LatAccelSnsrCorrStsAuth LLDP_LongAccelAuth LLDP_LongAccelSnsrCorrStsAuth DriverSeatBeltStatusAuth PCIP_CruiseControlDisableRequestedAuth YRP_YawRateAuth YRP_YawRateCorrAuth	 >0.250 seconds >0.250 seconds >0.250 seconds >0.250 seconds > 2.50 seconds > 2.50 seconds > 0.050 seconds > 0.050 seconds	Vehicle Supply Voltage ECU Operating Conditions: U015100_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Radar Sensor Module - Long Range	U0235	This DTC monitors for a loss of communication with the long range radar. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	Message not Recieved from Controller for: LRRODP_Brst1_Prtctd LRRODP_Brst2_Prtctd LRRODP_Brst3_Prtctd LRRODP_Brst4_Prtctd LRRODP_Brst5_Prtctd LRRODP_Brst6_Prtctd	 > 0.25 seconds > 0.25 seconds >0.25 seconds >0.25 seconds > 0.25 seconds > 0.25 seconds	Vehicle Supply Voltage ECU Operating Conditions: U021100_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communciation with Video Processing Module	U023C	This DTC monitors for a loss of communication with the video processing module Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	Message not Recieved from Controller for: SrrndVsnRLSDatBrst Aux1CameraConnectionStatus Aux2CameraConnectionStatus	 >0.250 seconds >0.250 seconds >0.250 seconds	Vehicle Supply Voltage ECU Operating Conditions: U023C00_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Radar Sensor Module - Short Range Left Front	U023D	This DTC monitors for a loss of communication with the short range radar. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	Message not Recieved from Controller for: SRRLFODP_Brst1_Prtctd SRRLFODP_Brst2_Prtctd SRRLFODP_Brst3_Prtctd SRRLFODP_Brst4_Prtctd SRRLFODP_Brst5_Prtctd SRRLFODP_Brst6_Prtctd	 > 0.20 seconds > 0.20 seconds >0.20 seconds >0.20 seconds > 0.20 seconds > 0.20 seconds	Vehicle Supply Voltage ECU Operating Conditions: U023D00_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9<V< 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Radar Sensor Module - Short Range Right Front	U023E	This DTC monitors for a loss of communication with the short range radar. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	Message not Recieved from Controller for: SRRRFODP_Brst1_Prtctd SRR RFCDP_B rst2_Prtctd SRRRFODP_B rst3_P rtctd SRRRFODP_B rst4_Prtctd SRRRFODP_Brst5_Prtctd SRRRFODP_Brst6_Prtctd	 > 0.20 seconds > 0.20 seconds >0.20 seconds >0.20 seconds > 0.20 seconds > 0.20 seconds	Vehicle Supply Voltage ECU Operating Conditions: U023E00_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9<V< 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Camera Module - Front	U0265	This DTC monitors for a loss of communication with the front camera module. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	Message not Recieved from Controller for: FCODP_Brst1_Prtctd FCODP_Brst2_Prtctd FCODP_Brst3_Prtctd FCODP_Brst4_Prtctd FCODP_Brst5_Prtctd FCODP_Brst6_Prtctd FCODP_Brst7_Prtctd FCODP_Brst8_Prtctd FCODP_Brst9_Prtctd FCODP_Brst10_Prtctd	 > 0.25 seconds > 0.25 seconds >0.25 seconds >0.25 seconds > 0.25 seconds > 0.25 seconds > 0.25 seconds > 0.25 seconds > 0.25 seconds > 0.25 seconds	Vehicle Supply Voltage ECU Operating Conditions: U026500_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9<V< 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Engine Control Module	U0401	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	An error has been detected on one of the following message: ActAxleTrqAuth AdaptiveCruiseControlAxleTorqueCommandLimitingStateAuth AdaptiveCruiseControlAxleTorqueCommandRequestStateAuth CCEP_Auth DrvIntndAxlTrqMxAuth DrvIntndAxlTrqAuth EngSpdAuth PTSndBrkPdlPsAuth PSP_EngRnngAuth PSP_PrplSysActvAuth AtTrnsCmndGrAuth TrnsEstGrAuth TrnsShftLvrPstnAuth AccActPstAuth AAP_AccelPedOvrrdActvAuth VMI1P_VehTopSpdLimArbdVaiAuth	6 out of 10 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	1.5 seconds out of a 2.5 seconds window (Based on the slowest signal tranmission)	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			VMI1 P_VehTopSpdLimModeActvAuth VSADP_VehSpdAvgDrvnAuth VSNDP_VehSpdAvgNDrvnAuth	6 out of 10 messages 3 out of 4 messages 6 out of 10 messages				

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 diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	An error has been detected on one of the following message: AtTrnsCmndGrAuth TrnsEstGrAuth TrnsShftLvrPstnAuth	 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	0.075 seconds out of a 0.125 seconds window	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Electronic Brake Control Module	U0418	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	An error has been detected on one of the following message: ABSAtvAuth ABSFIdAuth BrkPdIDrvAppPrsDetcdAuth BrkPdIDrvAppIPresAuth TCSP_ESCActvAuth TCSP_ESCSysStsAuth TCSP_ActvAuth TCSP_DrvrIntntAuth TCSP_FaildAuth WhIAngVelLFrtAuth WhIAngVeIRFrtAuth FWDECP_LFAuth FWDECP_RFAuth FWDECP-RstOccAuth WhIAngVelLRrAuth WhIAngVeIRRrAuth RWDECP_LRAuth RWDECP_RRAuth	6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	0.3 seconds out of a 0.4 seconds window (Based on the slowest signal tranmission)	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			RWDECP_RstOccAuth EPBSP_ElecPrkBrkApplStsAuth WRDSP_LFAuth WRDSP_LRAuth WRDSP_RFAuth WRDSP_RRAuth	6 out of 10 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages				

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	U0420	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	An error has been detected on one of the following message: DASTP_StrTrqAuth SteeringTorqueOverlayDeliveredAuth SteeringRequestDeliveredStatusAuth EPSTTDP_TotTorqDlvdAuth SteeringAssistStatusAuth SteeringAssistThermalInhibitedAuth SteeringPerformanceActualModeAuth SteeringTorqueRequestOverlayAvailableLeftAuth SteeringTorqueRequestOverlayAvailableRightAuth SteeringWheelAngleIntegrityStatusAuth SteeringWheelTorqueIntegrityStatusAuth ArbitratedSteeringFeatureRequestActiveAuth SteeringWheelHandsOffDetectionConfidenceLevelAuth	6 out of 10 messages 3 out of 4 messages 3 out of 4 messages 6 out of 10 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	0.3 seconds out of a 0.4 seconds window (Based on the slowest signal tranmission)	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			SteeringWheelHandsOffDetectionModeAuth SWHOP_StAuth SWIP_StrgWhlAngAuth SWIP_StrgWhlAngCalStsAuth SWIP_StrgWhlAngGradAuth	3 out of 4 messages 3 out of 4 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages				

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 diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	An error has been detected on one of the following message: BrkPedlnitTrvlAchvdAuth BrkPdIModTrvlAchAuth BrkPdIPosAuth CP_CruzSecSwStatAuth CP_CruzSpdLmtrSwStatAuth SPMP_SysPwrModeAuth	 6 out of 10 message 6 out of 10 message 6 out of 10 message 6 out of 10 message 6 out of 10 message 6 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	1.5 seconds out of a 2.5 seconds window (Based on the slowest signal tranmission)	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Instrument Panel Cluster	U0423	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations	An error has been detected on one of the following message: ACCSAAMSLP_TypAuth ACCSAAMSLP_SpdLimCnfrmdAuth ChimeSystemStateofHealthAuth IPCDisplayStatusAuth LaneFollowingChimeInterfaceFaultDetectedAuth MCRLDOperationalStatusAuth	 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	8 seconds out of a 10 seconds window (Based on the slowest signal tranmission)	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Radar Sensor Module - Long Range	U0433	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	An error has been detected on one of the following message: LRRODP_Brst1_Prtctd LRRODP_Brst2_Prtctd LRRODP_Brst3_Prtctd LRRODP_Brst4_Prtctd LRRODP_Brst5_Prtctd LRRODP_Brst6_Prtctd	3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	0.03 seconds out of a 0.04 seconds window (Based on the slowest signal tranmission)	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Restraints Control Module	U0452	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	An error has been detected on one of the following message: LLDP_LatAccelAuth LLDP_LatAccelSnsrCorrStsAuth LLDP_LongAccelAuth LLDP_LongAccelSnsrCorrStsAuth PCIP_CruiseControlDisableRequestedAuth YRP_YawRateAuth YRP_YawRateCorrAuth	6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 8 out of 10 messages 6 out of 10 messages 6 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	8 seconds out of a 10 seconds window (Based on the slowest signal tranmission)	Safety Emissions Neutral Diagnostics - Special Type C.

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Telematics Module	U0499	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise and/or SuperCruise wil occur	An error has been detected on one of the following message: RPPSD_Brst RedundantPrecisePositioningSystemHeading RedundantPrecisePositioningSystemLatitude RedundantPrecisePositioningSystemLongitude	6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	8 seconds out of a 10 seconds window (Based on the slowest signal tranmission)	Type D, SDA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From External Object Calculation Module 1 - Processor 2	U053C	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise and/or SuperCruise wil occur	An error has been detected on one of the following message: H2H1DDG1_CRC8_FsFA H2H1DDG2_CRC8_FsFA H2H1DDG3_CRC8_FsFA H2H1DDG4_CRC8_FsFA H2H1DDG5_CRC16_FsFA H2H1DDG6_CRC8_FsFARPPSD_Brst	6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	8 seconds out of a 10 seconds window (Based on the slowest signal tranmission)	Type D, SDA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Video Processing Module	U053D	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise and/or SuperCruise wil occur	An error has been detected on one of the following message: SrrndVsnRLSDatBrst Aux1CameraConnectionStatus Aux2CameraConnectionStatus	 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	8 seconds out of a 10 seconds window (Based on the slowest signal tranmission)	Type D, SDA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Camera Module - Front	U0566	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	An error has been detected on one of the following message: SLVFSP_SpdLimVsnFsdSpdAuth SLVFSP_NwDtdAuth SLVFSPJJntAuth FCODP_Brst1_Prtctd FCODP_Brst2_Prtctd FCODP_Brst3_Prtctd FCODP_Brst4_Prtctd FCODP_Brst5_Prtctd FCODP_Brst6_Prtctd FCODP_Brst7_Prtctd FCODP_Brst8_Prtctd FCODP_Brst9_Prtctd FCODP_Brst10_Prtctd FCODP_Brst11_Prtctd	3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	3 seconds out of a 4 seconds window (Based on the slowest signal tranmission)	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Radar Sensor Module - Short Range Left Rear	U1126	This DTC monitors for a loss of communication with the short range radar	Message not Recieved from Controller for: SRRLRODP_Brst1_Prtctd SRRLRODP_Brst2_Prtctd SRRLRODP_Brst3_Prtctd SRRLRODP_Brst4_Prtctd SRRLRODP_Brst5_Prtctd SRRLRODP_Brst6_Prtctd	 > 0.20 seconds > 0.20 seconds >0.20 seconds >0.20 seconds > 0.20 seconds > 0.20 seconds	Vehicle Supply Voltage ECU Operating Conditions: U112600_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9<V< 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Radar Sensor Module - Short Range Right Rear	U1127	This DTC monitors for a loss of communication with the short range radar	Message not Recieved from Controller for: SRRRRODP_Brst1_Prtctd SRRRRODP_Brst2_Prtctd SRRRRODP_Brst3_Prtctd SRRRRODP_Brst4_Prtctd SRRRRODP_Brst5_Prtctd SRRRRODP_Brst6_Prtctd	 > 0.20 seconds > 0.20 seconds >0.20 seconds >0.20 seconds > 0.20 seconds > 0.20 seconds	Vehicle Supply Voltage ECU Operating Conditions: U112700_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9<V< 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Radar Short Range Sensor - Side Left Rear	U1150	This DTC monitors for a loss of communication with the short range radar	Message not Recieved from Controller for: SRRSLRODPB1P_AcqTmStmAuth	> 0.20 seconds	Vehicle Supply Voltage ECU Operating Conditions: U112700_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Radar Short Range Sensor - Side RightRear	U1151	This DTC monitors for a loss of communication with the short range radar	Message not Recieved from Controller for: SRRSRRODPB1P_AcqTmStmAuth	> 0.20 seconds	Vehicle Supply Voltage ECU Operating Conditions: U112700_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Radar Sensor Module - Short Range Left Front	U130F	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations	An error has been detected on one of the following message: SRRLFODP_Brst1_Prtctd SRRLFODP_Brst2_Prtctd SRRLFODP_Brst3_Prtctd SRRLFODP_Brst4_Prtctd SRRLFODP_Brst5_Prtctd SRRLFODP_Brst6_Prtctd	 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	0.4 seconds out of a 0.5 seconds window	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Radar Sensor Module - Short Range Right Front	U1310	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations	An error has been detected on one of the following message: SRRRFODP_Brst1_Prtctd SRRRFODP_Brst2_Prtctd SRRRFODP_Brst3_Prtctd SRRRFODP_B rst4_P rtctd SRRRFODP_B rst5_P rtctd SRRRFODP_Brst6_Prtctd	 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9<V< 16 = True > 5 seconds = 0	0.4 seconds out of a 0.5 seconds window	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Radar Sensor Module - Short Range Left Rear	U1311	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations	An error has been detected on one of the following message: SRRLRCODP_Brst1_Prtctd SRRLRCODP_Brst2_Prtctd SRRLRCODP_Brst3_Prtctd SRRLRCODP_Brst4_Prtctd SRRLRCODP_Brst5_Prtctd SRRLRCODP_Brst6_Prtctd	8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	0.4 seconds out of a 0.5 seconds window	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Radar Sensor Module - Short Range Right Rear	U1312	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations	An error has been detected on one of the following message: SRRRRODP_Brst1_Prtctd SRRRRODP_Brst2_Prtctd SRRRRODP_Brst3_Prtctd SRRRRODP_Brst4_Prtctd SRRRRODP_Brst5_Prtctd SRRRRODP_Brst6_Prtctd	8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	0.4 seconds out of a 0.5 seconds window	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from Radar Short Range Sensor - Side Left Rear	U1366	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations	An error has been detected on one of the following message: SRRSLRODPB1P_AcqTmStmAuth	6 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	0.4 seconds out of a 0.5 seconds window	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	**Fault Code**	**Monitor Strategy Description**	**Malfunction Criteria**	**Threshold Value**	**Secondary Parameters**	**Enable Conditions**	**Time Required**	**MIL Ilium.**
Invalid Data Received from Radar Short Range Sensor - Side Right Rear	U1367	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations	An error has been detected on one of the following message: SRRSRRODPB1P_AcqTmStmAuth	6 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	0.4 seconds out of a 0.5 seconds window	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Gateway A on CAN 1	U1607	This DTC monitors for a loss of communication with the gateway module on CAN1 Upon fault detection the emissions neutral default action action of disabling adaptive cruise control and/or SuperCruise	Message not Recieved from Controller for: ChimeManagerStatus	> 2.50 seconds	Vehicle Supply Voltage ECU Operating Conditions: U160700_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communciation with Brake System Control Module on CAN 1	U160F	This DTC monitors for a loss of communication with the brake controller on CAN1 Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	Message not Recieved from Controller for: ABSAtvAuth ABSFldAuth BrkPdlDrvAppPrsDetcdAuth BrkPdlDrvApplPresAuth TCSP_ESCActvAuth TCSP_ESCSysStsAuth TCSP_FaildAuth WhlAngVelLFrtAuth WhlAngVelRFrtAuth FWDECP_LFAuth FWDECP_RFAuth FWDECP-RstOccAuth WhlAngVelLRrAuth WhlAngVelRRrAuth RWDECP_LRAuth RWDECP_RRAuth RWDECP_RstOccAuth	 > 0.05 seconds > 0.05 seconds > 0.05 seconds > 0.05 seconds > 0.625 seconds > 0.625 seconds > 0.625 seconds > 0.05 seconds > 0.05 seconds > 0.250 seconds > 0.250 seconds > 0.250 seconds >0.05 seconds >0.05 seconds > 0.250 seconds > 0.250 seconds > 0.250 seconds	Vehicle Supply Voltage ECU Operating Conditions: U160F00_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communciation with Brake System Control Module on CAN 2	U1610	This DTC monitors for a loss of communication with the brake controller on CAN2. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	Message not Recieved from Controller for: VAP_ActlVehAccelAuth CBIP_ACCBrkgActvAuth ACCPrfMdRq ABSPr EPBSP_ElecPrkBrkApplStsAuth TBI2P_TrlrBrkgManAppAtvAuth WRDSP_LFAuth	 > 0.30 seconds > 0.05 seconds > 2.50 seconds > 2.50 seconds > 0.25 seconds > 0.30seonds > 0.30 seconds	Vehicle Supply Voltage ECU Operating Conditions: U161000_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Engine Control Module on CAN2	U1611	This DTC monitors for a loss of communication with the engine control module on CAN 2. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	Message not Recieved from Controller for: CollisionPreparationSystemAxleTorqueCommandRequestStateAuth DrvIntndAxlTrqMnAuth DrvIntndAxlTrqMxAuth DrvIntndAxlTrqAuth EngSpdAuth TrnsEstGrAuth TrnsShftLvrPstnAuth AccActPstAuth VSADP_VehSpdAvgDrvnAuth VSNDP_VehSpdAvgNDrvnAuth WhlDstPrRvlFrtAuth WhlDstPrRvlRrAuth	>0.250 seconds >0.100 seconds >0.100 seconds > 0.100 seconds >0.050 seconds >0.050 seconds > 0.050 seconds >0.050 seconds >0.250 seconds >0.625 seconds >2.50 seconds >2.50 seconds	Vehicle Supply Voltage ECU Operating Conditions: U161100_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with External Object Calculation Module 1 - Processor 2 on Ethernet	U1623	This DTC monitors for a loss of communication with the EOCM HCP1 on internal ethernet. Upon fault detection the emissions neutral default action action of disabling adaptive cruise and SuperCruise will occur	Message not Recieved from Controller for: H2H1DDG1_CRC8_LcFA H2H1DDG2_CRC8_LcFA H2H1DDG3_CRC8_LcFA H2H1DDG4_CRC8_LcFA H2H1DDG5_CRC16_LcFA H2H1DDG6_CRC8_LcFA	>0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds	Vehicle Supply Voltage ECU Operating Conditions: U161100_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Telematics Control Platform on Ethernet	U1624	This DTC monitors for a loss of communication with the TCP on internal ethernet. Upon fault detection the emissions neutral default action action of disabling adaptive cruise and SuperCruise will occur	Message not Recieved from Controller for: PPPS2DAbsolutePositionErrorEstimate PPPSAbsoluteHeadingErrorEstimate PrimaryPrecisePositioningSystemCalendarDay PrimaryPrecisePositioningSystemCalendarYear PrimaryPrecisePositioningSystemElevation PrimaryPrecisePositioningSystemHeading PrimaryPrecisePositioningSystemLatitude PrimaryPrecisePositioningSystemLocationUsable PrimaryPrecisePositioningSystemLongitude PrimaryPrecisePositioningSystemLowerGlobalTimeStamp PrimaryPrecisePositioningSystemMode PrimaryPrecisePositioningSystemSignalAcquisitionTime	 >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds	Vehicle Supply Voltage ECU Operating Conditions: U161100_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9<V< 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			PrimaryPrecisePositioning SystemTimeofDay	>0.050 seconds				
			PrimaryPrecisePositioning SystemllpperGlobalTime Stamp	>0.050 seconds				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with External Object Calculation Module 1 - Processor 1 on Ethernet	U1625	This DTC monitors for a loss of communication with the EOCM HCP1 on internal ethernet. Upon fault detection the emissions neutral default action action of disabling adaptive cruise and SuperCruise will occur	Message not Recieved from Controller for: H1H2DDG1_CRC8 H1H2DDG2_CRC8 H1H2DDG3_CRC8 H1H2DDG4_CRC8 H1H2DDG5_CRC16 H1H2DDG6_CRC8	 >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds	Vehicle Supply Voltage ECU Operating Conditions: U161100_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.
		
		Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.
			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)
						Diagnostic Enabled:
						
						KaSSAR_h_DiagEnableCals[1] == Enabled
								Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
U1961 (Security Peripheral Performance)	U1961	This DTC indicates that the ECU security peripheral has reported that it has failed. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	The ECU security peripheral reports that the security peripheral hardware has failed.			Diagnostic Enabled: KaSSAR_h_DiagEnableCals[2] == Enabled		Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. It should noted not all devices with incorrect authentication will set the default action - only applies to adaptive cruise critical devices.	Message authentication on a single key slot has failed a configurable number of times.	=>3		Diagnostic Enabled: 1.00 (True)		Type D, SDA

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Hand Wheel Angle Sensor	C0051	Monitors system angle sensor 0. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Failure to communicate with sensor, Protection value faults, sensor power supply faults.	Fault Detected	$1F1 (SYSTEMPOWERMODE) $0C9 (ENGINE RUN ACTIVE) DIAGNOSTICENABLED Voltage	= RUN/ACC = TRUE TRUE 6V < voltage < 16V	4ms (2 failures/ 2ms/sample)	Safety Emissions Neutral Diagnostic - Type C
Hand Wheel Angle Sensor	C0051	Monitors system angle sensor 1. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Failure to communicate with sensor, Protection value faults, sensor power supply faults.	Fault Detected	$1F1 (SYSTEMPOWERMODE) $0C9 (ENGINE RUN ACTIVE) DIAGNOSTICENABLED Voltage	= RUN/ACC = TRUE TRUE 6V < voltage < 16V	4ms (2 failures/ 2ms/sample)	Safety Emissions Neutral Diagnostic - Type C
Hand Wheel Angle Sensor	C0051	Monitors system angle sensor 2. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Failure to communicate with sensor, Protection value faults, sensor power supply faults.	Fault Detected	$1F1 (SYSTEMPOWERMODE) $0C9 (ENGINE RUN ACTIVE) DIAGNOSTICENABLED Voltage	= RUN/ACC = TRUE TRUE 6V < voltage < 16V	4ms (2 failures/ 2ms/sample)	Safety Emissions Neutral Diagnostic - Type C
Hand Wheel Angle Sensor	C0051	Monitors system angle sensor 3. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Failure to communicate with sensor, Protection value faults, sensor power supply faults.	Fault Detected	$1F1 (SYSTEMPOWERMODE) $0C9 (ENGINE RUN ACTIVE) DIAGNOSTICENABLED Voltage	= RUN/ACC = TRUE TRUE 6V < voltage < 16V	4ms (2 failures/ 2ms/sample)	Safety Emissions Neutral Diagnostic - Type C
Hand Wheel Angle Sensor	C0051	Monitors motor sensor 0. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Failure to communicate with sensor, Protection value faults, sensor power supply faults.	Fault Detected	$1F1 (SYSTEMPOWERMODE) $0C9 (ENGINE RUN ACTIVE) DIAGNOSTICENABLED Voltage	= RUN/ACC = TRUE TRUE 6V < voltage < 16V	4ms (2 failures/ 2ms/sample)	Safety Emissions Neutral Diagnostic - Type C
Hand Wheel Angle Sensor	C0051	Monitors motor sensor 1. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Failure to communicate with sensor, Protection value faults, sensor power supply faults.	Fault Detected	$1F1 (SYSTEMPOWERMODE) $0C9 (ENGINE RUN ACTIVE) DIAGNOSTICENABLED Voltage	= RUN/ACC = TRUE TRUE 6V < voltage < 16V	4ms (2 failures/ 2ms/sample)	Safety Emissions Neutral Diagnostic - Type C

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Bus Signal Failure	U007E	Control Module Communication CAN Bus 8 Off Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer.	CAN driver indicates a bus off condition has occurred	= Fault Detected	Vehicle Supply Voltage PNC_ActiveTxPDUEnable U007E00_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event Power Mode	9V < voltage < 16V = True = Enabled = Inactive > 5 seconds = Run	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission neutral Diagnostic
Lost Communication with Central Gateway Module	U0146	Detects loss of communication between FCM_LC (Front Camera Module Low Content) and CGM (Central Gateway Module). The emissions neutral default action (described below) will only occur if both U0422 and U0477 are triggered at the same time, otherwise the camera will function normally. The emissions neutral default action is either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the	Monitored Messages: CGM_CAN8_MSG05 CGM_CAN8_MSG03 CGM_CAN8_MSG01	 = 2.5000 seconds (timeout) = 2.5000 seconds (timeout) = 0.0250 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable U014600_ENABLE Time since power up reset or running reset or under voltage or over voltage condition event DTC U007E00	9V < voltage < 16V = True = Enabled > 5 seconds = Inactive	Monitored continuously while CAN frames are being transmitted and received Fault maturation time is 02.5000 seconds	Safety Non-MIL Emission neutral Diagnostic
Invalid Data Received from Body Control Module	U0422	Detects Alive Rolling Counter (ARC) or Message Authentification Code (MAC) error in messages received from the Body Control Module (BCM). The emissions neutral default action (described below) will only occur if both U0422 and U0477 are triggered at the same time, otherwise the camera will function normally. The emissions neutral default action is either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the	The following messages are monitored for failed safety, security, continuous operation or protection and this code sets if a message fails any of these criteria for the timeout period SysPwrMode_Prtctd_MSG	= 0.62500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter	9V < voltage < 16V = True > 5 seconds = 0	Dependent upon receipt of each monitored signal from the Body Control Module (BCM) Fault maturation time is 0.62500 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received from Central Gateway Module	U0447	Detects Alive Rolling Counter (ARC) or Message Authentification Code (MAC) error in messages received from the Central Gateway Module (CGM). The emissions neutral default action (described below) will only occur if both U0422 and U0477 are triggered at the same time, otherwise the camera will function normally. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer.	The following messages are monitored for failed safety, security, continuous operation or protection and this code sets if a message fails any of these criteria for the timeout period BkupSysPwrMode_Prtctd_MSG	= 0.62500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter	9V < voltage < 16V = True > 5 seconds = 0	Dependent upon receipt of each monitored signal from the Central Gateway Module (CGM) Fault maturation time is 0.62500 seconds	Safety Non-MIL Emission neutral Diagnostic
Invalid Data Received from External Object Calculating Module 1	U053B	Detects Alive Rolling Counter (ARC) or Message Authentification Code (MAC) error in messages received from the External Object Calculation Module 1. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer.	The following messages are monitored for failed safety, security, continuous operation or protection and this code sets if a message fails any of these criteria for the timeout period HstVehPathParms_Prtctd_MSG	= 0.02500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter	9V < voltage < 16V = True > 5 seconds = 0	Dependent upon receipt of each monitored signal from the External Object Calculation Module 1 Fault maturation time is 0.02500 seconds	Safety Non-MIL Emission neutral Diagnostic
Lost Communication with External Object Calculating Module 1 on CAN Bus 8	U1616	Detects loss of communication between FCM_LC (Front Camera Module Low Content) and EOCM (External Object Calculating Module) on CAN bus 8. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer.	The following messages are monitored for late arrival and this code sets if a message times out HstVehPathParms_Prtctd_MSG	= 0.02500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable U161600_ENABLE Time since power up reset or running reset or under voltage or over voltage condition event DTC U007E00	9V < voltage < 16V = True = Enabled > 5 seconds = Inactive	Monitored continuously while CAN frames are being transmitted and received Fault maturation time is 0.02500 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Key Table Not Provisioned	U1960	The confirmed status for this DTC indicates that at least one Security Peripheral General Key must be provisioned. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer.	The Authoritative Counter Any single Key Slot Provision State Flag for Key 2 through to the final Key AND OBD Manufacturing Enable Counter ERC_KEY_EMPTY	= Max Value = 0 = 0 = TRUE	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SecurityPeripheralPerformanceDiagnosticPowerModeTime U196000_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event All of the previous conditions plus any one of the following: 1) Monitored continuously while CAN frames are being transmitted and received.	9V < voltage < 16V = True >= 5 seconds = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received.	Safety Non-MIL Emission neutral Diagnostic
Security Peripheral Performance - Performance or Incorrect Operation	U1961	The confirmed status for this DTC indicates that the Front Camera Module Low Content (FCM_LC) must be replaced due to an internal error. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer.	1) The security peripheral is considered to have failed if a request to the security peripheral cannot generate a Message Authentication Code (MAC) due to an internal error (not due to software timeouts). 2) The security peripheral is considered to have failed if a request to the security peripheral cannot verify a Message Authentication Code (MAC) due to an internal error (not due to software timeouts).	= Fault Detected	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SecurityPeripheralPerformanceDiagnosticPowerModeTime U196192_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event	9V < voltage < 16V = True >= 5 seconds = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission neutral Diagnostic
Unable to Authenticate Serial Data Message	U1962	Monitors incoming message authentification code and compares with the expected based on message source. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer. It should noted not all devices with incorrect authentication will set the default action - only applies to adaptive cruise critical devices.	A Message Authentication Code results in failed verification for a calibratable number of consecutive verification attempts for a specific key slot number of consecutive failures failures	> k_ERRH_C_FailedAuthenticationCounter	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SerialDataAuthentificationPowerModeTime Fault Code U196192 U196200_ENABLE Transport Mode Time since power up reset or running reset or under voltage	9V < voltage < 16V = True >= 2 seconds = Inactive = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Front Camera Module Low Content Internal/Programming failures	U3000	Control Module General Checksum Failure. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer. Applies for all diagnostics listed under U3000.	Internal Front Camera Module Low Content (FCM_LC) Memory Checksum Failure Detected.	= Fault Detected	Vehicle Supply Voltage U300041_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Control Module General Memory Failure	General Memory Failure Detected	= Fault Detected	Vehicle Supply Voltage U300042_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Control Module Data Memory Failure	a data (or working) memory failure for embedded systems using FLASH RAM memory has occurred	= Fault Detected	Vehicle Supply Voltage U300044_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Control Module Internal Electronic Failure	Front Camera Module Low Content (FCM_LC) internal circuit micro (Not Image Processing Engine) is detected - BIST Fail - Registier Check Error - Internal Voltage Out of Range - Internal Comm Error	= Fault Detected	Vehicle Supply Voltage U300049_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Control Module Not Programmed	Application Data File Not Programmed CRC Calculated in Chunks - Missing Data	= Fault Detected	Vehicle Supply Voltage U300051_ENABLE	9V < voltage < 16V = Enabled	Startup	Safety Non-MIL Emission neutral Diagnostic
		Control Module Deactivated due to incorrect or invalid data provied to FCM OR Internal Falure (as listed)	-Bad or out of date vehicle yaw, or speed provided -Imager timestamp indicates missing image -EyeQ performs CRC check on program section of code in DDR RAM -Internal data strcuture CRC mismatch -Internal input signals storage corruption -Stack Over/Underflow detection -EyeQ challenge and response failure -Clock Error -All EyeQ messages stopped - Stale Data	= Fault Detected	Vehicle Supply Voltage U300053_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Control Module Missing Calibration	Camera has not been calibrated or camera calibration process failed. Out of calibration	= Fault Detected	Vehicle Supply Voltage U300054_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Control Module Not Configured	Sub system option content or vehilcle option content not programmed	= Fault Detected	Vehicle Supply Voltage U300055_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Control Module Invalid Incompatible Configuration	Control Module or System Configuration not valid	= Fault Detected	Vehicle Supply Voltage U300056_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Control Module Invalid Incompatible Software Component	Software component not compatible with detected hardware/software	= Fault Detected	Vehicle Supply Voltage U300057_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
Vehicle Identification Number	U3002	Diagnostic detects VIN not programmed	This diagnostic shall fail if VIN stored in EEPROM contains all bytes such that: VIN EEPROM	= 0xFF	Vehicle Supply Voltage Vehicle Power Mode U300251_ENABLE OBD Manufacturer Enable Counter	9V < voltage < 16V = Run = Enabled = 0	Startup	Safety Non-MIL Emission neutral Diagnostic
		This diagnostic detects a VIN mismatch	Any digit of the programmed VIN does not match the digits of the VIN transmitted over the GMLAN. In addition, the VIN numbers programmed in EEPROM are NOT all OxFF's such that: VIN Stored AND VIN Stored	Does not equal VIN transmitted over GMLAN Does not equal to 0xFF	Vehicle Supply Voltage Vehicle Power Mode U300256_ENABLE OBD Manufacturer Enable Counter	9V < voltage < 16V = Run = Enabled = 0	Startup	Safety Non-MIL Emission neutral Diagnostic
Battery Supply Voltage	U3003	Battery Voltage - Circuit Voltage Below Threshold. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer. Applies for all diagnostics listed under U3003.	Front Camera Module Low Content (FCM_LC) supply voltage (Vsup)	< 9.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active. U300316_ENABLE	> 5 seconds = Enabled	3.000 Seconds	Safety Non-MIL Emission neutral Diagnostic
		Battery Voltage - Circuit Voltage Above Threshold	Front Camera Module Low Content (FCM_LC) supply voltage (Vsup)	> 16.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active. U300317_ENABLE	> 5 seconds = Enabled	3.000 Seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ethernet Bus 11 (+)	B1A09	Monitoring for a failure of the Ethernet Bus connceted to the HDLM Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the	Upon receipt of Link status =Down for a specific port for a calibratable amount of time	<1 second	Vehicle Power Mode: VN Activation Conditions: Supply Voltage Virtual Network condition Diagnostic_ENABLE	= RUN COMM_ENABLE=HIGH = 9 - 16V = Any Virtual Network that the ECU participates in is active. ± disabled	Continuosuly	Safety Non-MIL Emission neutral Diagnostic
Ethernet Bus 12 (+)	B1A0B	Monitoring for a failure of the Ethernet Bus connceted to the HDLM Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the	Upon receipt of Link status =Down for a specific port for a calibratable amount of time	<1 second	Vehicle Power Mode: VN Activation Conditions: Supply Voltage Virtual Network condition Diagnostic_ENABLE	= RUN COMM_ENABLE=HIGH = 9 - 16V = Any Virtual Network that the ECU participates in is active. # disabled	Continuosuly	Safety Non-MIL Emission neutral Diagnostic
Map Data Corrupted	B1BA5	Monitors for a failure of the updated map pushed to the HDLM Modue Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the	At startup, The updated map in memory fails the integrity check	Fault detected	Vehicle Power Mode: VN Activation Conditions: Supply Voltage Virtual Network condition Diagnostic_ENABLE	= RUN COMM_ENABLE=HIGH = 9 - 16V = Any Virtual Network that the ECU participates in is active. ± disabled	The map age verification algorithm will RUN once on Power Up until it completes.	Safety Non-MIL Emission neutral Diagnostic
Map Information Not Updated	B2BA1	The map data is not up to date Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	(current date) - (last successful map update)	>= calibration attribute MaxMapAge (6 months)	Vehicle Power Mode: VN Activation Conditions: Supply Voltage Virtual Network condition Diagnostic_ENABLE	= RUN COMM_ENABLE=HIGH = 9 - 16V = Any Virtual Network that the ECU participates in is active. # disabled	The map age verification algorithm will RUN once on Power Up until it completes.	Safety Non-MIL Emission neutral Diagnostic
Invalid Data Received from External Object Calculating Module 1	U053B	Monitors for the intergrity of the data being received from the EOCM module	When the ECU has determined that the signal payload received has a failed safety, security (MAC), protection (PV) or continuous operation (ARC, Checksum) indication as per the signal status monitor	Fault detected	Vehicle Power Mode: VN Activation Conditions: Supply Voltage Virtual Network condition Diagnostic_ENABLE	= RUN COMM_ENABLE=HIGH = 9 - 16V = Any Virtual Network that the ECU participates in is active. ± disabled	Continuosuly	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Telematics Control Platform Module on Ethernet Bus	U1624	Monitoring for a failure of the communication with the TCP Module on Ethernet Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the	Upon receipt of Link status =Down for a specific port for a calibratable amount of time	<1 second	Vehicle Power Mode: VN Activation Conditions: Supply Voltage Virtual Network condition Diagnostic_ENABLE	= RUN COMM_ENABLE=HIGH = 9 - 16V = Any Virtual Network that the ECU participates in is active. ± disabled	Continuosly	Safety Non-MIL Emission neutral Diagnostic
Lost Communication with External Object Calculating Module 1 - Processor 1 on Ethernet Bus	U1625	Monitoring for a failure of the communication with the EOCM Module on Ethernet Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the	Upon receipt of Link status =Down for a specific port for a calibratable amount of time	<1 second	Vehicle Power Mode: VN Activation Conditions: Supply Voltage Virtual Network condition Diagnostic_ENABLE	= RUN COMM_ENABLE=HIGH = 9 - 16V = Any Virtual Network that the ECU participates in is active. ± disabled	Continuosly	Safety Non-MIL Emission neutral Diagnostic
Key Table Not Provisioned	U1960	The confirmed status for this DTC indicates that at least one Security Peripheral General Key must be provisioned. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	The Authoritative Counter Any single Key Slot Provision State Flag for Key 2 through to the final Key AND OBD Manufacturing Enable Counter ERC_KEY_EMPTY	= Max Value = 0 = 0 = TRUE	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SecurityPeripheralPerformanceDiagnosticPowerModeTime U196000_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event All of the previous conditions plus any one of the following: 1) Monitored continuously while CAN frames are being transmitted and received. 2) Checked at ECU power up. 3) Monitored whileRID	9V < voltage < 16V = True >= 5 seconds = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received.	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Security Peripheral Performance - Performance or Incorrect Operation	U1961	The confirmed status for this DTC indicates that the Front Camera Module Low Content (FCM_LC) must be replaced due to an internal error. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	1) The security peripheral is considered to have failed if a request to the security peripheral cannot generate a Message Authentication Code (MAC) due to an internal error (not due to software timeouts). 2) The security peripheral is considered to have failed if a request to the security peripheral cannot verify a Message Authentication Code (MAC) due to an internal error (not due to software timeouts).	= Fault Detected	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SecurityPeripheralPerformanceDiagnosticPowerModeTime U196192_ENABLE Transport Mode Time since power up reset or running reset or under volta e or over	9V < voltage < 16V = True >= 5 seconds = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission neutral Diagnostic
Unable To Authenticate Serial Data Message	U1962	Monitors incoming message authentification code and compares with the expected based on message source. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. It should noted not all devices with incorrect authentication will set the default action - only applies to adaptive cruise critical devices.	A Message Authentication Code results in failed verification for a calibratable number of consecutive verification attempts for a specific key slot number of consecutive failures failures	> k_ERRH_C_FailedAuthenticationCounter	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SerialDataAuthenticationPowerModeTime Fault Code U196192 U196200_ENABLE Transport Mode Time since power up reset or running reset or [illegible]	9V < voltage < 16V = True >= 2 seconds = Inactive = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission neutral Diagnostic
Control Module		General Checksum Failure	Internal Front Camera Module Low Content (FCM_LC) Memory Checksum Failure Detected.	= Fault Detected	Vehicle Supply Voltage U300041_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		General Memory Failure	General Memory Failure Detected	= Fault Detected	Vehicle Supply Voltage U300042_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Special Memory Failure	At startup, error in file server mount file Unable to perform file read/write operation on file system. After four	= Fault Detected	Vehicle Supply Voltage U300043_ENABLE	9V < voltage < 16V = Enabled	At Start-up	Safety Non-MIL Emission neutral Diagnostic
		Data Memory Failure	a data (or working) memory failure for embedded systems using FLASH RAM memory has occurred	= Fault Detected	Vehicle Supply Voltage U300044_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	U3000	Program Memory Failure	working memory failure for embedded systems using ROM memory has occurred	= Fault Detected	Vehicle Supply Voltage U300045_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Calibration / Parameter Memory Failure	In case a Data Flash memory failure is detected.	= Fault Detected	Vehicle Supply Voltage U300046_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Watchdog and Safety Microcontroller Failure	In case a Data Flash memory failure is detected.	= Fault Detected	Vehicle Supply Voltage U300046_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Supervision Software Failure	Failure of Safety MCU Software	= Fault Detected	Vehicle Supply Voltage U300048_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Internal Electronic Failure	Front Camera Module Low Content (FCM_LC) internal circuit micro (Not Image Processing Engine) is detected - BIST Fail - Registier Check Error - Internal Voltage Out of Range	= Fault Detected	Vehicle Supply Voltage U300049_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Control Module Over Temperature	VPM internal temperature above threshold	75C	Diagnostic_ENABLE = Enabled	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Not Programmed	Default Calibrations Stored. This is checked by verifying a specific signature is written at calibration section	Memory location is Set to 0xFF or Calibration signature is not present	Vehicle Power Mode: Supply Voltage Virtual Network condition Diagnostic_ENABLE	= RUN = 9 - 16V = Any Virtual Network that the ECU participates in is active. # disabled	Once at power-up	Safety Non-MIL Emission neutral Diagnostic
		Missing Calibration	Indicates faults related to operational software, calibrations, and options	= Fault Detected	Vehicle Supply Voltage U300054_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Invalid Incompatible Software Componet	Incorrect software program	= Fault Detected	Vehicle Supply Voltage U300057_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Signal Compare Failure	Signal comparison has failed within contrller	= Fault Detected	Vehicle Supply Voltage U300062_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Voltage	U3003	Battery Voltage - Circuit Voltage Below Threshold. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer. Applies for all diagnostics listed under U3003.	Front Camera Module Low Content (FCM_LC) supply voltage (Vsup)	< 9.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active. U300316_ENABLE	> 5 seconds = Enabled	3.000 Seconds	Safety Non-MIL Emission neutral Diagnostic
		Battery Voltage - Circuit Voltage Above Threshold	Front Camera Module Low Content (FCM_LC) supply voltage (Vsup)	> 16.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active. U300317_ENABLE	> 5 seconds = Enabled	3.000 Seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication CAN Bus 8 Off	U007E	This DTC monitors for a BUS 8 off condition Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	CAN driver indicates a bus off condition has occurred	= Fault detected	Vehicle Supply Voltage PNC_ActiveTxPDUEnable U007E00_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event Power Mode OBD Manufacturing Enable Counter	9V< voltage < 16V = True = Enabled = Inactive > 5 seconds = Run = 0	Monitored continuously while CAN frames are being transmitted and received Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
Invalid Data Received from Body Control Module	U0422	Detects invalid data errors in messages received from the Body Control Module (BCM) e.g. alive rolling count. checksum, MAC The emissions neutral default action (described below) will only occur if both U0422 and U0477 are triggered at the same time, otherwise the LRR will function normally. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	The following messages are monitored. This code sets if a message fails any of these criteria for the timeout period SysPwrMode_Prtctd_MSG	= 0.62500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturing Enable Counter	9V < voltage < 16V = True > 5 seconds = 0	Dependent upon receipt of each monitored signal from the Body Control Module (BCM) Fault maturation time is 0.62500 seconds	Safety Non-MIL Emission neutral Diagnostic
Invalid Data Received from Central Gateway Module	U0447	Detects invalid data errors in messages received from the Central Gateway Module (CGM) e.g. alive rolling count. checksum, MAC The emissions neutral default action (described below) will only occur if both U0422 and U0477 are triggered at the same time, otherwise the LRR will function normally. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	The following messages are monitored. This code sets if a message fails any of these criteria for the timeout period BkupSysPwrMode_Prtctd_MSG	= 0.625 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturing Enable Counter	9V < voltage < 16V = True > 5 seconds = 0	Dependent upon receipt of each monitored signal from the Central Gateway Module (CGM) Fault maturation time is 0.62500 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received from External Object Calculating Module 1	U053B	Detects invalid data errors in messages received from the External Object Calculating Module (EOCM) e.g. alive rolling count Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	The following messages are monitored. This code sets if a message fails any of these criteria for the timeout period HstVehPathParms_Prtctd_MSG	= 0.02500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter	9V < voltage < 16V = True > 5 seconds = 0	Dependent upon receipt of each monitored signal from the External Object Calculation Module 1 Fault maturation time is 0.02500 seconds	Safety Non-MIL Emission neutral Diagnostic
Lost Communication with External Object Calculating Module 1 on CAN Bus 8	U1616	This DTC monitors for a loss of communication with the External Object Calculation Module on Can Bus 8 Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	The following messages are monitored for late arrival and this code sets if a message times out HstVehPathParms_Prtctd_MSG	= 0.02500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable U161600_ENABLE Time since power up reset or running reset or under voltage or over voltage condition event DTC U007E00 OBD Manufacturer Enable Counter	9V < voltage < 16V = True = Enabled > 5 seconds = Inactive = 0	Monitored continuously while CAN frames are being transmitted and received Fault maturation time is 0.02500 seconds	Safety Non-MIL Emission neutral Diagnostic
Key Table Not Provisioned	U1960	The confirmed status for this DTC indicates that at least one Security Peripheral General Key must be provisioned Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	The Authoritative Counter Any single Key Slot Provision State Flag for Key 2 through to Key 20 AND OBD Manufacturing Enable Counter ERC_KEY_EMPTY	= Max Value = 0 = 0 = TRUE	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SecurityPeripheralPerformance DiagnosticPowerModeTime U196000_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event All of the previous conditions plus any one of the following: 1) Monitored continuously while CAN frames are being transmitted and received. 2) Checked at ECU power up. 3) Monitored whileRID 0x0200; Provision Security Peripheral General Keys is being executed	9V < voltage < 16V = True >= 5 seconds = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Security Peripheral Performance - Performance or Incorrect Operation	U1961	The confirmed status for this DTC indicates that the radar must be replaced due to an internal error Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	The two following conditions lead to this failure: 1) The security peripheral is considered to have failed if a request to the security peripheral cannot generate a Message Authentication Code (MAC) due to an internal error (not due to software timeouts). 2) The security peripheral is considered to have failed if a request to the security peripheral cannot verify a Message Authentication Code (MAC) due to an internal error (not due to software timeouts). These failures are detected by monitoring the following conditions updated by the security peripheral ERC function: ERC_KEY_INVALID ERC_BUSY ERC_GENERAL_FAILURE ERC_KEY_NOT_AVAILABLE ERC_KEY_UPDATE_ERROR ERC_KEY_WRITE_PROTECTED ERC_MEMORY_FAILURE ERC_NO_DEBUGGING ERC_NO_SECURE_BOOT ERC_SEQUENCE_ERROR	= Fault detected For all ERC errors: = True	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SecurityPeripheralPerformanceDiagnosticPowerModeTime U196191_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event	9V < voltage < 16V = True >= 5 seconds = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received DTC matures instantly	Safety Non-MIL Emission neutral Diagnostic
Unable To Authenticate Serial Data Message	U1962	Monitors incoming message authentification code and compares with the expected based on message source Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. It should noted not all devices with incorrect authentication will set the default action - only applies to adaptive cruise critical devices.	A Message Authentication Code results in failed verification for a calibratable number of consecutive verification attempts for a specific key slot number of consecutive failures failures	> k_ERRH_C_FailedAuthenticationCounter	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SerialDataAuthentificationPowerModeTime Fault Code U196192 U196200_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over volta e condition event	9V < voltage < 16V = True >= 2 seconds = Inactive = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Radar Internal/Programming failures		Control Module General Failure - No Sub Type Information available. Internal voltage problems, problems with the RF, ATIC or MCU power supply. Upon fault detection for any fault under U3000, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	Radar has an internel supply voltage error or minimum excitation level magnet lost. This DTC is set If the following voltages are measured to be out of range. Voltage UBATT (with CAT2 reaction) Voltage UBATT Warn Level (UBATT_CHECK_CAT3) Voltage 5V0_SMPS Voltage 3V6_SMPS Voltage ADC Bandgap 0 Voltage ADC Bandgap 1	< 5.665V or > 27.811V < 8.575V or > 16.503V < 4.749V or > 5.240V < 3.415V or > 3.776V < 1.183V or > 1.255V < 1.183V or > 1.255V	Vehicle Supply Voltage U300000_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module General Checksum Failure	Radar Memory Checksum Failure occurs. A CRC (cyclic redundance check) is performed on NVM (non-volatile memory) and a fault is triggered if the calculation does not validate the information stored in NVM.	= Fault detected	Vehicle Supply Voltage U300041_ENABLE Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module General Memory Failure. Indicates a serious Memory issue; i.e. a failure within the hardware or information is lost that cannot be recovered. If the non-volatile memory (NVM) component reports read errors regarding the integrity of the data or if data is corrupted or if certain read, write, erase procedures fail.	The memory component triggers various error DEMs (diagnostic event monitors) to determine a failure. Failures can be discovered during various memory operations in the flash. Common failures include - memory erase/ read/ write errors. Comparison failures, wrong block IDs and unexpected flash IDs	= Fault detected	Vehicle Supply Voltage U300042_ENABLE Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Control Module Special Memory Failure. Proposed to be a mild memory issue. i.e. A failure occurs in which the radar can recover and if data is lost, the data can be recovered. For example this can trigger if a redundant block is lost.	The NVM component triggers various error DEMs (diagnostic event managers) to determine a failure. Common faults include - loss of redundancy, attempted writes to protected memory.	= Fault detected	Vehicle Supply Voltage U300043_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Internal Electronic Failure. Consists of general internal hardware issues that are not related to memory, temperature or voltage. This diagnostic covers issues with the RF (radio frequency) chirps, resets, DMA (direct memory access) bus failures, stack overflows, hardware timeouts, watchdog issues etc.	Radar internal circuit failure occurs such as: 1) Multiple random access memory errors 2) Watchdog errors These failures are mostly related to issues with the RF (radio frequency) board triggered from the RFCOM (radio frequency communication) component, the driver for the high frequency. Can be caused also by hardware timeouts, failures in the MMIC (millimeter integrated circuit - radio frequency chip), internal MCU (microprocessor control unit) problems like DMA (direct memory access) bus failures or register failures.	= Fault detected	Vehicle Supply Voltage U300049_ENABLE Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Over Temperature	Radar RF internal temperature is above threshold such that it cannot operate effectively.	= Fault detected	Vehicle Supply Voltage U30004B_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	U3000	Control Module not Programmed	Sensor operating software not sucessfully flashed on to the microcontroller	= Fault detected	Vehicle Supply Voltage U300051_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Missing Calibration. Triggers if the APAR application parameters)/PPAR (production parameters) is missing from the software.	Radar has not been calibrated or Radar calibration process failed indicated by: k_default_calibration	= True	Vehicle Supply Voltage U300054_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Not Configured. Sensor has not yet completed a successful aiming process.	Radar sensor address has not been learned and locked in. Additional the following values have not yet been aimed and provided to the radar: azmiuth (left and right), elevation (high, low)	= Fault detected	Vehicle Supply Voltage U300055_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Control Module Invalid Incompatible Configuration. APAR (application parameters) Calibration values are outside the valid calibration range.	Control Module or System Configuration not valid such that calibration values are outside the valid calibration range. On initialization, every calibration is range checked to be within specified high and low range limits. If one of these values are out of range, then the APAR (application parameters) is rejected and a default APAR is loaded instead.	= Fault detected	Vehicle Supply Voltage U300056_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Invalid Incompatible Software Component. The calibration table doesn't align properly and is no longer compatible with the OP software.	Software component not compatible with detected hardware/software. For the calibration table, it's checked with a "versioning" system. Another calibration was added to the APAR (application parameters) as a version number. This number increments when the table is modified. The SW has a defined version number as well. If these two match, then it's known that the SW is compatible with the APAR and if they don't this fault is triggered.	= Fault detected	Vehicle Supply Voltage U300057_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	0.10000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Wrong mounting position - the radar is not mounted correctly	Absolute value of Angle Misalignment Any of the following bits of Active Fault are set:	> k_Radar_Misalignment_Out_Of_Range alignment_mode horizontal_alignment_out_of_range vertical_alignment_out_of_range alignment_routine_failed_fault	Vehicle Supply Voltage U300076_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	0.10000 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Incorrect Assembly - This DTC indicates a repositioned sensor or wiring fault.	Learned address and current address position mismatch	Active_Fault.bit.sensor_addr_unstable_fault = TRUE	Vehicle Supply Voltage U300095_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	0.10000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Component or System Operation Obstructed or Blocked. This is caused by a radar algorithm detecting blockage on the sensor, keeping it from detecting objects.	The operation of a component is prevented by an obstruction which trigers this fault. This is detected if the immediate environment of the radar does not change for a given period of time, the radar determines that it is blocked and a fault is detected.	= Fault detected	Vehicle Supply Voltage U300097_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Component or System Operating Condition. For this DTC, it is monitoring the RF (radio frequency) and Internal MCU (microprocessor control unit) temperatures.	Radar internal temperature at threshold for the RF and internal MCU	= Fault detected	Vehicle Supply Voltage U30009A_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Radar Power Circuit	U3003	Battery Voltage - Circuit Voltage Below Threshold Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. This applie to high and low voltage diagnostics	Radar supply voltage (Vsup)	< 9.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active. U300316_ENABLE	> 5 seconds = Enabled	3.000 Seconds	Safety Non-MIL Emission neutral Diagnostic
		Battery Voltage - Circuit Voltage Above Threshold	Radar supply voltage (Vsup)	> 16.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active U300317_ENABLE	> 5 seconds = Enabled	3.000 Seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Multi Axis Accelerometer Performance	C006A	This sub type is used for failures where the control module has detected that the component performance is outside its expected range or operating in an incorrect way. Upon fault detection, the SDM will flag IMU data is Invalid or Uncorrelated. Upstream consumers such as adaptive cruise control will disable based on these flags.	One of the following IMU (Inertial Measauement Unit) failures occurs within the SDM (Sensing and Diagnostic module) 1) Sensor 1 Yaw Data 2) Sensor 2 Yaw Data 3) Sensor 1 Longitudinal Acceleration Data 4) Sensor 2 Longitudinal Acceleration Data 5) Sensor 1 Lateral Acceleration Data 6) Sensor 2 Lateral Acceleration Data For 7,8,9 a correlation algorithm compares data from 2 separate IMUs (Inertial Measurement Unit) and fails if the sensor data sample by sample comparrisons are outside of tolerance 7) Yaw Data Correlation Failure YRP_YawRateCorrAuth 8) Longitudinal Acceleration Correlation Failure LLDP_LongAccelSnsrCorrStsAuth 9) Lateral Acceleration Correlation Failure LLDP_LatAccelSnsrCorrStsAuth	(1) to (6) = Invalid (7) to (9) = $03 (Uncorrelated)	Vehicle Supply Voltage C006A00_ENABLE	9V < voltage < 16V = Enabled	Within 0.05000 seconds	Safety Non-MIL Emission Neutral Diagnostic
Control Module Communication CAN Bus 1 Off	U0075	This DTC monitors for a BUS 1 off condition. Upon fault detection, the SDM will flag IMU data is Invalid or Uncorrelated. Upstream consumers such as adaptive cruise control will disable based on these flags.	CAN driver indicates a bus off condition has occurred	= Fault Detected	Vehicle Supply Voltage PNC_ActiveTxPDUEnable U007500_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event Power Mode	9V < voltage < 16V = True = Enabled = Inactive > 5 seconds = Run	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission Neutral Diagnostic
Sensing and Diagnostic Module Internal/Programming failures	U3000	SMI7xx - SPI interprocessor communications - open circuit. Detected by the SPI software. Diagnostic runs at start-up and every 0.001 s Upon fault detection, the SDM will flag IMU data is Invalid or Uncorrelated. Upstream consumers such as adaptive cruise control will disable based on these flags. Applies to all DTC within U3000	SPI diagnostic software detects an open circuit	= Fault Detected	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Drive/Predrive =6.0 < V < 18.0	0.003 seconds	Safety Non-MIL Emission Neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		SMI7xx - Chip external supply - open circuit. Detected by the voltage supply diagnostic. Diagnostic runs every 0.001 s	Voltage supply detects an open circuit	= Fault Detected	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Drive =6.0 < V < 18.0	0.03 seconds	
		SMI7xx - SPI interprocessor communications - short circuit. Detected by the SPI software. Diagnostic runs at start-up and every 0.001 s	SPI diagnostic software detects an short circuit	= Fault Detected	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Drive/Predrive =6.0 < V < 18.0	0.003 seconds	
		SMI7xx - Chip external supply - short circuit. Detected by the voltage supply diagnostic. Diagnostic runs every 0.001 s	Voltage supply detects an short circuit	= Fault Detected	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Drive =6.0 < V < 18.0	0.03 seconds	
		SMI7xx - Chip external supply - Out-of-Range. Detected by the voltage supply diagnostic. Diagnostic runs every 0.001 s	Voltage supply detects voltage out of range	= Fault Detected	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Drive =6.0 < V < 18.0	0.03 seconds	
		SMI7xx - Drift or oscillations or Offset in the valid range	1) Error in Calculating IMU Offset OR 2) When in drive mode if the saturation thresholds out of range for a period of time (3 seconds) OR 3) When in drive mode, a failure will be detected by the Level 1 diagnostic comparison of the primary and secondary sensor data.	For 1) and 3) detected by SMI7xx Software. For 2) X Accel >1g Y Accel > 1g Yaw >40 deg/s	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Drive =6.0 < V < 18.0	1) 1.042 s 2) 3 s 3) 0.04 s	
		SMI7xx - Values stuck in valid range	IMU and Roll - In PDC, sensor self-tests are performed and will set an error condition if a failure is detected	= Fault Detected	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Predrive =6.0 < V < 18.0	3 occurances - diagnostic operates at start-up	
			IMU - When in drive mode, a failure will be detected by the Level 1 diagnostic comparison of the primary and secondary sensor data.	= Fault Detected	DTC Calibration SDM Power Mode ECU Status	= Enabled = Run/Propulsion = Drive	0.04 s	

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		System Communication SPI - Aged data (delay, repeated data, re-sequencing)	IMU and Roll - In PDC, sensor self-tests are performed and will set an error condition if a failure is detected	= Fault Detected	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Predrive =6.0 < V < 18.0	3 occurances - diagnostic operates at start-up	
			IMU - When in drive mode, a failure will be detected by the Level 1 diagnostic comparison of the primary and secondary sensor data.	= Fault Detected	DTC Calibration SDM Power Mode ECU Status	= Enabled = Run/Propulsion = Drive	0.04 s	
		System Communication SPI - Corrupted Data (incorrect data, insertion of data, re-sequencing)	Corrupted SPI data errors are detected by SPI diagnostics, including CRC and address diagnostics, internal to the sensor as well as in application software. If a SPI error is detected, an error condition is set.	= Fault Detected	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Predrive/Drive =6.0 < V < 18.0	0.03 s	
		System Communications SPI - Loss of Data	Sensor data is monitored for availability. If it is unavailable, an error condition will be set.	No data detected for fault threshold	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Predrive/Drive =6.0 < V < 18.0	0.03 s	
		System Communications SPI - 'Interrupted data (partial data transmit or no data transmit)	Interrupted SPI data errors are detected by SPI diagnostics, including CRC and address diagnostics, internal to the sensor as well as in application software. If a SPI error is detected, an error condition is set.	= Fault Detected	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Predrive/Drive =6.0 < V < 18.0	0.03 s	
		SMI7xxx Power Supply	Under Voltage - The sensor monitors Vcc for under voltage and will set an error condition if a failure is detected.	< 3.13 V	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Drive =6.0 < V < 18.0	0.03 s	
			Over Voltage - The sensor monitors Vcc for over voltage and will set an error condition if a failure is detected.	>3.47 V	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Drive =6.0 < V < 18.0	0.03 s	

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Supply Voltage	U3003	Battery Voltage - Circuit Voltage Below Threshold The DTC code will set at 9 V, however the emissions neutral default action of stopping tramissions of data, and disabling adaptive cruise control will not occur until ~5V, or whenever the SDM can no longer send CAN messages	Sensing and Diagnostic Module (SDM) supply voltage (Vsup)	< 9.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active. U300316_ENABLE	> 5 seconds = Enabled	3.000 Seconds	Safety Non-MIL Emission Neutral Diagnostic
		Battery Voltage - Circuit Voltage Above Threshold	Sensing and Diagnostic Module (SDM) supply voltage (Vsup)	> 16.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active. U300317_ENABLE	> 5 seconds = Enabled	3.000 Seconds	

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication CAN Bus 8 Off	U007E	This DTC monitors for a BUS 8 off condition Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	CAN driver indicates a bus off condition has occurred	= Fault detected	Vehicle Supply Voltage PNC_ActiveTxPDUEnable U007E00_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event Power Mode OBD Manufacturing Enable Counter	9V< voltage < 16V = True = Enabled = Inactive > 5 seconds = Run = 0	Monitored continuously while CAN frames are being transmitted and received Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
Invalid Data Received from Body Control Module	U0422	Detects invalid data errors in messages received from the Body Control Module (BCM) e.g. alive rolling count. checksum, MAC Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	The following messages are monitored. This code sets if a message fails any of these criteria for the timeout period SysPwrMode_Prtctd_MSG	= 0.62500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturing Enable Counter	9V < voltage < 16V = True > 5 seconds = 0	Dependent upon receipt of each monitored signal from the Body Control Module (BCM) Fault maturation time is 0.62500 seconds	Safety Non-MIL Emission neutral Diagnostic
Invalid Data Received from Central Gateway Module	U0447	Detects invalid data errors in messages received from the Central Gateway Module (CGM) e.g. alive rolling count. checksum, MAC Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	The following messages are monitored. This code sets if a message fails any of these criteria for the timeout period BkupSysPwrMode_Prtctd_MSG	= 0.625 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturing Enable Counter	9V < voltage < 16V = True > 5 seconds = 0	Dependent upon receipt of each monitored signal from the Central Gateway Module (CGM) Fault maturation time is 0.62500 seconds	Safety Non-MIL Emission neutral Diagnostic
Invalid Data Received from External Object Calculating Module 1	U053B	Detects invalid data errors in messages received from the External Object Calculating Module (EOCM) e.g. alive rolling count Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	The following messages are monitored. This code sets if a message fails any of these criteria for the timeout period HstVehPathParms_Prtctd_MSG	= 0.02500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter	9V < voltage < 16V = True > 5 seconds = 0	Dependent upon receipt of each monitored signal from the External Object Calculation Module 1 Fault maturation time is 0.02500 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with External Object Calculating Module 1 on CAN Bus 8	U1616	This DTC monitors for a loss of communication with the External Object Calculation Module on Can Bus 8 Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	The following messages are monitored for late arrival and this code sets if a message times out HstVehPathParms_Prtctd_MSG	= 0.02500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable U161600_ENABLE Time since power up reset or running reset or under voltage or over voltage condition event DTC U007E00 OBD Manufacturer Enable Counter	9V < voltage < 16V = True = Enabled > 5 seconds = Inactive = 0	Monitored continuously while CAN frames are being transmitted and received Fault maturation time is 0.02500 seconds	Safety Non-MIL Emission neutral Diagnostic
Radar Internal/Programming failures		Control Module General Failure - No Sub Type Information available. Internal voltage problems, problems with the RF, ATIC or MCU power supply. Upon fault detection for any fault under U3000, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	Radar has an internel supply voltage error or minimum excitation level magnet lost. This DTC is set If the following voltages are measured to be out of range. Voltage UBATT (with CAT2 reaction) Voltage UBATT Warn Level (UBATT_CHECK_CAT3) Voltage 5V0_SMPS Voltage 3V6_SMPS Voltage ADC Bandgap 0 Voltage ADC Bandgap 1	< 5.665V or > 27.811V < 8.575V or > 16.503V < 4.749V or > 5.240V < 3.415V or > 3.776V < 1.183V or > 1.255V < 1.183V or > 1.255V	Vehicle Supply Voltage U300000_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module General Checksum Failure	Radar Memory Checksum Failure occurs. A CRC (cyclic redundance check) is performed on NVM (non-volatile memory) and a fault is triggered if the calculation does not validate the information stored in NVM.	= Fault detected	Vehicle Supply Voltage U300041_ENABLE Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Control Module General Memory Failure. Indicates a serious Memory issue; i.e. a failure within the hardware or information is lost that cannot be recovered. If the non-volatile memory (NVM) component reports read errors regarding the integrity of the data or if data is corrupted or if certain read, write, erase procedures fail.	The memory component triggers various error DEMs (diagnostic event monitors) to determine a failure. Failures can be discovered during various memory operations in the flash. Common failures include - memory erase/ read/ write errors. Comparison failures, wrong block IDs and unexpected flash IDs	= Fault detected	Vehicle Supply Voltage U300042_ENABLE Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Special Memory Failure. Proposed to be a mild memory issue. i.e. A failure occurs in which the radar can recover and if data is lost, the data can be recovered. For example this can trigger if a redundant block is lost.	The NVM component triggers various error DEMs (diagnostic event managers) to determine a failure. Common faults include - loss of redundancy, attempted writes to protected memory.	= Fault detected	Vehicle Supply Voltage U300043_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Internal Electronic Failure. Consists of general internal hardware issues that are not related to memory, temperature or voltage. This diagnostic covers issues with the RF (radio frequency) chirps, resets, DMA (direct memory access) bus failures, stack overflows, hardware timeouts, watchdog issues etc.	Radar internal circuit failure occurs such as: 1) Multiple random access memory errors 2) Watchdog errors These failures are mostly related to issues with the RF (radio frequency) board triggered from the RFCOM (radio frequency communication) component, the driver for the high frequency. Can be caused also by hardware timeouts, failures in the MMIC (millimeter integrated circuit - radio frequency chip), internal MCU (microprocessor control unit) problems like DMA (direct memory access) bus failures or register failures.	= Fault detected	Vehicle Supply Voltage U300049_ENABLE Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Control Module Over Temperature	Radar RF internal temperature is above threshold such that it cannot operate effectively.	= Fault detected	Vehicle Supply Voltage U30004B_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module not Programmed	Sensor operating software not sucessfully flashed on to the microcontroller	= Fault detected	Vehicle Supply Voltage U300051_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
	U3000	Control Module Missing Calibration. Triggers if the APAR application parameters)/PPAR (production parameters) is missing from the software.	Radar has not been calibrated or Radar calibration process failed indicated by: k_default_calibration	= True	Vehicle Supply Voltage U300054_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Control Module Not Configured. Sensor has not yet completed a successful aiming process.	Radar sensor address has not been learned and locked in. Additional the following values have not yet been aimed and provided to the radar: azmiuth (left and right), elevation (high, low)	= Fault detected	Vehicle Supply Voltage U300055_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Invalid Incompatible Configuration. APAR (application parameters) Calibration values are outside the valid calibration range.	Control Module or System Configuration not valid such that calibration values are outside the valid calibration range. On initialization, every calibration is range checked to be within specified high and low range limits. If one of these values are out of range, then the APAR (application parameters) is rejected and a default APAR is loaded instead.	= Fault detected	Vehicle Supply Voltage U300056_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Invalid Incompatible Software Component. The calibration table doesn't align properly and is no longer compatible with the OP software.	Software component not compatible with detected hardware/software. For the calibration table, it's checked with a "versioning" system. Another calibration was added to the APAR (application parameters) as a version number. This number increments when the table is modified. The SW has a defined version number as well. If these two match, then it's known that the SW is compatible with the APAR and if they don't this fault is triggered.	= Fault detected	Vehicle Supply Voltage U300057_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	0.10000 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Wrong mounting position - the radar is not mounted correctly	Absolute value of Angle Misalignment Any of the following bits of Active Fault are set:	> k_Radar_Misalignment_Out_Of_Range alignment_mode horizontal_alignment_out_of_range vertical_alignment_out_of_range alignment_routine_failed_fault	Vehicle Supply Voltage U300076_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	0.10000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Incorrect Assembly - This DTC indicates a repositioned sensor or wiring fault.	Learned address and current address position mismatch	Active_Fault.bit.sensor_addr_unstable_fault = TRUE	Vehicle Supply Voltage U300095_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	0.10000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Component or System Operation Obstructed or Blocked. This is caused by a radar algorithm detecting blockage on the sensor, keeping it from detecting objects.	The operation of a component is prevented by an obstruction which trigers this fault. This is detected if the immediate environment of the radar does not change for a given period of time, the radar determines that it is blocked and a fault is detected.	= Fault detected	Vehicle Supply Voltage U300097_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Control Module Component or System Operating Condition. For this DTC, it is monitoring the RF (radio frequency) and Internal MCU (microprocessor control unit) temperatures.	Radar internal temperature at threshold for the RF and internal MCU	= Fault detected	Vehicle Supply Voltage U30009A_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
Radar Power Circuit	U3003	Battery Voltage - Circuit Voltage Below Threshold Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. This applie to high and low voltage diagnostics	Radar supply voltage (Vsup)	< 9.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active. U300316_ENABLE	> 5 seconds = Enabled	3.000 Seconds	Safety Non-MIL Emission neutral Diagnostic
		Battery Voltage - Circuit Voltage Above Threshold	Radar supply voltage (Vsup)	> 16.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active U300317_ENABLE	> 5 seconds = Enabled	3.000 Seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cell/Global Positioning System Combined Antenna Coaxial Signal	B13AA	Short to Battery The emissions neutral default action for all diagnotics under DTC B13AA is to disable adaptive cruise control and/or Super Cruise	The purpose of this DTC is to detect short to positive of GPS(secondary) antenna circuit. DTC is set when the latest 6 consecutive GPS(secondary) antenna ADC values are under the open/short threshold defined in DID and ANT_PT_SENSE values is high.	Short to Battery Threshold = 1.53 - 2.35 V	Diagnoic Calibration Enabled	Vehicle Power Mode condition: ACCESSORY, RUN Algorithm will be started just after TCP is getting to OnStar on mode.	After the end of boot sequence, modem sends GPS(secondary) antenna ADC value and ANT_PT_SENSE value to MDM via LocAPI every second. MDM checks GPS(secondary) antenna state with these values.	Safety Non-MIL Emissions Neutral Diagnostic
		Short to Ground	The purpose of this DTC is to detect short to ground of GPS(secondary) antenna circuit. Short to Ground DTC is set when the GPS(secondary) Antenna ADC value is under the open/short threshold defined in DID and	ANT_PT_SENSE(GPIO) is low state - GPS Antenna Short to Ground DTC Voltage Lower Value Threshold = 0.05V	Diagnoic Calibration Enabled	Vehicle Power Mode condition: ACCESSORY, RUN Algorithm will be started just after TCP is getting to OnStar on mode.	After the end of boot sequence, modem sends GPS(secondary) antenna ADC value and ANT_PT_SENSE value to MDM via LocAPI every second. MDM checks GPS(secondary) antenna state with these values.	Safety Non-MIL Emissions Neutral Diagnostic
		Open Circuit	The purpose of this DTC is to detect open of GPS(secondary) antenna circuit. DTC is set when the latest 6 consecutive GPS(secondary) antenna ADC values are between open/short threshold and connect/open threshold defined in DID.	GPS Antenna Open DTC Voltage Upper Value Threshold = 0.2V	Diagnoic Calibration Enabled	Vehicle Power Mode condition: ACCESSORY, RUN Algorithm will be started just after TCP is getting to OnStar on mode.	After the end of boot sequence, modem sends GPS(secondary) antenna ADC value and ANT_PT_SENSE value to MDM via LocAPI every second. MDM checks GPS(secondary) antenna state with these values.	Safety Non-MIL Emissions Neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with External Object Calculating Module/EOCM_HCP1 on CAN Bus 2	U1615	Upon notification by the handler that the associated supervised signal has failed supervision (typically 2.5 times the nominal periodic rate of the monitored signal. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	Signals not detected for 2.5 times the sampling rate	Fault Detected	Test Results shall not be considered valid if any of the following are true: • U161500_ENABLE = disabled • within the first 5 seconds of o a power-up reset o a running reset o a recovery from an under voltage condition or a recovery from an over voltage condition. • When a bus off condition (U007X) is current, the Lost Communications DTCs shall not set but the failsoft action shall occur if conditions to set the DTC are met. • Transport mode is active3	• Vehicle Supply voltage is within a calibratable range1 (k_Battery Voltage Low Threshold and k_Battery Voltage High Threshold). • Monitored PDUs/Signals are specified as part of the active partial network(s). • Any PN that the monitored PDU/Signal is mapped to has been active for 5 seconds or longer. This timer only resets when the Signal/PDU becomes inactive due to PN(s) deactivation(s).	Continuously	Safety Non-MIL Emission neutral Diagnostic
Invalid Data Received from External Object Calculating Module 1	U053B	Detects Alive Rolling Counter (ARC) or Message Authentification Code (MAC) error in messages received from the External Object Calculation Module 1. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	The following messages are monitored for failed safety, security, continuous operation or protection and this code sets if a message fails any of these criteria for the timeout period HstVehPathParms_Prtctd_MSG	= 0.02500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer	9V < voltage < 16V = True > 5 seconds = 0	Dependent upon receipt of each monitored signal from the External Object Calculation Module 1 Fault maturation time is 0.02500 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Key Table Not Provisioned	U1960	The confirmed status for this DTC indicates that at least one Security Peripheral General Key must be provisioned. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	The Authoritative Counter Any single Key Slot Provision State Flag for Key 2 through to the final Key AND OBD Manufacturing Enable Counter ERC_KEY_EMPTY	= Max Value = 0 = 0 = TRUE	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SecurityPeripheralPerformanceDiagnosticPowerModeTime U196000_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event All of the previous conditions plus any one of the following: 1) Monitored continuously while CAN frames are being transmitted and received. 2) Checked at ECU power up. 3) Monitored whileRID 0x0200; Provision Security Peripheral	9V < voltage < 16V = True >= 5 seconds = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received.	Safety Non-MIL Emission neutral Diagnostic
Security Peripheral Performance - Performance or Incorrect Operation	U1961	The confirmed status for this DTC indicates that the Front Camera Module Low Content (FCM_LC) must be replaced due to an internal error. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	1) The security peripheral is considered to have failed if a request to the security peripheral cannot generate a Message Authentication Code (MAC) due to an internal error (not due to software timeouts). 2) The security peripheral is considered to have failed if a request to the security peripheral cannot verify a Message Authentication Code (MAC) due to an internal error (not due to software timeouts).	= Fault Detected	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SecurityPeripheralPerformanceDiagnosticPowerModeTime U196192_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over	9V < voltage < 16V = True >= 5 seconds = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Unable To Authenticate Serial Data Message	U1962	Monitors incoming message authentification code and compares with the expected based on message source. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. It should noted not all devices with incorrect authentication will set the default action - only applies to adaptive cruise critical devices.	A Message Authentication Code results in failed verification for a calibratable number of consecutive verification attempts for a specific key slot number of consecutive failures failures	> k_ERRH_C_FailedAuthenticationCounter	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SerialDataAuthenticationPowerModeTime Fault Code U196192 U196200_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event	9V < voltage < 16V = True >= 2 seconds = Inactive = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission neutral Diagnostic
Module Low Content Internal/Programming failures	U3000	Control Module General Checksum Failure. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. Applies for all diagnostics listed under U3000.	The purpose of this DTC is to detect checksum failure of NAND Flash File System. DTC is set only when partition mount failed at boot up time. And during run-time, file monitor daemon (It's name is "cfm-daemon") will request system reboot when detect error then system has a chance to repair the problem file system (try fix up or try format) at boot up time. if system couldn't recover file system and fail to mount it then DTC will be set.	= Fault Detected	Exceptions: Algorithm shall not run if; Diagnostic Calibration E = disabled	Vehicle Power Mode condition: ACCESSORY, RUN 'DTC is set when file system not mounted.	Power On Diagnostics	Safety Non-MIL Emission neutral Diagnostic
		Control Module Data Memory Failure	General Memory Failure Detected	= Fault Detected	Vehicle Supply Voltage U300042_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Control Module Program Memory Failure	Program Memory Failure Detected	= Fault Detected	Vehicle Supply Voltage Dignostic_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Control Module Calibration / Parameter Memory Failure	TCP has not been calibrated/configured or calibration process failed indicated by: k_default_calibration	 = True	Vehicle Supply Voltage U300054_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Watchdog and Safety Microcontroller Failure	The purpose of DTC is to detect watchdog happened in previous cycle. It just only show watch dog was happened.	DTC is set when register value is same to written value in the previous cycle.	Exceptions: Algorithm shall not run if; Diagnostic Calibration disabled	Vehicle Power Mode condition: RUN	Running Diagnostics	Safety Non-MIL Emissions Neutral Diagnostic
		Control Module Internal Electronic Failure	Internal circuit failure is detected	Fault Detected	Diagnostic_ENABLE = Enabled.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously and at Startup.	Safety Non-MIL Emission neutral Diagnostic
		Control Module Not Configured	Sensor operating software not sucessfully flashed on to the microcontroller	= Fault detected	Vehicle Supply Voltage Calibration_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Component Internal Failure	Internal circuit failure is detected	Fault Detected	Diagnostic_ENABLE = Enabled.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously and at Startup.	Safety Non-MIL Emission neutral Diagnostic

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 fail time, 50 millisecond update rate 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 longitudinal acceleration signal stability time > 10.0 seconds raw longitudinal acceleration signal 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 fail time, 50 millisecond update rate 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 raw longitudinal acceleration signal fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate region 2 fail time > 75.0 seconds out of region 2 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		
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal fail time, 50 millisecond update rate 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 raw longitudinal acceleration signal fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate region 3 fail time > 75.0 seconds out of region 3 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		
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal fail time, 50 millisecond update rate 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 raw longitudinal acceleration signal 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 U0073 fault active U0073 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.**
Backup Transmission Range Command Message Counter Incorrect	C1201	The diagnostic monitor detects an Alive Rolling Count (ARC) error or a two's compliment Protection Value (PV) error in the LIN bus frame containing the Electronic Transmission Range Selector (ETRS) backup transmission range command signal data. The ARC sequences 0, 1, 2, 3 repeatedly. As each serial data frame is broadcast by the transmitting controller, the transmitting controller increments the ARC in this sequence manner. The receiving controller compares the most recent received ARC value to the previous value plus one. If the values are not equal, an ARC error has occurred. The PV is based on the two's compliment of the serial data frame critical data parameters in the transmit message frame, and is incorporated in the transmit message frame. If the TCM receives the serial data message frame, the	rolling count value received from ECM/ CHCM and expected TCM calculated value not equal	= TRUE	service mode $04 active battery voltage ETRS ECM/CHCM frame recieved	= FALSE > 11.00 volts = TRUE	alive rolling count errors > 8 out of 10 sample counts	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		TCM calculates the PV, again based on the critical data parameters, in the receive message frame. If the TCM calculated PV does not equal the PV incorporated in the receive data message frame, a PV error has occurred. If continuous ARC errors or PV errors occur, the DTC is set.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lateral Acceleration Sensor Circuit Low	C124F	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a short to ground or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	< -3.8500 g > -3.8500 g (< 0.5 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	C1250	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a short to power or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	> 3.8500 g < 3.8500 g (< 0.5 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	C1251	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a signal value that is stuck in a valid range by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	ABS(raw lateral acceleration signal) AND ABS(raw lateral acceleration signal) update raw lateral acceleration signal fail, 50 millisecond update rate	> 0.5300 g < 3.8500 g	battery voltage run crank voltage diagnostic monitor enable update raw lateral acceleration signal stablity time: TOSS vehicle speed automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear ABS(raw lateral acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	> 11.00 volts > 11.00 volts = 1 Boolean > 15.0 KPH = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA	raw lateral acceleration signal stability time > 10.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic-Type C

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
ECU 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.
ECU RAM Failure	P0604	Indicates that the TCM 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 ECU Processor Integrity Fault	P0606	Indicates that the TCM 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 TCM main processor	
			2 fails in a row in the MAIN processor's ALU check			Test enabel cailbration: CPU 1 enabled = 1 CPU 2 enabled = 1 CPU 3 enabled = 1 CPU 4 enabled = 1 CPU 5 enabled = 1 CPU 6 enabled = 1 CPU 7 enabled = 1 CPU 8 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 >=	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 TCM main processor	
			Checks for ECC (error	3 (results in MIL),		Test is Enabled:	variable,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			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 >=	5 (results in MIL and remedial action)		1 (If 0, this test is disabled)	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	
			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:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							P0606 PFM Sequence Sample f(Loop Time) counts 50 ms/count in the TCM main processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal ECU Processor Integrity Performance	P0607	Indicates that the TCM has detected an internal processor integrity performance.	Performs the failure diagnostic for the offline and online BIST results.			Test is enabled: 0 . (If 0, this test is disabled)	5 counts background task/ count in the TCM 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.
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 Q impedance between signal and controller ground OR > 200 K Q 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.
Torque Managment System - Forced Engine Shutdown	P06AF	This diagnostic is monitoring that the TCM is processing code correctly. The TCM computes the correct pattern sent via a CAN message to the monitoring TCM. When the TCM does not receive a correct pattern or a missing pattern to the monitoring TCM, the DTC is set.	Received pattern from the TCM OR Received malfunction pattern	± expected pattern >= 2 counts	Run Crank Active Time	Run or Crank >= 500 milliseconds	6/12 counts or 2,000 milliseconds continuous; 25 ms/count in the TCM 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 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.
					TFT Warmup Pass P0711 test fail this key on	EngineTorqueEstInaccurate AcceleratorPedalFailure CrankSensor_FA ECT_Sensor_FA VehicleSpeedSensor_FA = 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	diagnsotic monitor enable P0712 NOT fault active P0713 NOT fault active battery voltage run crank voltage stuck in range test enable propulsion system active raw transmission fluid temperature raw transmission fluid temperature	= 1 Boolean > 9.00 volts > 9.00 volts = 1 Boolean = TRUE > -273.0 °C < 150.0 °C	fail time > 600.0 seconds 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.
Transmission Fluid Temperature Sensor Circuit Low Voltage	P0712	Controller specific analog circuit diagnoses the transmission fluid temperature sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds, converted to a resistance value.	circuit resistance update fail time 1 seconds update rate	< 13.000 Ω			fail time > 5.00 seconds out of sample time > 6.00 seconds 1 seconds update rate	Type B, 2 Trips
					diagnostic monitor enable	= 1 Boolean	battery voltage in range time > 0.100 seconds	
					battery voltage	> 9.00 volts		
							run crank voltage in range time > 0.100 seconds	
					run crank voltage run crank voltage in range time	> 9.00 volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Ω	diagnostic monitor enable battery voltage run crank voltage run crank voltage in range time	= 1 Boolean > 9.00 volts > 9.00 volts	fail time > 5.00 seconds out of fail time > 6.00 seconds 1 seconds update rate battery voltage in range time > 0.100 seconds run crank voltage in range time > 0.100 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 cailbration	= 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		Wheel Speed Rationality met = 0 s	
					Vehicle Speed Fault	= FALSE		
					AND			
					Tease state	!= Neutral		
					AND		counts down from 0.25 s	
					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	# 1 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	= 1 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 PTC 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 # 1 Boolean = 1 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 transmission output speed is active in NEUTRAL enable fail evaluation:			
					PRNDL OR	= CeTRGR_e_PRNDL_Neutral		
					PRNDL OR	= CeTRGR_e_PRNDL_Transitional1 N-D transitional		
					PRNDL OR	= CeTRGR_e_PRNDL_Transitional4 R-N transitional		
					raw transmission output speed OR	> 250.0 RPM		
					last valid raw transmission output speed	> 250.0 RPM		
					determine if raw transmission input speed is stable:			
					((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 power supply 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: engine 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:	= 1 Boolean = 1 Boolean = 1 Boolean	fail count > 4 counts in 75 count sample 25 millisecond update rate	Type A, 1 Trips
					engine speed	> 500.0 RPM	engine speed time > **engine speed time for transmission hydraulic pressure available** see supporting table	
					battery voltage	> 9.00 volts	battery voltage time > 0.100 seconds	
					run crank voltage	> 9.00 volts	run crank voltage time > 0.100 seconds	
					engine speed status	# INVALID		
					PRNDL PRNDL Commanded Gear Commanded Gear	# PARK # NEUTRAL # PARK # NEUTRAL		
					transmission fluid temperature transmission fluid temperature	> -6.66 °C < 130.0 °C		
					engine speed	> 750.0 RPM		

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 > 5.00 Nm > 0.00 % < 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	****************************** 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) TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TOM 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 oressure control			procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					(hydraulic pressure	> 10.00 kPa		
					OR			
					Clutch Stuck on in Park/ Neutral fault pending	= TRUE		
					OR			
					Neutral Staging Line Pressure Disable)	= TRUE		
					*****************************	*****************************		
					enable C1 clutch slip speed fail compare when:			
					((startle mitigation active	= FALSE		
					OR			
					(startle mitigation active	= TRUE		
					AND			
					startle mitigation gear)) (see startle mitigation active NOTE below)	# initial startle mitigation gear		
					unintended deceleration fault pending	= FALSE		
					OR			
					unintended deceleration fault pending enable cal is FALSE (startle mitigation)	= 0 (0 to enable, 1 to disable)		
					clutch steady state adaptive active	= FALSE		
					(transmission output shaft speed	> 36.0 RPM		
					OR			
					accelerator pedal position	> 0.50 %		
					OR			

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)	> 1,000.0 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 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 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 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 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					**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 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 performance faults can			use run crank voltage calibration is FALSE	= 1 Boolean		
		be present, and no speed sensor electrical or performance faults			OR (use run crank voltage calibration is TRUE	= 1 Boolean		
		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: **C21Oncoming Post-Torque Phase Delay** OR **C31Oncoming Post-Torque Phase Delay** OR **C41Oncoming Post-Torque Phase Delay** OR **C5JOncoming Post-Torque Phase Delay** OR **C61Oncoming 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** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C1 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					*****************************	*****************************		
					conditions needed to trigger test:			
					(current shift type AND shift type enable cal for current shift type)	# Garage shift **Clutch StucJ On Shift = Type Enable** (0 table value will disable, 1 will enable)		
					OR			
					(Intrusive shift active AND	= FALSE		
					shift type enable cal for garage shift AND	= 1 (0 will enable, 1 will enable)		
					Attained Gear AND (stuck on enable cal for	= NEUTRAL OR commanded aear		

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 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 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 = ranoe 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 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 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 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	> 10 kPa		
					Park/Neutral Stuck on FP OR	= TRUE		
					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		
					((C1 off going clutch pressure control ramp time out complete AND	= TRUE		
					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 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** 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.
					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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					forward garge shifts AND	= 1 (0 to disable, 1 to enable)		
					driver requested direction AND	= FORWARD		
					commanded gear) OR	= a FORWARD gear		
					(stuck on enable cal for reverse garage shifts AND	= 1 (0 to disable, 1 to enable)		
					driver requested direction AND	= REVERSE		
					commanded gear))	= REVERSE		
					clutch stuck off intrusive shift active	= FALSE		
					startle mitigation active (see note on startle mitigation below)	= FALSE		
					(new clutch controller has been initalized OR	= TRUE		
					transitioning to a different clutch controller)	= TRUE		
					current clutch solenoid test state	transitions to TestState or TUT_HOLD (see note below about state transitions)		
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 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 = ranoe 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 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	
					TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TOM 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 oressure 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	> 1,000.0 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 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D 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 P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 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 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 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			******************************	******************************	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count > 3 counts 6.25 millliscond update	
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	> 9.00 volts	battery voltage time > 0.100 seconds	
					use run crank voltage calibration is FALSE	= 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 C2 CB128910R clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					(hydraulic pressure	> 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: **ClOncoming 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: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C2 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test: (current shift type AND shift type enable cal for current shift type) OR (Intrusive shift active AND shift type enable cal for garage shift AND	# 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	= NEUTRAL OR commanded gear		
					(stuck on enable cal for forward garge shifts AND	= 1 (0 to disable, 1 to enable)		
					driver requested direction AND	= FORWARD		
					commanded gear) OR	= a FORWARD gear		
					(stuck on enable cal for reverse garage shifts AND	= 1 (0 to disable, 1 to enable)		
					driver requested direction AND	= REVERSE		
					commanded gear))	= REVERSE		
					clutch stuck off intrusive shift active	= FALSE		
					startle mitigation active (see note on startle mitigation below)	= FALSE		
					(new clutch controller has been initalized OR	= TRUE		
					transitioning to a different clutch controller)	= TRUE		
					current clutch solenoid test state	transitions to TestState or TUT_HOLD (see note below about state transitions)		
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 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 P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 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 DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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					**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count > 3 counts 6.25 milliscond update	
					******************************	******************************		
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	> 9.00 volts	battery voltage time > 0.100 seconds	
					use run crank voltage calibration is FALSE	= 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 C2 CB128910R clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					(hydraulic pressure OR	> 10 kPa		
					Park/Neutral Stuck on FP OR	= TRUE		
					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 AND	= TRUE		
					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)	> 8,192 Nm = 0 (0 is enable, 1 is enable)		
					OR			
					(primary oncoming clutch active	= TRUE		
					primary on coming control state	# clutch fill phase		
					primary on coming commanded pressure)	> pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **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: **ClOncoming 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: **Clutch Clip Press CD Shifts 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 clutch slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test: (current shift type AND shift type enable cal for current shift type) OR (Intrusive shift active AND shift type enable cal for garage shift AND	# 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 P17D3 P17C5 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 P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 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 DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	****************************** 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) TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TOM 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 oressure control			procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					(hydraulic pressure	> 10.00 kPa		
					OR			
					Clutch Stuck on in Park/ Neutral fault pending	= TRUE		
					OR			
					Neutral Staging Line Pressure Disable)	= TRUE		
					*****************************	*****************************		
					enable C3 clutch slip speed fail compare when:			
					((startle mitigation active	= FALSE		
					OR			
					(startle mitigation active	= TRUE		
					AND			
					startle mitigation gear)) (see startle mitigation active NOTE below)	# initial startle mitigation gear		
					unintended deceleration fault pending	= FALSE		
					OR			
					unintended deceleration fault pending enable cal is FALSE (startle mitigation)	= 0 (0 to enable, 1 to disable)		
					clutch steady state adaptive active	= FALSE		
					(transmission output shaft speed	> 36.0 RPM		
					OR			
					accelerator pedal position	> 0.50 %		
					OR			

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	> 1,000.0 RPM		
					transmission input shaft speed)	> 350.0 RPM		
					C3 clutch slip speed valid	= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)		
					C3 clutch pressured map	= mapped to line pressure, C3 clutch pressure has reached fully applied state		
					(enable forward gear cal AND	= 1 (1 to enable, 0 to disable)		
					driver direction request AND	= FORWARD		
					Attained Gear) OR	= a FORWARD gear		
					(enable reverse gear cal AND	= 0 (1 to enable, 0 to disable)		
					driver direction request AND	= REVERSE		
					Attained Gear)	= REVERSE		
					range shift state	= range shift complete	> 0.500 seconds	
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 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 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 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	= 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		
					((C3 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	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	> 8,192 Nm		
					AND			
					Primary oncoming stuck on torque enable cal)	= 0 (0 is enable, 1 is enable)		
					OR			
					(primary oncoming clutch active	= TRUE		
					primary on coming control state	# clutch fill phase	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**	
					primary on coming commanded pressure)	> pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C1 Torque-Based Pressure Clip** OR **C2 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip** OR		

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: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C3 clutch slip speed valid, all speed sensors are functional for lever node 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 tvoe enable cal for	****************************** # 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.
					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 P17D3 P17C5 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 P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 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 verifv 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 DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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			*****************************	*****************************	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count > 3 counts 6.25 milliscond update	
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	> 9.00 volts	battery voltage time > 0.100 seconds	
					use run crank voltage calibration is FALSE	= 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 C3 C23457910 clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					(hydraulic pressure 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		
					((C3 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	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: **Clutch Clip Press CD Shifts 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 P17D3 P17C5 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 P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 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 DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input/Turbine Speed Sensor A Circuit Low	P07BF	Controller specific analog circuit diagnoses the transmission input/ turbine speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intput/turbine speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	< 0.2500 volts (< 0.5 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 Sensor A Circuit High	P07C0	Controller specific analog circuit diagnoses the transmission input/ turbine speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission input/turbine speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	> 4.7500 volts (< 0.5 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 D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = 1 Boolean > 5.00 volts > 25 milliseconds > 9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE > 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity	fail time 1 > 1.00 seconds	Emissions Neutral Diagnostics - Type C
			switch state update fail time 2 100 millisecond update rate	= tap up (upshift) state active	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active	= FALSE = 1 Boolean > 5.00 volts > 25 milliseconds > 9.00 volts = FALSE	fail time 2 > 120.00 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = FALSE = FALSE = FALSE = FALSE > 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = 1 Boolean > 5.00 volts > 25 milliseconds > 9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE > 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity	fail time 1 > 1.00 seconds	Emissions Neutral Diagnostics - Type C
			switch state update fail time 2 100 millisecond update rate	= tap down (downshift) state active	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active	= FALSE = 1 Boolean > 5.00 volts > 25 milliseconds > 9.00 volts = FALSE	fail time 2 > 120.00 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = FALSE = FALSE = FALSE = FALSE > 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Q impedance between signal and controller ground			fail time > 0.30 seconds out of sample time > 0.50 seconds	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	>1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)	> 12.5 milliseconds	
					(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 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 Q 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 B Control Circuit Open	P0964	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch, or CVT primary pulley solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q 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 CB128910R, 8 speed CB12345R clutch, or CVT primary pulley solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q 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 CB128910R, 8 speed CB12345R clutch, or CVT primary pulley solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q 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_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 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 Q 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 Q 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 Q 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	The diagnostic monitor detects a failure of the wheel speed sensor signals serial data values to have been update in a sequential manner. The diagnostic monitor determines that valid serial data frames are being received by the controller, and, the actual sequencing, the sequence counter, is not incrementing normally. If the sequence counter has stopped cycling when normal communication is occurring, a sequence error has occurred. Emission neutral state defaults wheel speed sensor signals serial data values to 0.0 RPM.	IF sequence number raw THEN update fail time AND SET sequence number previous is to current frame sequence number	 = sequence number previous	diagnostic monitor enable calibration run crank voltage for 25 milleseconds run crank voltage [(wheel speed serial data type front wheel angular AND rear wheel velocity available, which occurs when loss communcation with ABS U0121 NOT fault pending) OR (wheel speed serial data type loss communcation with ABS U0121 fault pending non-driven wheel rotational speed fails soft, which occurs when controller is receiving frame data in normal receive time)] sequence number raw is updated when controller is receiving frame data in normal receive time, otherwise sequence number is frozen at the last valid frame value normal frame receive time	= 1 Boolean > 5.00 volts > 11.00 volts = revolutions per second = available = pulse count and time stamp = FALSE = FALSE > 10.0 seconds	fail time > 2.000 seconds update rate 25 millseconds	Emissions Neutral Diagnostic-Type C

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	P16F3	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** +				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 ranae	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) 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) outout shaft deceleration	= 1 (1 to enable, 0 to disable) > 5.0 KPH = TRUE > 5.0 KPH = TRUE = TRUE = TRUE = FALSE = TRUE > 8.0 KPH = 4 Filled Clutches > 1.00 > 1.00 > 1.00 > 1.00 > 1.00 > 1.00 > 1.00 Transfer case range is 4WD Lo: < -399.4 RPM/sec	when fail timer reaches 100, set DTC >2.50 sec	

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 commanded on when the commanded range is reverse). This is used to prevent an incorrect direction safety hazard.			DTCs Not Fault Active DTCs Not Test Failed This Key On	Else < -147.9 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 timer	< **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	command shift monitor	= 1 (1 to enable, 0 to	when incorrect downshift fail timer reaches 4.63 sec, set DTC when invalid 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.
			6.25 ms update rate		enable calibration Service Fast Learn OR (Service Fast Learn AND Vehicle Speed) High Side Driver 1 On High Side Driver 2 On DTCs Not Fault Active DTCs Not Test Failed This Key On	disable) = FALSE = TRUE > 8.0 KPH = TRUE = TRUE P077C, P077D, P0721 P0723, P0722, P172A, P172B	 >2.50 sec	
			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* driver requested range	 **Illegal Drive Clutch** **= Combinations** = Drive = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable) = **Illegal Reverse Clutch Combinations** = Reverse			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** 6.25 ms update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Incorrect reverse enable calibration Incrorrect reverse disable calibration Neutral: An invalid combinatio of neutral clutches commanded on* driver requested range Incorrect neural enable calibration Incrorrect neutral disable calibration Park: An invalid combination of reverse clutches commanded on* driver requested range Incorrect park enable calibration Incrorrect park disable calibration	= 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to enable) = **Illegal Park-Neutral Clutch Combinations** = Neutral = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable) = **Illegal Park-Neutral Clutch Combinations** = Park = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable)	Current driver requested range (vehicle speed AND vehicle speed OR Fail Timer) clutch connectivity monitor enable OR clutch connectivity monitor disable Service Fast Learn OR (Service Fast Learn AND Vehicle Speed) High Side Driver 1 On High Side Driver 2 On DTCs Not Fault Active DTCs Not Test Failed This Key On * Note, clutch is considered "on" when the following conditions are met: Clutch commanded pressure	= previous driver requested range > -6.00 KPH > 6.00 KPH > 0.0 = 1 (1 to enable, 0 to disable = 0 (0 to enable, 1 to disable) = FALSE = TRUE > 8.0 KPH = TRUE = TRUE P077C, P077D, P0721 P0723, P0722, P172A, P172B ≥ **Clutch Connectivity C1 On Threshold** OR ≥	≥ **Incorrect Direction Range Change Delay Time** >2.50 sec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						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 Output speed direction OR Output speed direction	= TRUE = FORWARD = REVERSE			increment fail timer by **Ratio Monitor Fail Increment Rate (Percent per Loop)** when timer	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Plus following criteria based on driver requested range:				reaches 100, set fault pending	
			Drive:				Fail time based on driver requested range (once fault pending has matured):	
			driver requested range	= Drive				
			Incorrect drive enable calibration	= 1 (1 to enable, 0 to disable)			**Incorrect Drive Fail Time**	
			Incrorrect drive disable calibration	= 0 (0 to enable, 1 to disable)				
			Reverse:				**Incorrect Reverse Fail Time**	
			driver requested range	= Reverse				
			Incorrect reverse enable calibration	= 1 (1 to enable, 0 to disable)			**Incorrect Neutral Fail Time**	
			Incrorrect reverse disable calibration	= 0 (0 to enable, 1 to enable)	******************************	******************************	**Incorrect Park Fail Time** 6.25 ms update rate	
			Neutral:		If all conditions below are met, increment ratio monitor fault pending timer:			
			driver requested range	= Neutral				
			Incorrect neural enable calibration	= 1 (1 to enable, 0 to disable)	vehicle speed OR vehicle speed (note: fault pending will remain latched if vehicle speed max thresholds are exceeded)	> 0.50 AND < 6.00 KPH <-0.50 AND >-6.00 KPH		
			Incrorrect neutral disable calibration	= 0 (0 to enable, 1 to disable)				
			Park:					
			driver requested range	= Park	Monitor Armed	= TRUE		
			Incorrect park enable calibration	= 1 (1 to enable, 0 to disable)	Measured output speed direction	= REVERSE or FORWARD		
			Incrorrect Dark disable	= 0 (0 to enable. 1 to	Incut sDeed default			

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

			calibration	disable)	direction
					
					Current driver requested range
					
					based on PRNDL position:
					
					driver requested range
					AND
					transmission measured speed ratio
					AND
					Loop-to-loop change in measured ratio
					AND
					(Direction By Ratio
					OR
					Direction By Clutch Slip)
					
					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:
						= REVERSE or FORWARD
						
						= previous driver requested range
						
						= Reverse
						
						> 0.40
						
						> -8.00
						
						= FORWARD
						
						= a FORWARD Gear
						
						= Drive
						
						< -0.40
						
						< 8.00
						
						= REVERSE
						
						= REVERSE
						******************************
						
						= 0 (1 to enable, 0 to disable)
						= Range Shift Complete
						
						= 0 (1 to enable, 0 to disable)
							≥ Incorrect Direction Range Change Delay Time	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					THEN Attained Gear ALSO Engine Speed Ratio Monitor enable cal OR Ratio Monitor disable cal ***************************** Direction By Ratio: Direction By Ratio Enable cal (vehicle speed OR vehicle speed) WHEN: Measured output speed direction AND 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 slio valid	# Neutral AND # Park > 400 RPM = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable) ***************************** = 0 (1 to enable, 0 to disable) > 0.50 KPH < -0.50 KPH = reverse > 4.80 AND < 4.92 = REVERSE = forward > 4.65 AND < 0.66 = FORWARD ***************************** = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					C2 clutch slip valid	= TRUE		
					C5 clutch slip valid	= TRUE		
					C3C4 dual clutch slip valid	= TRUE		
					C3C6 dual clutch slip valid	= TRUE		
					C4C6 dual clutch slip valid	= TRUE		
					Direction by Clutch Slip Enable cal	= 1 (1 to enable, 0 to disable)		
					(vehicle speed	> 0.50 KPH		
					OR			
					vehicle speed)	< -0.50 KPH		
					for each clutch: current clutch slip	**Ratio Monitor Slip < Threshold** (if slip condition met, clutch held = 1, else held = 0)		
					clutch held combination matches a valid gear in:	**Ratio Monitor Clutch States**		
					******************************	******************************		
					General enables:			
					Genral Ratio Monitor Detection enable cal	= 0 (1 to enable, 0 to disable)		
					Transmission Type	= RWD 10 Spd Automatic		
					Service Fast Learn	= FALSE	>2.50 sec	
					OR			
					(Service Fast Learn	= TRUE		
					AND			
					Vehicle Speed)	> 8.0 KPH		
					High Side Driver 1 On	= TRUE		
					High Side Driver 2 On	= TRUE		
					DTCs Not Fault Pending	P0716, P0717, P07BF, P07C0. P0721. P0722.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						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.
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	= 0 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 = 255 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	= 0 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE	TCM range sensor fault time > 409.0 seconds UPDATE TCM range sensor latent fault fail count SET TCM range sensor fault = TRUE TCM range sensor latent fault fail count > 255 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 [(P0717 or 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 orP172Aor 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 orP160Eor 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 EngineTorqueEstInaccura te 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 = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = 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.
					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	> 10.0 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	> 9.00 volts	battery voltage time > 0.100 seconds	
					transmission hydraulic pressure available: engine speed	> 500.0 RPM	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** *t* **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 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.
						engine speed time for transmission hydraulic pressure available seconds		
					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 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) AND	**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	*t* **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 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.
						engine speed time for transmission hydraulic pressure available seconds		
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	> 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE		
					range shift state (auto trans shift complete)	= range shift complete		
					enable time	> 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR	# **intermediate speed sensor 1 or 2 predicted direction**	when the following conditions are met update the enable time: diagnsotic monitor enable	**speed sensor directional rationality = enable calibration**	2.50 seconds	
			intermediate speed sensor 2 direction raw) AND	# **intermediate speed sensor 1 or 2 predicted direction**	TOSS sensor type must be directional	= CeTOSR_e_Directional		
			attained gear AND attained gear	> 1st gear < 10th gear	engine speed engine speed time	> 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds		
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	> 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete		

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 cailbration (senortype 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** ***t*** **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	**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** t **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 cailbration (senortype 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	> 10.0 RPM > **P17D6 intermediate speed sensor fail RPM threshold** see supporting tables	diagnostic monitor enable speed sesnor configuration calibration is dual ratio calibration is function of command gear and intermediate speed sesnor when not REVERSE ratio calibration is function of command gear and intermediate speed sesnor when REVERSE ****************************** delay time updates when: estimated transmission intermediate speed (transmission input speed / ratio calibration) with	= 1 Boolean = CeTNSR_e_NSPD_DualSpdSnsr = **P17D6 ratio calibration when not REVERSE** 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		
					■kidek-k'k-k-k-k-kitick'k-k-k-k-k-k-k-kickick-k-k	*****************************		
					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.
Transmission Park Valve Position Sensor/ Switch A Circuit/Open	P17F5	The diagnostic monitor detects an illegal voltage on the park valve position sensor circuit.	raw sensor voltage raw sensor voltage	> 0.41 volts < 1.504 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 9.00 volts > 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Valve Position Sensor/ Switch A Circuit Low	P17F6	The diagnostic monitor detects a ground short or open circuit fault in the park valve position sensor circuit.	raw sensor voltage	< 0.414 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 9.00 volts > 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Valve Position Sensor/ Switch A Circuit High	P17F7	The diagnostic monitor detects a short to voltage circuit fault in the park valve position sensor circuit.	raw sensor voltage	> 2.538 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 9.00 volts > 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Valve Position Sensor/ Switch B Circuit/Open	P17FA	The diagnostic monitor detects an illegal voltage on the park valve position sensor circuit.	raw sensor voltage raw sensor voltage	> 1.263 volts < 1.504 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 9.00 volts > 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Valve Position Sensor/ Switch B Circuit Low	P17FB	The diagnostic monitor detects a ground short or open circuit fault in the park valve position sensor circuit.	raw sensor voltage	< 0.414 volts	diagnostic monitor enable battery voltage battey voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 9.00 volts > 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Valve Position Sensor/ Switch B Circuit High	P17FC	The diagnostic monitor detects a short to voltage circuit fault in the park valve position sensor circuit.	raw sensor voltage	> 2.538 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 9.00 volts > 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Valve Stuck On (GR10 Only)	P187D	This diagnostic monitor rationalizes the driver ETRS command direction of “out of PARK” against the actual park valve position, as the park valve position is measured by the park valve position sensor A or B.	when: out of park commanded only one valid park valve sensor (either Park Sensor A OR Park Sensor B) with sensor not indicating out of park OR two valid park sensors (Park Sensor A AND Park Sensor B) not indicating out of park transition delay for commanded park valve transition (not required for steady state commanded out of park conditions) increment fail time when fail time threshold met, increment fail count	# Park = Park = Park ≥ **P187D P18E7 Park to Out Of Park Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general park servo diagnostic enable park valve stuck on diagnostic enable high side driver 1 or high side driver 2 is on P187D, P187E (Park Servo DTC) Test Fail This Key On (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active) OR (P17FA, P17FB, P17FC (Park Sensor B) Fault Active) (mode valve A commanded high and mode valve A confirmed high) OR mode valve related fault disabled confirmation (P18AA0R P18AB OR P27EC Test Fail This Key) OR (P27EB OR P27ED OR P27EE Fault Active) pump out available (engine speed for	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = FALSE = TRUE = TRUE = TRUE = TRUE	steady state fail time > 0.25 seconds OR transition fail time > 0.25 seconds fail count > 2 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					engine speed time) line pressure available (commanded) line pressure sufficient for pull out of park (transition) or maintain out of park (steady state)	> 250 RPM **Pump Out Available** **> Transition Time** > 100.00 kPa > 1,000.00 kPa > 500.00 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Valve Stuck Off (GR10 Only)	P187E	This diagnostic monitor rationalizes the driver ETRS command direction of "PARK" against the actual park valve position, as the park valve position is measured by the mode valve position sensor A and B.	when: park commanded only one valid park valve sensor (either Park Sensor A OR Park Sensor B) with sensor not indicating park OR two valid park senssors sensors (Park Sensor A AND Park Sensor B) not indicating park transition delay for commanded park valve transition OR transition delay for commanded park valve transition with min line (not required for steady state commanded park conditions) increment fail time when fail time threshold met, increment fail count	= Park # Park * Park ≥ **P187E P18E8 Out Of Park to Park Transition Delay** ≥ **P187E P18E8 Out Of Park to Park Min Line Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general park servo diagnostic enable park valve stuck off diagnostic enable (high side driver 1 or high side driver 2 is on) OR (pump out available (engine speed for engine speed low time) AND line press available (line pressure command)) P187D, P187E (Park Servo DTC) Test Fail This Key On (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active) OR (P17FA, P17FB, P17FC (Park Sensor B) Fault Active) ((((mode valve A commanded low and mode valve A confirmed low)	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE <250 RPM > 0.25 = FALSE < 100.00 kPa = FALSE = FALSE = FALSE	steady state fail time > 0.25 seconds OR transition fail time > 1.80 seconds OR transition fail time (at min line) > 1.80 seconds fail count > 2.00 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR mode valve related fault disabled confirmation (P18AAOR P18AB OR P27EC Test Fail This Key On) OR mode valve sensor fault (P27EB OR P27ED OR P27EE Fault Active)) AND ((park inhibit solenoid electrically stuck on) OR (park inhibit solenoid electrically stuck on AND line pressure command))) OR min line commanded (line pressure command))	= TRUE = TRUE = TRUE = FALSE = TRUE ≥ **Park Inhibit Solenoid Override Line Pressure** < 100.00 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Command Message Performance	P189C	The diagnostic monitor detects a failure of the LIN serial communication failure between the TCM and the ECM/CHCM for Electronic Transmission Range Select (ETRS) vehicles.	LIN range command is undetected by TCM based on Rx LIN service fucntion Range Command Secondary Updated	= FALSE set to FALSE as part of normal background time updates, set to TRUE as part of normal LIN service fucntion when Rx messages are processed	diagnostic monitor calibration enable (P189C fault active OR P189C test fail this key on) range change delay when P189C fault pending time, update P189C fail time service mode $04 active run/crank voltage run/crank voltage time	= 1 Boolean = FALSE = FALSE > 3,000 milliseconds > 3 milliseconds = FALSE > 5.00 volts > 3,000 milliseconds	P189C fail time > 425 milliseconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Electronic Transmission Range Select Valve Performance - Stuck On (GR10 Only)	P18A1	This diagnostic monitor detects the condition where the transmission is latching the drive state on a commanded drive to park shift due to the range select valve being stuck on. P18A1 is only active during pressure / solenoid controlled shifts, not min line pressure default shifts which will break drive latch regardless of the range select valve position.	when: commanded mode valve high to low transition (drive to park shift) mode valve position park valve postion remains out of park transition delay for solenoid commanded mode valve transition increment fail time when fail time threshold met, increment fail count	= LOW = HIGH # Park ≥ **P18A1 P18AAP27EC Mode Valve High To Low Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general mode valve diagnostic enable range select valve stuck on diagnostic enable high side driver 1 or high side driver 2 is on mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND (P27EB, P27ED, P27EE Fault Active) drive latch possible (mode valve previously confirmed position AND calculated line pressure)	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = HIGH > 0.00	fail time > 0.10 seconds fail count > 3 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Inhibit Actuator Control Circuit Low	P18A2	Controller specific circuit diagnoses internal ETRS park solenoid for an ground 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 Controller specific circuit voltage thresholds are set to meet the following controller specification for an short to ground circuit	> 200 K Q impedance between signal and controller ground Increment open fail time OR < 0.5 Q impedance between signal and controller ground Increment low fail time	battery voltage run crank voltage OR accessory voltage active (open test (solenoid is mapped to high side driver 1 (= CeTSCR_e_HSD1) AND high side driver 1 on) OR open test (solenoid is mapped to high side driver 2 (= CeTSCR_e_HSD2) AND high side driver 2 on)) (low test (solenoid is mapped to high side driver 1 (= CeTSCR_e_HSD1) AND high side driver 1 on) OR low test (solenoid is mapped to high side driver 2 (= CeTSCR_e_HSD2) AND high side driver 2 on)) solenoid open failure mapped to low DTC	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = CeTSCR_e_NoHSD = CeTSCR_e_NoHSD = CeTSCR_e_NoHSD = CeTSCR_e_NoHSD see "P18A2 open failure enable"	> 1.000 seconds 25 milliseconds 12.5 milliseconds open fail time> 0.300 seconds out of open	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enable calibration solenoid low failure mapped to low DTC enable calibration	= 0 Boolean see "P18A2 low failure enable" = 0 Boolean	samle time > 0.500 seconds low fail time > 0.300 seconds out of low samle time > 0.500 seconds fail timer in sample time window reaching open OR low fail thresholds will set DTC	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Inhibit Actuator Control Circuit (T93 GR10 Only)	P18A3	Controller specific circuit diagnoses internal ETRS park solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Increment fail time	> 200 K Q impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration (1=enabled, 0=disabled) ((solenoid is mapped to high side driver 1 (= CeTSCR_e_HSD1) AND high side driver 1 on) OR (solenoid is mapped to high side driver 2 (= CeTSCR_e_HSD2) AND high side driver 2 on))	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = 1 = CeTSCR_e_HSD1 = On = CeTSCR_e_HSD1 = On	> 1.000 seconds 25 milliseconds 12.5 milliseconds fail time > 0.300 seconds out of sample time > 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Inhibit Actuator Control Circuit High	P18A4	Controller specific circuit diagnoses internal ETRS park solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Increment fail time	< 0.5 Q impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration (1=enabled, 0=disabled) ((solenoid is mapped to high side driver 1 (= CeTSCR_e_HSD1) AND high side driver 1 on) OR (solenoid is mapped to high side driver 2 (= CeTSCR_e_HSD2) AND high side driver 2 on))	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = 1 = CeTSCR_e_HSD1 = On = CeTSCR_e_HSD1 = On	> 1.000 seconds 25 milliseconds 12.5 milliseconds fail time > 0.300 seconds out of sample time > 0.500 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Park Inhibit Solenoid Stuck Off (GR10 Only)	P18A8	This diagnostic monitor detects when the park inhibit solenoid is unable to maintain out of park/neutral as expected when out of park oil is not available	when: neutral commanded out of park oil park inhibit solenoid commanded (only required to start fail time) only one valid park valve sensor (either Park Sensor A OR Park Sensor B) with sensor not indicating out of park OR two valid park sensors (Park Sensor A AND Park Sensor B) not indicating out of park increment fail time when fail time threshold met, increment fail count	= Neutral = Not Available = HIGH # Out Of Park # Out Of Park	ETRS system type is internal ETRS time since controller init battery voltage general park servo diagnostic enable park inhibit solenoid stuck off diagnostic enable high side driver 1 or high side driver 2 is on OR (pump out available (engine speed for engine speed low time) AND line press available (line pressure command)) P187D, P187E (Park Servo DTC) Test Fail This Key On (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active) OR (P17FA, P17FB, P17FC (Park Sensor B) Fault Active) (((mode valve A commanded low and mode valve A confirmed low) OR	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE <250 RPM > 0.25 = FALSE < 100.00 kPa = FALSE = FALSE = FALSE	fail time >0.13 seconds fail count > 2.00 counts update rate 6.25 milliseconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					mode valve related fault (P18AAOR P18AB OR P27EC Test Fail This Key On) OR mode valve sensor fault (P27EB OR P27ED OR P27EE Fault Active))) park inhibit solenoid not electrically stuck off (P18A3 OR P18A4 Fault Active) (pump out available (engine speed for engine speed low time OR min line commanded (line pressure command)) aux pump commanded on	= TRUE = TRUE = TRUE = FALSE = FALSE < 250.00 > 0.25 < 100.00 kPa = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Control A Position Sensor/ Switch Circuit Stuck On (GR10 Only)	P18AA	This diagnostic monitor detects a Mode Valve A Position Sensor State in the "on" or "high" state while being commanded low or when pressure is insufficient to hold the mode valve high. After a failure of a pressure controlled mode valve high to low transition, a min line mode valve high to low transition is used for fault isolation between P18A1 and P18AA.	when: mode valve solenoid commaned state mode valve A position sensor state transition delay for solenoid controlled mode valve transition OR transition delay for solenoid min line mode valve transition (no transistion delay required for steady state commanded mode valve low conditions) increment fail time when fail time threshold met, increment fail count	= LOW = HIGH ≥ **P18A1 P18AAP27EC Mode Valve High To Low Transition Delay** ≥ **P18AA Mode Valve High To Low Min Line Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general mode valve diagnostic enable mode valve stuck on diagnostic enable high side driver 1 or high side driver 2 is on (pump out available (engine speed for engine speed low time) AND line press available (line pressure command)) mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND mode valve sensor fault (P27EB, P27ED, P27EE Fault Active) AND ((pump out available (engine speed for engine speed high time) AND line pressure available (pressure commanded)	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE <250 RPM > 0.25 = FALSE < 100.00 kPa = FALSE = FALSE = TRUE > 250.00 **Pump Out Available > Transition Time**	steady state fail time > 0.25 seconds OR high to low transition fail time > 0.10 seconds OR high to low min line transition fail time > 1.00 seconds fail count > 2.00 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND out of park status) OR (pump out available OR line pressure available)	= TRUE > 100.00 kPa # Park = FALSE = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Control A Position Sensor/ Switch Circuit Stuck Off (GR10 Only)	P18AB	This diagnostic monitor detects a Mode Valve A Position Sensor State in the "off" or "low" state, which is in error, when hydraulic pressure in the circuit used to move the mode valve is sufficient to overcome the mode valve return spring force, leaving the mode valve mechanically in the “on” or “high” state. The diagnostic monitor also executes during transitions of the mode valve to verify Mode Valve A Position Sensor State changes correctly with mode valve state command.	when: mode valve solenoid commaned state mode valve A position sensor state transition delay for solenoid controlled mode valve transition (no transistion delay required for steady state commanded mode valve high conditions) increment fail time when fail time threshold met, increment fail count	= HIGH = LOW ≥ **P18AB P27EC Mode Valve Low to High Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general mode valve diagnostic enable mode valve stuck off diagnostic enable high side driver 1 or high side driver 2 is on mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND mode valve sensor fault (P27EB, P27ED, P27EE Fault Active) pump out available (engine speed for engine speed high time) AND line pressure available (pressure commanded) AND out of park status	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1.00 Boolean = TRUE = FALSE = FALSE = TRUE > 250.00 **Pump Out Available > Transition Time** = TRUE > 100.00 kPa = Park	steady state fail time > 0.25 seconds OR low to high transition fail time 0.25 >seconds fail count > 2.00 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Control Enable Valve Stuck On (GR10 Only)	P18AE	This diagnostic monitor detects when the Enable Valve is not able to cut pressure from the pump to the rest of the hydraulic system within the transmission. The test checks for 02 incorrectly gaining capacity when commanded on with line pressure cut.	park commanded commanded gear only one valid park valve sensor (either Park Sensor A OR Park Sensor B) with sensor indicating park OR two valid park sensors (Park Sensor A AND Park Sensor B) with both sensors indicating park enable valve delay time C2 pressure command C2 slip increment enable valve stuck on fail time	= PARK = PARK w/ No clutches = Park = Park > **P18AE Enable Valve Test Delay** = 2,200.00 < 60.00	ETRS system type is internal ETRS high side driver 1 or high side driver 2 is on trans oil temp engine crank (only required to initiate test) engine off commanded line pressure pump out available (engine speed for engine speed high time) transmission input speed enable valve diagnostic not completed (P18AE Test Pass / Test Fail This Key) no C2 solenoid electrical (P0964 OR P0966 OR P0967 Fault Active) no line pressure electrical fault (P2812 OR P2814 OR P2815 Fault Active) engine crank time total test time	= CeTRGR_e_InternalETRS = TRUE > 0.00 Deg C = TRUE = FALSE = 0 = TRUE > 250.00 RPM **Pump Out Available > Transition Time** > 300.00 RPM = FALSE = FALSE = FALSE < **P18AE Max Crank Time**	fail time > 4.50 update rate 6.25 milleseconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						< 6.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Valve Position Sensor/ Switch "A" Performance (GR10 Only)	P18E7	This diagnostic monitor detects park valve position sensor A performance faults, the sensor is indicating not park when command is park, or sensor does not transition when park is not commanded.	when: out of park commanded Park Sensor A indicating park Park Sensor B not indicating park transition delay for commanded park valve transition (not required for steady state commanded out of park conditions) increment fail time when fail time threshold met, increment fail count	# Park = Park # Park ≥ **P187D P18E7 Park to Out Of Park Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general park servo diagnostic enable park position sensor A performance diagnostic enable high side driver 1 or high side driver 2 is on P187D, P187E (Park Servo DTC) Test Fail This Key On (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active) OR (P17FA, P17FB, P17FC (Park Sensor B) Fault Active) mode valve A commanded high and mode valve A confirmed high mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND mode valve sensor fault (P27EB, P27ED, P27EE Fault Active) pump out available (engine speed	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = FALSE = TRUE = FALSE = FALSE	steady state fail time > 0.25 seconds transition fail time > 0.25 seconds fail count > 1.00 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					for engine speed time) line pressure available (commanded) line pressure sufficient for pull out of park	= TRUE > 250 RPM **Pump Out Available** **> Transition Time** > 100.00 kPa > 1,000.00 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Valve Position Sensor/ Switch "B" Performance (GR10 Only)	P18E8	This diagnostic monitor detects park valve position sensor B performance faults, the sensor is indicating not park when command is park, or sensor does not transition when park is not commanded.	when: steady state out of park commanded Park Sensor A not indicating park Park Sensor B indicating park increment fail time when fail time threshold met, increment fail count	± Park * Park = Park	ETRS system type is internal ETRS time since controller init battery voltage general park servo diagnostic enable park position sensor B performance diagnostic enable high side driver 1 or high side driver 2 is on P187D, P187E (Park Servo DTC) Test Fail This Key On (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active) OR (P17FA, P17FB, P17FC (Park Sensor B) Fault Active) mode valve A commanded high and mode valve A confirmed high mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND mode valve sensor fault (P27EB, P27ED, P27EE Fault Active) pump out available (engine speed for	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = FALSE = TRUE = FALSE = FALSE = TRUE	fail time > 0.25 seconds fail count > 2.00 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					engine speed time) line pressure available (commanded) line pressure sufficient for pull out of park	> 250 RPM **Pump Out Available > Transition Time** > 100.00 kPa > 1,000.00 kPa		
			when: park commanded Park Sensor A indicating park Park Sensor B not indicating park transition delay for commanded park valve transition OR transition delay for commanded park valve transition with min line (not required for steady state commanded park conditions) increment fail time when fail time threshold met, increment fail count	= Park = Park # Park ≥ **P187E P18E8 Out Of Park to Park Transition Delay** ≥ **P187E P18E8 Out Of Park to Park Min Line Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general park servo diagnostic enable park position sensor B performance diagnostic enable high side driver 1 or high side driver 2 is on OR (pump out available (engine speed for engine speed low time) AND line press available (line pressure command)) P187D, P187E (Park Servo DTC) Test Fail This Key On (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active)	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE <250 RPM > 0.25 = FALSE < 100.00 kPa = FALSE	steady state fail time > 0.25 seconds OR transition fail time > 1.80 seconds OR transition fail time (at min line) > 1.80 seconds fail count > 2.00 counts update rate 6.25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR (P17FA, P17FB, P17FC (Park Sensor B) Fault Active) mode valve A commanded low and mode valve A confirmed low (park commanded) mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND mode valve sensor fault (P27EB, P27ED, P27EE Fault Active)	= FALSE = FALSE = TRUE = FALSE = FALSE		

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 Q impedance between signal and controller ground OR > 200 K Q 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			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	
					TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TOM 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 oressure 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) C4 clutch slip speed valid C4 clutch pressured map (enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear) range shift state ****************************** DTCs not fault pending DTCs not fault active	> 1,000.0 RPM > 350.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip speed calculation) = mapped to line pressure, C4 clutch pressure has reached fully applied state = 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE = range shift complete ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D 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 P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 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 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 Stuck On	P2715	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C4 clutch slip speed OR shift type is garage shift: C4 clutch slip speed ELSE shift is another type: C4 clutch slip speed update fail time 6.25 milliscond update	 < 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time > 0.60 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time > 0.15 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 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	> 10 kPa		
					Park/Neutral Stuck on FP OR	=TRUE		
					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		
					((C4 off going clutch pressure control ramp time out complete AND	= TRUE		
					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 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: **ClOncoming 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: **Clutch Clip Press CD Shifts 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 (Intrusive shift active AND	****************************** # Garage shift **Clutch Stuck On Shift = Type Enable** (0 table value will disable, 1 will enable) = 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 P17D3 P17C5 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 P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 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 diaonostic 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 diaanostic 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 Q 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 Q 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 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 Q 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			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	
					TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TOM 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 oressure 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 Dedal oosition	= 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 OR transmission input shaft speed)	 > 1,000.0 RPM > 350.0 RPM		
					C5 clutch slip speed valid	= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)		
					C5 clutch pressured map	= mapped to line pressure, C5 clutch pressure has reached fully applied state		
					(enable forward gear cal AND 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 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 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 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 Stuck On	P2724	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C5 clutch slip speed OR shift type is garage shift: C5 clutch slip speed ELSE shift is another type: C5 clutch slip speed update fail time 6.25 milliscond update	 < 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time > 0.60 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time > 0.15 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

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

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	> 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		
					((C5 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 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: **Clutch Clip Press CD Shifts 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 P17D3 P17C5 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 DTCs not test fail this key on ****************************** 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 durino an	P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B ******************************		

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 oressure 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 Q 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 Q 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 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 Q 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_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 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	
					TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TOM 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 oressure control			procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					(hydraulic pressure	> 10.00 kPa		
					OR			
					Clutch Stuck on in Park/ Neutral fault pending	= TRUE		
					OR			
					Neutral Staging Line Pressure Disable)	= TRUE		
					****************************	****************************		
					enable C6 clutch slip speed fail compare when:			
					((startle mitigation active	= FALSE		
					OR			
					(startle mitigation active	= TRUE		
					AND			
					startle mitigation gear)) (see startle mitigation active NOTE below)	# initial startle mitigation gear		
					unintended deceleration fault pending	= FALSE		
					OR			
					unintended deceleration fault pending enable cal is FALSE (startle mitigation)	= 0 (0 to enable, 1 to disable)		
					clutch steady state adaptive active	= FALSE		
					(transmission output shaft speed	> 36.0 RPM		
					OR			
					accelerator pedal position	> 0.50 %		
					OR			

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)	> 1,000.0 RPM > 350.0 RPM		
					C6 clutch slip speed valid	= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)		
					C6 clutch pressured map	= mapped to line pressure, C6 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 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 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 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 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			****************************** 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 millliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	> 10 kPa		
					Park/Neutral Stuck on FP OR	=TRUE		
					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		
					((C6 off going clutch pressure control ramp time out complete AND	= TRUE		
					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 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.
						C5 Torque-Based Pressure Clip clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C6 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test: (current shift type AND shift type enable cal for current shift type) OR (Intrusive shift active AND shift type enable cal for garage shift AND	# 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)) 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 P17D3 P17C5 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 P176C P176D P176B P17D6		
					DTCs not test fail this key on	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA 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 DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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				fail time > 0.30 seconds out of sample time > 0.50 seconds	Type A, 1 Trips
			Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground			6.25 millisecond update rate	
				When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage	> 5.00 volts	> 25 milliseconds	
					OR			
					accessory voltage active	= TRUE	> 12.5 milliseconds	
					OR			
					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)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)		
					AND high side driver 1)	= ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)		
					AND high side driver 2)	= ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)		
					AND high side driver 3)	= ON		

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 Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.10 seconds out of sample time > 0.17 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage OR accessory voltage active 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 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 Q 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	> 5.00 volts	> 25 milliseconds	
					OR accessory voltage active	= TRUE	> 12.5 milliseconds	
					OR 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 A Calibration Incorrect	P27A7	The diagnostic monitor verifies that the pressure control solenoid A (GF9 line or GR10 C1 C123456R clutch or CVT secondary pulley) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid A electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault - pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 (GF9 TCC or GRW 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 GR10 C3 C23457910 clutch or CVT line) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid C electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault - pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 CVT TCC) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid E electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault - pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 C45678910R clutch or CVT binary pump) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid F electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault - pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 GR10 line or CVT mode valve A ETRS only) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid G electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault - pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 GR10 TCC or CVT mode valve B ETRS only) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid H electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault - pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Control A Position Sensor/ Switch Circuit/Open	P27EB	The diagnostic monitor detects an illegal voltage on the mode valve A position sensor circuit.	raw sensor voltage raw sensor voltage	> 1.263 volts < 1.504 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 9.00 volts > 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Control A Position Sensor/ Switch Circuit Stuck On (GR10 Only)	P27EC	Sensor signal fails to transition when solenoid mode valve control commands to PARK, DRIVE or REVERSE occur.	when: mode valve solenoid commaned state mode valve A position sensor state confirmed park servo position transition delay for solenoid controlled mode valve transition (not required for steady state mode valve low conditions) increment fail time when fail time threshold met, increment fail count	= LOW = HIGH = PARK ≥ **P18A1 P18AAP27EC Mode Valve High To Low Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general mode valve diagnostic enable mode valve sensor performance enable high side driver 1 or high side driver 2 is on mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND move valve sensor fault (P27EB, P27ED, P27EE Fault Active) AND park servo fault (P187D, P187ETest Fail This Key On) one good park sensor (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active OR P17FA, P17FB, P17FC (Park Sensor B) Fault Active) pump out available (engine speed for engine speed high time) AND line pressure available	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = TRUE > 250.00 **Pump Out Available > Transition Time**	steady state fail time > 0.02 seconds OR transition fail time > 0.10 seconds fail count > 4.00 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(pressure commanded)	= TRUE > 100.00 kPa		
			when: mode valve solenoid commaned state mode valve A position sensor state confirmed park servo position transition delay for solenoid controlled mode valve transition (not required for steady state mode valve high conditions) increment fail time when fail time threshold met, increment fail count	= HIGH = LOW = OUT OF PARK ≥ **P18AB P27EC Mode Valve Low to High Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general mode valve diagnostic enable mode valve sensor performance enable high side driver 1 or high side driver 2 is on mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND move valve sensor fault (P27EB, P27ED, P27EE Fault Active) AND park servo fault (P187D, P187ETest Fail This Key On) one good park sensor (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active OR P17FA, P17FB, P17FC (Park Sensor B) Fault Active) pump out available	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE	steady state fail time > 0.25 seconds transition fail time > 0.25 seconds fail count > 4.00 counts update rate 6.25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine speed for engine speed high time) AND line pressure available (pressure commanded)	= TRUE > 250.00 **Pump Out Available** **> Transition Time** = TRUE > 100.00 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Control A Position Sensor/ Switch Circuit Low	P27ED	The diagnostic monitor detects a ground short or open circuit fault on the mode valve A position sensor circuit.	raw sensor voltage	< 0.414 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 9.00 volts > 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Control A Position Sensor/ Switch Circuit High	P27EE	The diagnostic monitor detects a short to voltage on the mode valve A position sensor circuit.	raw sensor voltage	> 2.538 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 9.00 volts > 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Q 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 Q 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 Q 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	> 5.00 volts	> 25 milliseconds	
					OR accessory voltage active	= TRUE	> 12.5 milliseconds	
					OR 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_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 TCC command capacity TCC command pressure (TCC control mode previous TCC control mode previous TCC control mode previous) AND (TCC control mode current OR TCC control mode current) (TCC stuck off enable OR TCC stuck on enable) hydraulic pressure available: engine speed	= 1 Boolean > 0.00 % > 500.0 kPa # TCC control mode current # ON mode (controlled slip mode) + LOCK = ON mode (controlled slip mode) = LOCK = 1 Boolean = 1 Boolean > 500.0 RPM	fail time > 4.000 seconds increment fail count fail count > 3 counts 25 millisecond update rate TCC command capacity time > 0.00 seconds TCC command pressure time > 2.00 seconds engine speed time > **engine speed time for transmission hydraulic pressure available**	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							see supporting table	
					service fast learn active	= FALSE		
					battery voltage	> 9.00 volts	battery voltage time > 0.100 seconds	
					run crank voltage	> 9.00 volts	run crank voltage time > 0.100 seconds	
						= FALSE		
					(PTO active			
					OR	= 1 Boolean		
					PTO disable calibration)	> 8.0 %		
					accelerator pedal position	< 99.0 %		
					accelerator pedal position	= range shift complete		
					range shift state	> -6.66 °C		
					transmission fluid temperature	< 130.0 °C		
					transmission fluid temperature	> 50.0 Nm		
					engine torque	< 8,191.8 Nm		
					engine torque	= FALSE		
					P2817 test fail this key on	= ON mode (controlled slip mode)		
					(TOO control mode			
					OR	= LOCK		
					TOO control mode)			
					attained gear	≥ CeCGSR_e_CR_Second		
						> 75.00 RPM		
					attainded gear slip			
						AcceleratorPedalFailure		
					DTCs not fault active	EngineTorqueEstInaccurate		
						P281B, P281D, P281E, P0716, P0717, P07BF, P07C0		
						P0722, P0723, P077C, P077D		
						P0722, P0723, P0716, P0717, P07BF, P07C0		
					DTCs not fault pending			

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	< 35.0 RPM > 50.0 RPM > 50.0 RPM > 40.0 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	= 1 Boolean	battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	
					PRNDL commanded gear PRNDL commanded gear	# PARK # PARK # NEUTRAL # NEUTRAL		
					TCC command mode (PTO active OR PTO disable calibration)	= OFF = FALSE = 1 (0 to enable, 1 to disable)		
					transmission fluid temperature transmission fluid temperature	> -6.66 °C < 130.00 °C		
					engine torque engine torque	> -25.0 Nm < 800.0 Nm		
					turbine speed	> cmnd gear turbine speed - 25.0 RPM		
					P2818 test fail this key on	= FALSE		
					engine speed engine speed accelerator pedal position 4WD low state (driver shift mode active OR driver shift mode calibration)	> 200.0 RPM < 1,000.0 RPM < 5.0 % = FALSE = FALSE = 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 > 70.0 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	= 1 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 = 1 (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 (driver shift mode active OR driver shift mode calibration)	= FALSE = 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 Q 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 Q 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 Q 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 (PC) Solenoid J Stuck Off (GR10)	P2820	Each pressure control solenoid stuck off diagnostic monitor detects a control solenoid failed hydraulically off, while the solenoid is electrically functional. This diagnostic monitor detects the default disable valve solenoid failed hydraulically off. The default disable valve is used to route hydraulic fluid to transmission clutches to achieve a hydraulic default gear in the event that a fault occurs which requires the solenoid electrical drivers to be turned off. If the default disable solenoid is hydraulically stuck off, the transmission will enter hydraulic default unintentionally while the control system is actively commanding another gear, which can result in a tie-up condition. When the default disable valve solenoid is hydraulically off while in drive, hydraulic fluid will be routed to clutches to achieve either 7th or 2nd gear. If the vehicle is moving	(gear ratio AND gear ratio) OR (gear ratio AND gear ratio) (C1 clutch slip speed C2 clutch slip speed C3 clutch slip speed C4 clutch slip speed OR C3 clutch slip speed C4 clutch slip speed C5 clutch slip speed C6 clutch slip speed) update fail time 6.25 milliscond update	> 1.020 < 0.980 > 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) TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TOM 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 reauest	= 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 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not test fail this key on	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not fault active	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
			(gear ratio AND gear ratio) OR (gear ratio AND	> 1.020 < 0.980 > 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 orocedure 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 Clutch Stuck on in Park/ Neutral Fault Pending OR Neutral Staging Line Pressure Disable)	> 10.00 kPa = TRUE =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 P17D3 P17C5 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 P176C P176D P176B P17D6		
					DTCs not test fail this key on	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not fault active	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
			Input speed decel test: transmission input speed deceleration neutral test to set DTC on next shift into drive:	> **P2820 GR10 hydraulic default input speed deceleration threshold**			decel time: > 0.05 sec decel observed within **P2820 GR10 hydraulic default at launch test window**	

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 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		
					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	> 10.00 kPa		
					Clutch Stuck on in Park/ Neutral fault pending OR	= TRUE		
					Neutral Staging Line Pressure Disable)	= TRUE		
					*****************************	*****************************		
					conditions needed to trigger decel test:			
					Driver direction change request	= TRUE		
					Driver requested direction	= FORWARD		
					default disable stuck off at launch enable cal	= 0 (1 to enable, 0 to disable)		
					ETRS system type	= CeTRGR_e_InternalETRS		
					deceleration test on previous shift into drive failed	(CeTRGR_e_NoETRS to enable)		
					P2820 Test Passed this Key on OR	= TRUE		
					(Multiple pass cal AND	= FALSE		
					Trans output speed since last pass)	= 0 (1 to enable, 0 to disable)	>0.10 sec	
					Accelerator pedal position transmission input speed transmission output speed	> 36.0 RPM < 2.5 % < 900 RPM < 100 RPM		
					*****************************	*****************************		
					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 Driver direction request current predicted hydraulic default gear if solenoid drivers are turned off transmission input speed transmission output speed ***************************** conditions needed to trigger neutral test: decel test failed transmission output speed attained gear direction brake pedal position park brake status park brake status accelerator pedal position Driver direction change request driver requested direction transmission input speed ***************************** DTCs not fault pending DTCs not test fail this kev	= NEUTRAL = FORWARD = a drive gear (i.e. 2nd) < 900 RPM < 100 RPM ***************************** = TRUE < 100 RPM = FORWARD < 5.00 % # APPLIED # APPLY IN PROGRESS > 10.0 % = TRUE = FORWARD > 100 RPM ***************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6	All conditions met for > 1.00 sec, increment count, count > 1 , set FP	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					on DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA 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 P172AP172B		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid J Stuck On (Default Disable Solenoid Stuck On) (GR10 Only)	P2821	The diagnostic monitor tests for the default disable solenoid stuck on hydraulically at engine start while the default disable solenoid has not failed electrically. The default disable solenoid feeds both the default disable valve but also feeds the ETRS hydraulic-mechanical (check-ball) valve. If the default disable solenoid is stuck on hydraulically, with the default disable solenoid providing a hydraulic pressure circuit to the ETRS hydraulic-mechanical (check-ball) valve at low transmission line pressure, the mode valve position sensor will indicate movement of the ETRS hydraulic-mechanical (check-ball) valve when it should not move during the engine start.	when: mode valve solenoid commaned state mode valve position in park engine crank active (required to initiate test) increment fail time when fail time threshold met, increment fail count	 = LOW = HIGH = TRUE	ETRS system type is internal ETRS time since controller init battery voltage general mode valve diagnostic enable default disable solenoid stuck on diagnostic enable high side driver 1 or high side driver 2 is on mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND (P27EB, P27ED, P27EE Fault Active) pump out available engine speed for engine speed high time	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = TRUE > 250.00 ≥ **Pump Out Available Transition Time**	fail time > 0.25 seconds fail count > 2.00 counts update rate 6.25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Q 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_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 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 Q 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 Q 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 TCM 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 / 1 6 counts intermittent 12.5 ms /count in the TCM 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	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 OBDII: 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 >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 OBDII: 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	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 >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	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 OBDII: 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 (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
			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: Battery voltage	>= 5,000.00 milliseconds >= 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				
			SD17PARC:	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	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:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Emissions Neutral Diagnostics - Type C
			SWIP_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		
			StrgWhlInfo_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 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
			SPMP_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		
			SysPwrMode_Prtctd:	2.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending			
			PltfTrnsTUDSwStARC:	8.00 fail counts out of 10.00 sample counts	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 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 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	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.	Emissions Neutral Diagnostics - Type C
			SD47P_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		
			SrlDat47_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.
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 >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 >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 $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 OBDII: 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 Message $011: Message $016: Message $01C: Message $01D: Message $02A: Message $084: Message $086: Message $087: Message $08C: Message $097: Message $213: Message $214: Message $21D:	>10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >418.75 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >387.50 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00	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 $227: Message $229: Message $22A: Message $254: Message $41D: Message $41F: Message $429: Message $42A: Message $499: Message $4BB: Message $4BC: Message $4BD: Message $4C1:	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	If OBDII: 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 >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_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.
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	Diagnostc is 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	0.650	0.650	0.650	0.500	0.500

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_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionIlnknown	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	CeCGSReCREighth
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 - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

.

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - 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	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - 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 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 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 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 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 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 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 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 - 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 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 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 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 - 02 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 - 02 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 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 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 - 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 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 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 - 03 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 - 03 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 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 - 03 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 - 03 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 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 - 03 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 - 03 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 - 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 - 04 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 - 04 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 - 04 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 - 04 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 - 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 - 05 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 - 05 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 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 - 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 - 06 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 - 06 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 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 - 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	750	850	400	400	400

Initial Supporting table - Clutch Clip Press GS Shifts

Description: Oncoming clutch clip pressure for garage shifts

Value Units: kPa
X Unit: Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	450	750	850	400	400	400

Initial Supporting table - Clutch Clip Press NU Shifts

Description: Oncoming clutch clip pressure for negative torque up shifts

Value Units: kPa
X Unit: Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	450	450	450	600	450	450

Initial Supporting table - Clutch Clip Press 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 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 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 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 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 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 Fail Offset Time STGR Shifts

Description: Used for clutch staging shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Shift Type Enable

Description: Calibration to enable the clutch stuck on test for each shift type

X Unit: Shift Type
Y Units: Boolean

y/x	CeTSER_e_STGR	CeTSER_e_GSCR	CeTSER_e_NUCR	CeTSER_e_PUCR	CeTSER_e_CDCR	CeTSER_e_PDCR	CeTSER_e_CLAR
1	0	1	1	1	1	1	0

Initial Supporting table - Clutch Stuck On Shift Type Enable

Description: Calibration to enable the clutch stuck on test for each shift type

X Unit: Shift Type
Y Units: Boolean

y/x	CeTSER_e_STGR	CeTSER_e_GSCR	CeTSER_e_NUCR	CeTSER_e_PUCR	CeTSER_e_CDCR	CeTSER_e_PDCR	CeTSER_e_CLAR
1	0	1	1	1	1	1	0

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.650	0.650	0.650	0.500	0.500

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	0.650	0.650	0.650	0.500	0.500

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_DirectionIlnknown	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	CeCGSReCREighth
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 - 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	0

P0606 PFM_Enable f(Loop Time) - Part 2

y/x	CePISR_e_1OmsFlow	CePISR_e_12p5msFlow	CePISR_e_20msFlow	CePISR_e_25msFlow
1	0	0	0	0

P0606 PFMEnable f(Loop Time) - Part 3

y/x	CePISR_e_40msFlow	CePISR_e_50msFlow	CePISR_e_80msFlow	CePISR_e_1OOmsFlow
1	0	0	0	0

P0606 PFM Enable f(Loop Time) - Part 4

y/x	CePISR_e_250msFlow			
1	0			

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	225.0	200.0	200.0	200.0	250.0	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

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Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - 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	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P187D P18E7 Park to Out Of Park Transition Delay

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1	4.00	2.00	1.00	0.80	0.80

Initial Supporting table - P187E P18E8 Out Of Park to Park Min Line Transition Delay

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	4.80	2.40	1.20	1.20	1.20

Initial Supporting table - P187E P18E8 Out Of Park to Park Transition Delay

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	2.40	1.20	0.60	0.60	0.60

Initial Supporting table - P18A1 P18AA P27EC Mode Valve High To Low Transition Delay

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	1.60	0.80	0.25	0.07	0.07

Initial Supporting table - P18AA Mode Valve High To Low Min Line Transition Delay

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	4.70	2.00	0.80	0.43	0.26

Initial Supporting table - P18AB P27EC Mode Valve Low to High Transition Delay

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	1.20	0.60	0.20	0.10	0.08

Initial Supporting table - P18AE Enable Valve Test Delay

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	0.50	0.30	0.16	0.08	0.08

Initial Supporting table - 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
X Unit: °C

y/x	-10	5	15	30	110
1	0	0	1	1	1

Initial Supporting table - P2820 GR10 hydraulic default input speed deceleration threshold

Description: Negative acceleration needed to increment fail timer for GR10 default disable solenoid stuck off at launch diagnostic

Value Units: RPM/sec
X Unit: °C

y/x	-10	5	15	30	110
1	-32,768	-32,768	-3,500	-2,000	-2,000

Initial Supporting table - Park Inhibit Solenoid Override Line Pressure

Description:

Value Units: kPa
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	2,000.00	2,000.00	2,000.00	2,000.00	2,000.00

Initial Supporting table - Pump Out Available Transition Time

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	0.05	0.02	0.02	0.02	0.02

Initial Supporting table - speed sensor directional 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
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.650	0.650	0.650	0.500	0.500

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	0.650	0.650	0.650	0.500	0.500

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_Directionllnknown	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	CeCGSReCREighth
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 - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - 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	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - 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
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.650	0.650	0.650	0.500	0.500

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	0.650	0.650	0.650	0.500	0.500

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_DirectionIlnknown	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	CeCGSReCREighth
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 - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

.

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - 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	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - 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
X Unit: transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.650	0.650	0.650	0.500	0.500

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_DirectionIlnknown	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	CeCGSReCREighth
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 - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

.

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P176B ratio calibration when REVERSE

.

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - 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	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - 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 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	72	72	4,096	72	72	76	72
CeTRMR_e_C2_Clutch	61	61	61	4,096	61	61	61
CeTRMR_e_C3_Clutch	67	67	67	67	4,096	67	318
CeTRMR_e_C4_Clutch	116	116	116	116	116	4,096	116
CeTRMR_e_C5_Clutch	65	65	65	65	251	65	4,096
CeTRMR_e_C6_Clutch	35	35	35	35	35	63	35
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	72	4,096	4,096	4,096	4,096	4,096	72
CeTRMR_e_C2_Clutch	61	4,096	4,096	61	61	61	4,096
CeTRMR_e_C3_Clutch	67	4,096	67	4,096	67	318	4,096
CeTRMR_e_C4_Clutch	654	4,096	116	116	4,096	116	116
CeTRMR_e_C5_Clutch	65	4,096	65	251	65	4,096	251
CeTRMR_e_C6_Clutch	4,096	4,096	35	35	63	35	35
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	76	72	72	78	72	72	76
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	61	67	61	61
CeTRMR_e_C3_Cl utch	67	587	67	4,096	4,096	4,096	318
CeTRMR_e_C4_Clutch	4,096	116	654	4,096	116	654	4,096
CeTRMR_e_C5_Clutch	65	4,096	65	251	4,096	402	4,096
CeTRMR_e_C6_Clutch	63	35	4,096	63	35	4,096	171
CeTRMR_e_C7_Cl utch	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	76	72	72	4,096	72	72	76
CeTRMR_e_C2_Cl utch	61	61	61	61	4,096	61	61
CeTRMR_e_C3_Clutch	67	67	67	67	67	4,096	67
CeTRMR_e_C4_Clutch	4,096	116	116	116	116	116	4,096
CeTRMR_e_C5_Cl utch	65	65	65	65	65	251	65
CeTRMR_e_C6_Clutch	4,096	35	35	35	35	35	63
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_Cl utch	72	72	4,096	4,096	72	76	72
CeTRMR_e_C2_Cl utch	61	61	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	318	67	4,096	67	4,096	67	587

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

CeTRMR_e_C4_Clutch	116	654	4,096	116	116	4,096	116
CeTRMR_e_C5_Clutch	4,096	65	4,096	65	251	65	4,096
CeTRMR_e_C6_Clutch	35	4,096	4,096	35	35	63	35
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_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_Clutch	72	78	72	72	76	76	72
CeTRMR_e_C2_Clutch	4,096	61	67	61	61	61	61
CeTRMR_e_C3_Clutch	67	4,096	4,096	4,096	318	67	67
CeTRMR_e_C4_Clutch	654	4,096	116	654	4,096	4,096	116
CeTRMR_e_C5_Clutch	65	251	4,096	402	4,096	65	65
CeTRMR_e_C6_Clutch	4,096	63	35	4,096	171	4,096	35
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	93	61
CeTRMR_e_C3_Clutch	67	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	116	116	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutch	65	4,096	4,096	251	251	4,096	402
CeTRMR_e_C6_Clutch	4,096	35	35	63	63	171	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	118	76	72	78	
CeTRMR_e_C2_Clutch	67	61	176	4,096	4,096	4,096	
CeTRMR_e_C3_Clutch	4,096	318	4,096	587	4,096	4,096	
CeTRMR_e_C4_Clutch	727	4,096	4,096	4,096	654	4,096	
CeTRMR_e_C5_Clutch	4,096	4,096	4,096	4,096	4,096	727	
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	
CeTRMR_e_C7_Cl utch	4,096	4,096	4,096	4,096	4,096	4,096	

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	195	195	4,096	195	195	204	195
CeTRMR_e_C2_Clutch	163	163	163	4,096	163	163	166
CeTRMR_e_C3_Clutch	180	180	180	180	4,096	180	859
CeTRMR_e_C4_Clutch	314	314	314	314	314	4,096	314
CeTRMR_e_C5_Clutch	175	175	175	175	677	175	4,096
CeTRMR_e_C6_Clutch	95	95	95	95	95	170	95
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	195	4,096	4,096	4,096	4,096	4,096	195
CeTRMR_e_C2_Clutch	163	4,096	4,096	163	163	166	4,096
CeTRMR_e_C3_Clutch	180	4,096	180	4,096	180	859	4,096
CeTRMR_e_C4_Clutch	1,765	4,096	314	314	4,096	314	314
CeTRMR_e_C5_Clutch	175	4,096	175	677	175	4,096	677
CeTRMR_e_C6_Clutch	4,096	4,096	95	95	170	95	95
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	204	195	195	210	195	195	204
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	163	181	163	166
CeTRMR_e_C3_Cl utch	180	1,586	180	4,096	4,096	4,096	859
CeTRMR_e_C4_Clutch	4,096	314	1,765	4,096	314	1,765	4,096
CeTRMR_e_C5_Clutch	175	4,096	175	677	4,096	1,085	4,096
CeTRMR_e_C6_Clutch	170	95	4,096	170	95	4,096	462
CeTRMR_e_C7_Cl utch	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	204	195	195	4,096	195	195	204
CeTRMR_e_C2_Cl utch	163	163	163	163	4,096	163	163
CeTRMR_e_C3_Clutch	180	180	180	180	180	4,096	180
CeTRMR_e_C4_Clutch	4,096	314	314	314	314	314	4,096
CeTRMR_e_C5_Cl utch	175	175	175	175	175	677	175
CeTRMR_e_C6_Clutch	4,096	95	95	95	95	95	170
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_Cl utch	195	195	4,096	4,096	195	204	195
CeTRMR_e_C2_Cl utch	166	163	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	859	180	4,096	180	4,096	180	1,586

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

CeTRMR_e_C4_Clutch	314	1,765	4,096	314	314	4,096	314
CeTRMR_e_C5_Clutch	4,096	175	4,096	175	677	175	4,096
CeTRMR_e_C6_Clutch	95	4,096	4,096	95	95	170	95
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	195	210	195	195	204	204	195
CeTRMR_e_C2_Clutch	4,096	163	181	163	166	163	163
CeTRMR_e_C3_Clutch	180	4,096	4,096	4,096	859	180	180
CeTRMR_e_C4_Clutch	1,765	4,096	314	1,765	4,096	4,096	314
CeTRMR_e_C5_Clutch	175	677	4,096	1,085	4,096	175	175
CeTRMR_e_C6_Clutch	4,096	170	95	4,096	462	4,096	95
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	251	163
CeTRMR_e_C3_Clutch	180	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	314	314	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutch	175	4,096	4,096	677	677	4,096	1,085
CeTRMR_e_C6_Clutch	4,096	95	95	170	170	462	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	317	204	195	210	
CeTRMR_e_C2_Clutch	181	166	476	4,096	4,096	4,096	
CeTRMR_e_C3_Clutch	4,096	859	4,096	1,586	4,096	4,096	
CeTRMR_e_C4_Clutch	1,962	4,096	4,096	4,096	1,765	4,096	
CeTRMR_e_C5_Clutch	4,096	4,096	4,096	4,096	4,096	1,962	
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	
CeTRMR_e_C7_Cl utch	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
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.650	0.650	0.650	0.500	0.500

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	0.650	0.650	0.650	0.500	0.500

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_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionIlnknown	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 - 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	225.0	200.0	200.0	200.0	250.0	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	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - 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	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P187D P18E7 Park to Out Of Park Transition Delay

Description: Transition delay before fail timer can increment, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1	4.00	2.00	1.00	0.80	0.80

Initial Supporting table - P187E P18E8 Out Of Park to Park Min Line Transition Delay

Description: Transition delay before fail timer can increment for line pressure cut controlled transitions, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	4.80	2.40	1.20	1.20	1.20

Initial Supporting table - P187E P18E8 Out Of Park to Park Transition Delay

Description: Transition delay before fail timer can increment, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	2.40	1.20	0.60	0.60	0.60

Initial Supporting table - P18A1 P18AA P27EC Mode Valve High To Low Transition Delay

Description: Transition delay before fail timer can increment, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	1.60	0.80	0.25	0.07	0.07

Initial Supporting table - P18AA Mode Valve High To Low Min Line Transition Delay

Description: Transition delay before fail timer can increment for line pressure cut controlled transitions, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	4.70	2.00	0.80	0.43	0.26

Initial Supporting table - P18AB P27EC Mode Valve Low to High Transition Delay

Description: Transition delay before fail timer can increment, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	1.20	0.60	0.20	0.10	0.08

Initial Supporting table - P18AE Enable Valve Test Delay

Description: Time enable conditions must be met before fail timer can increment, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	0.50	0.30	0.16	0.08	0.08

Initial Supporting table - P18AE Max Crank Time

Description: Test Abort Crank Time

Value Units: Seconds
X Unit: Deg C

y/x	-40	-20	0	20	130
1	5	5	5	5	5

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	50	50	50	50	50	50

Initial Supporting table - P2818 TCC stuck on fail time garage shift - GR10

Description: GR10 P2818 TCC stuck on fail time garage shift

Value Units: seconds
X Unit: rate of change of engine speed, RPM/second
Y Units: unitless

y/x	50	100	150	250	300
1	0.250	0.200	0.125	0.100	0.100

Initial Supporting table - P2818 TCC stuck on fail time stall pending - GR10

Description: GR10 P2818 TCC stuck on fail time stall pending

Value Units: seconds
X Unit: rate of change of engine speed, RPM/second
Y Units: unitless

y/x	50	100	150	250	300
1	0.750	0.300	0.300	0.200	0.100

Initial Supporting table - P2820 GR10 hydraulic default at launch test window

Description:

Value Units: RPM/sec
X Unit: °C

y/x	-10	5	15	30	110
1	0	0	1	1	1

Initial Supporting table - P2820 GR10 hydraulic default input speed deceleration threshold

Description: Negative acceleration needed to increment fail timer for GR10 default disable solenoid stuck off at launch diagnostic

Value Units: RPM/sec
X Unit: °C

y/x	-10	5	15	30	110
1	-32,768	-32,768	-3,500	-2,000	-2,000

Initial Supporting table - Park Inhibit Solenoid Override Line Pressure

Description: Line pressure that is expected to be able to overcome the PISA and force the transmission into Park, looked up based on transmission fluid temperature

Value Units: kPa
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	2,000.00	2,000.00	2,000.00	2,000.00	2,000.00

Initial Supporting table - Pump Out Available Transition Time

Description: Delay before pump out available flag is set TRUE, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	0.05	0.02	0.02	0.02	0.02

Initial Supporting table - 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	1	1	1	

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	68	25
CeTGRR_e_Gear2	107	40
CeTGRR_e_Gear3	149	55
CeTGRR_e_Gear4	181	67
CeTGRR_e_Gear5	210	78
CeTGRR_e_Gear6	251	93
CeTGRR_e_Gear7	320	119
CeTGRR_e_Gear8	375	139
CeTGRR_e_Gear9	464	172
CeTGRR_e_Gear10	503	186

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 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 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 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 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 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 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 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 - 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 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 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 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 - 02 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 - 02 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 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 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 - 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 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 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 - 03 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 - 03 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 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 - 03 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 - 03 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 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 - 03 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 - 03 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 - 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 - 04 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 - 04 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 - 04 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 - 04 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 - 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 - 05 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 - 05 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 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 - 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 - 06 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 - 06 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 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 - 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	750	850	400	400	400

Initial Supporting table - Clutch Clip Press GS Shifts

Description: Oncoming clutch clip pressure for garage shifts

Value Units: kPa
X Unit: Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	450	750	850	400	400	400

Initial Supporting table - Clutch Clip Press NU Shifts

Description: Oncoming clutch clip pressure for negative torque up shifts

Value Units: kPa
X Unit: Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	450	450	450	600	450	450

Initial Supporting table - Clutch Clip Press 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 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 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 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 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 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 Fail Offset Time STGR Shifts

Description: Used for clutch staging shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Shift Type Enable

Description: Calibration to enable the clutch stuck on test for each shift type

X Unit: Shift Type
Y Units: Boolean

y/x	CeTSER_e_STGR	CeTSER_e_GSCR	CeTSER_e_NUCR	CeTSER_e_PUCR	CeTSER_e_CDCR	CeTSER_e_PDCR	CeTSER_e_CLAR
1	0	1	1	1	1	1	0

Initial Supporting table - Clutch Stuck On Shift Type Enable

Description: Calibration to enable the clutch stuck on test for each shift type

X Unit: Shift Type
Y Units: Boolean

y/x	CeTSER_e_STGR	CeTSER_e_GSCR	CeTSER_e_NUCR	CeTSER_e_PUCR	CeTSER_e_CDCR	CeTSER_e_PDCR	CeTSER_e_CLAR
1	0	1	1	1	1	1	0

Initial Supporting table - 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	195	195	4,096	195	195	204	195
CeTRMR_e_C2_Clutch	163	163	163	4,096	163	163	166
CeTRMR_e_C3_Clutch	180	180	180	180	4,096	180	859
CeTRMR_e_C4_Clutch	314	314	314	314	314	4,096	314
CeTRMR_e_C5_Clutch	175	175	175	175	677	175	4,096
CeTRMR_e_C6_Clutch	95	95	95	95	95	170	95
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	195	4,096	4,096	4,096	4,096	4,096	195
CeTRMR_e_C2_Clutch	163	4,096	4,096	163	163	166	4,096
CeTRMR_e_C3_Clutch	180	4,096	180	4,096	180	859	4,096
CeTRMR_e_C4_Clutch	1,765	4,096	314	314	4,096	314	314
CeTRMR_e_C5_Clutch	175	4,096	175	677	175	4,096	677
CeTRMR_e_C6_Clutch	4,096	4,096	95	95	170	95	95
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	204	195	195	210	195	195	204
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	163	181	163	166
CeTRMR_e_C3_Cl utch	180	1,586	180	4,096	4,096	4,096	859
CeTRMR_e_C4_Clutch	4,096	314	1,765	4,096	314	1,765	4,096
CeTRMR_e_C5_Clutch	175	4,096	175	677	4,096	1,085	4,096
CeTRMR_e_C6_Clutch	170	95	4,096	170	95	4,096	462
CeTRMR_e_C7_Cl utch	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	204	195	195	4,096	195	195	204
CeTRMR_e_C2_Cl utch	163	163	163	163	4,096	163	163
CeTRMR_e_C3_Clutch	180	180	180	180	180	4,096	180
CeTRMR_e_C4_Clutch	4,096	314	314	314	314	314	4,096
CeTRMR_e_C5_Cl utch	175	175	175	175	175	677	175
CeTRMR_e_C6_Clutch	4,096	95	95	95	95	95	170
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_Cl utch	195	195	4,096	4,096	195	204	195
CeTRMR_e_C2_Cl utch	166	163	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	859	180	4,096	180	4,096	180	1,586

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

CeTRMR_e_C4_Clutch	314	1,765	4,096	314	314	4,096	314
CeTRMR_e_C5_Clutch	4,096	175	4,096	175	677	175	4,096
CeTRMR_e_C6_Clutch	95	4,096	4,096	95	95	170	95
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_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_Clutch	195	210	195	195	204	204	195
CeTRMR_e_C2_Clutch	4,096	163	181	163	166	163	163
CeTRMR_e_C3_Clutch	180	4,096	4,096	4,096	859	180	180
CeTRMR_e_C4_Clutch	1,765	4,096	314	1,765	4,096	4,096	314
CeTRMR_e_C5_Clutch	175	677	4,096	1,085	4,096	175	175
CeTRMR_e_C6_Clutch	4,096	170	95	4,096	462	4,096	95
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	251	163
CeTRMR_e_C3_Clutch	180	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	314	314	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutch	175	4,096	4,096	677	677	4,096	1,085
CeTRMR_e_C6_Clutch	4,096	95	95	170	170	462	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	317	204	195	210	
CeTRMR_e_C2_Clutch	181	166	476	4,096	4,096	4,096	
CeTRMR_e_C3_Clutch	4,096	859	4,096	1,586	4,096	4,096	
CeTRMR_e_C4_Clutch	1,962	4,096	4,096	4,096	1,765	4,096	
CeTRMR_e_C5_Clutch	4,096	4,096	4,096	4,096	4,096	1,962	
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	
CeTRMR_e_C7_Cl utch	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	72	72	4,096	72	72	76	72
CeTRMR_e_C2_Clutch	61	61	61	4,096	61	61	61
CeTRMR_e_C3_Clutch	67	67	67	67	4,096	67	318
CeTRMR_e_C4_Clutch	116	116	116	116	116	4,096	116
CeTRMR_e_C5_Clutch	65	65	65	65	251	65	4,096
CeTRMR_e_C6_Clutch	35	35	35	35	35	63	35
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	72	4,096	4,096	4,096	4,096	4,096	72
CeTRMR_e_C2_Clutch	61	4,096	4,096	61	61	61	4,096
CeTRMR_e_C3_Clutch	67	4,096	67	4,096	67	318	4,096
CeTRMR_e_C4_Clutch	654	4,096	116	116	4,096	116	116
CeTRMR_e_C5_Clutch	65	4,096	65	251	65	4,096	251
CeTRMR_e_C6_Clutch	4,096	4,096	35	35	63	35	35
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	76	72	72	78	72	72	76
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	61	67	61	61
CeTRMR_e_C3_Cl utch	67	587	67	4,096	4,096	4,096	318
CeTRMR_e_C4_Clutch	4,096	116	654	4,096	116	654	4,096
CeTRMR_e_C5_Clutch	65	4,096	65	251	4,096	402	4,096
CeTRMR_e_C6_Clutch	63	35	4,096	63	35	4,096	171
CeTRMR_e_C7_Cl utch	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	76	72	72	4,096	72	72	76
CeTRMR_e_C2_Cl utch	61	61	61	61	4,096	61	61
CeTRMR_e_C3_Clutch	67	67	67	67	67	4,096	67
CeTRMR_e_C4_Clutch	4,096	116	116	116	116	116	4,096
CeTRMR_e_C5_Cl utch	65	65	65	65	65	251	65
CeTRMR_e_C6_Clutch	4,096	35	35	35	35	35	63
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_Cl utch	72	72	4,096	4,096	72	76	72
CeTRMR_e_C2_Cl utch	61	61	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	318	67	4,096	67	4,096	67	587

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

CeTRMR_e_C4_Clutch	116	654	4,096	116	116	4,096	116
CeTRMR_e_C5_Clutch	4,096	65	4,096	65	251	65	4,096
CeTRMR_e_C6_Clutch	35	4,096	4,096	35	35	63	35
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	72	78	72	72	76	76	72
CeTRMR_e_C2_Clutch	4,096	61	67	61	61	61	61
CeTRMR_e_C3_Clutch	67	4,096	4,096	4,096	318	67	67
CeTRMR_e_C4_Clutch	654	4,096	116	654	4,096	4,096	116
CeTRMR_e_C5_Clutch	65	251	4,096	402	4,096	65	65
CeTRMR_e_C6_Clutch	4,096	63	35	4,096	171	4,096	35
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	93	61
CeTRMR_e_C3_Clutch	67	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	116	116	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutch	65	4,096	4,096	251	251	4,096	402
CeTRMR_e_C6_Clutch	4,096	35	35	63	63	171	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	118	76	72	78	
CeTRMR_e_C2_Clutch	67	61	176	4,096	4,096	4,096	
CeTRMR_e_C3_Clutch	4,096	318	4,096	587	4,096	4,096	
CeTRMR_e_C4_Clutch	727	4,096	4,096	4,096	654	4,096	
CeTRMR_e_C5_Clutch	4,096	4,096	4,096	4,096	4,096	727	
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	
CeTRMR_e_C7_Cl utch	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_OutLock1	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_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 - P187D P18E7 Park to Out Of Park Transition Delay

Description: Transition delay before fail timer can increment, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1	4.00	2.00	1.00	0.80	0.80

Initial Supporting table - P187E P18E8 Out Of Park to Park Min Line Transition Delay

Description: Transition delay before fail timer can increment for line pressure cut controlled transitions, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	4.80	2.40	1.20	1.20	1.20

Initial Supporting table - P187E P18E8 Out Of Park to Park Transition Delay

Description: Transition delay before fail timer can increment, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	2.40	1.20	0.60	0.60	0.60

Initial Supporting table - P18A1 P18AA P27EC Mode Valve High To Low Transition Delay

Description: Transition delay before fail timer can increment, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	1.60	0.80	0.25	0.07	0.07

Initial Supporting table - P18AA Mode Valve High To Low Min Line Transition Delay

Description: Transition delay before fail timer can increment for line pressure cut controlled transitions, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	4.70	2.00	0.80	0.43	0.26

Initial Supporting table - P18AB P27EC Mode Valve Low to High Transition Delay

Description: Transition delay before fail timer can increment, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	1.20	0.60	0.20	0.10	0.08

Initial Supporting table - P18AE Enable Valve Test Delay

Description: Time enable conditions must be met before fail timer can increment, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	0.50	0.30	0.16	0.08	0.08

Initial Supporting table - P18AE Max Crank Time

Description: Test Abort Crank Time

Value Units: Seconds
X Unit: Deg C

y/x	-40	-20	0	20	130
1	5	5	5	5	5

Initial Supporting table - Park Inhibit Solenoid Override Line Pressure

Description: Line pressure that is expected to be able to overcome the PISA and force the transmission into Park, looked up based on transmission fluid temperature

Value Units: kPa
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	2,000.00	2,000.00	2,000.00	2,000.00	2,000.00

Initial Supporting table - Pump Out Available Transition Time

Description: Delay before pump out available flag is set TRUE, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	0.05	0.02	0.02	0.02	0.02

Initial Supporting table - 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	1	1	1	

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	68	25
CeTGRR_e_Gear2	107	40
CeTGRR_e_Gear3	149	55
CeTGRR_e_Gear4	181	67
CeTGRR_e_Gear5	210	78
CeTGRR_e_Gear6	251	93
CeTGRR_e_Gear7	320	119
CeTGRR_e_Gear8	375	139
CeTGRR_e_Gear9	464	172
CeTGRR_e_Gear10	503	186

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.650	0.650	0.650	0.500	0.500

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	225.0	200.0	200.0	200.0	250.0	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	50	50	50	50	50	50

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