

DIAGNOSTIC SUMMARY TABLES -- CGM (Initial DTCs)
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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Run/Start Position Circuit Stuck Low Detected	B2B0D	This monitoring checks if the hardwired Run/Crank analog signal matches the value of the Run/Crank Terminal Status message received from the ECM. This fault is set if the two signals do not match where the hardwired signal is set to INACTIVE while the serial data signal is set to ACTIVE.	Run/Crank Analog Signal State AND Run/Crank Terminal Status AND X OUT OF Y	<= 1.5V = ACTIVE = 80 = 100	ECM Timed Out	= FALSE	0.8 [Sec]	Type B 2 Trips
Ignition Switch Run/Start Position Circuit Stuck High Detected	B2BOE	This monitoring checks if the hardwired Run/Crank analog signal matches the value of the Run/Crank Terminal Status message received from the ECM. This fault is set if the two signals do not match where the hardwired signal is set to ACTIVE while the serial data signal is set to INACTIVE.	Run/Crank Analog Signal State AND Run/Crank Terminal Status AND X OUT OF Y	>=5.5V = INACTIVE = 80 = 100	ECM Timed Out	= FALSE	0.8 [Sec]	Type B 2 Trips
Bus-Off detected on the HS Primary bus (Bus A)	U2413	This fault is set if the HS Primary bus enters the Bus-Off state	Bus Off Event Occurred on HS Primary	= TRUE	Run/Crank Analog Signal State OR Comm Enable Hardware Line AND System Voltage	>= 5.5V >= 4.5V > 5.5V	25[usec] for pass 10[usec] for fail	Type B 2 Trips

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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal memory failure on the CGM Detected	B2B12	This monitoring checks whether a double bit ECCError has occurred in code flash or RAM. This fault is set if an ECCError has occurred.	ECCError Detected	= TRUE	Guarded Read Flag	= FALSE	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 whether the ALU in the microcontroller is functioning correctly by running an algorithm and checking the results against an expected value. If the result is incorrect the fault shall be set.	Test Result 1 AND Test Result 2	1=Expected Result 1 != Expected Result 2	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		

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Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Loss of Communication with the ECM Detected	U18D5	This monitoring shall check a supervised message from the ECM to check the communication status. If the CGM has not received the supervised message from the ECM for 2.5x of its periodic rate, a secondary counter shall be enabled and decremented. When the secondary timer reaches zero, this fault shall be set if the message still has not been received.	Supervised Message has not been received in 62.5[ms] THEN Secondary Timer (4 sec)	= TRUE - 0 sec	Run/Crank Analog Signal State AND System Voltage	>= 5.5V >= 7V	4.0625 [sec]	Type B 2 Trips
Loss of Communication with the TCM Detected	U18D7	This monitoring shall check a supervised message from the TCM to check the communication status. If the CGM has not received the supervised message from the TCM for 2.5x of its periodic rate, a secondary counter shall be enabled and decremented. When the secondary timer reaches zero, this fault shall be set if the message still has not been received.	Supervised Message has not been received in 2.5[sec] THEN Secondary Timer (4 sec)	= TRUE = 0 sec	Run/Crank Analog Signal State AND System Voltage	= ACTIVE >= 7V	6.5 [sec]	Type B 2 Trips

(Initial DTCs)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
CGM Ignition Switch Run/ Start Position Circuit Low	B2B0D	This DTC monitors for a CGM Ignition Switch Run/Start Position Circuit Low error as determined by the CGM	<p>A corresponding index within the CGM Diagnostic Status Message Signal indicates that the CGM Ignition Switch Run/Start Position Circuit Low DTC has set in the CGM.</p> <p>See CGM summary pages for more information.</p>		<p>General Enable Criteria:</p> <p>The corresponding index within the CGM Diagnostic Status Message Signal</p> <p>Central Gateway Module</p>	<p>is being received</p> <p>is present on the bus</p>	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

(Initial DTCs)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
CGM Ignition Switch Run/ Start Position Circuit High	B2B0E	This DTC monitors for a CGM Ignition Switch Run/Start Position Circuit High error as determined by the CGM	<p>A corresponding index within the CGM Diagnostic Status Message Signal indicates that the CGM Ignition Switch Run/Start Position Circuit High DTC has set in the CGM.</p> <p>See CGM summary pages for more information.</p>		<p>General Enable Criteria:</p> <p>The corresponding index within the CGM Diagnostic Status Message Signal</p> <p>Central Gateway Module</p>	<p>is being received</p> <p>is present on the bus</p>	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

(Initial DTCs)

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

(Initial DTCs)

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

(Initial DTCs)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Longitudinal Acceleration Sensor Performance	C0552	<p>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.</p> <p>Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.</p>	<p>ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal)</p> <p>update raw longitudinal acceleration signal fail time, 50 millisecond update rate</p> <p>update raw longitudinal acceleration signal region 1 fail time, 50 millisecond update rate</p>	> 0.5300 g	<p>battery voltage run crank voltage diagnostic monitor enable region 1 specific enable</p> <p>update raw lateral longitudinal acceleration signal stability 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)</p> <p>update region 1 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed</p>	<p>> 11.00 volts > 11.00 volts = 1 Boolean = 0 Boolean</p> <p>> 15.0 KPH < 0.5300 g = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th > 0.5300 g < 3.8500 g</p> <p>< 0.70 % > 80.0 Nm > 0.1500 g > 15.0 KPH < 200.0 KPH</p>	<p>raw longitudinal acceleration signal stability time > 10.0 seconds</p> <p>raw longitudinal acceleration signal fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate</p> <p>region 1 fail time > 75.0 seconds out of region 1 sample time > 120.0 seconds, 50 millisecond update rate</p>	Type C, No SVS "Emissions Neutral Diagnostic - Type C"

(Initial DTCs)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					ABS(raw longitudinal acceleration signal) update sample time 110073 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 stability 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 = 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	

(Initial DTCs)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					update region 2 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed ABS(raw longitudinal acceleration signal) update sample time U0073 fault active 110073 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 stability 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 diagnostic 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	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	

(Initial DTCs)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P07C0 fault active P07C0test fail this key on attained gear ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal) update region 3 sample time: brake pedal position engine torque ABS(TOSS vehicle speed acceleration) TOSS vehicle speed ABS(raw longitudinal acceleration signal) update sample time 110073 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		
			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	> 0.0000 g	battery voltage run crank voltage diagnostic monitor enable region 3 specific enable update raw lateral longitudinal acceleration signal stability 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	

(Initial DTCs)

[illegible]

(Initial DTCs)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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_VoltageDirec tProp = FALSE = FALSE	raw longitudinal acceleration signal stability time > 15.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	Type C, No SVS "Emissio ns Neutral Diagnost ic - Type C"

(Initial DTCs)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 110073 test fail this key on	> 11.00 volts > 11.00 volts = 1 Boolean = CeLATR_e_VoltageDirec tProp = 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, No SVS "Emissions Neutral Diagnostic - Type C"

(Initial DTCs)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Steering Wheel Angle Sensor Signal Message Counter Incorrect	C1211	This DTC monitors for an error in the Steering Wheel Angle Sensor Signal Message Counter.	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: Steering Wheel Angle ARC Steering Angle Sensor CSUM	 ≥8.00 counts out of ≥18.00 counts ≥8.00 counts out of ≥18.00 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	 ≥3,000.00 milliseconds ≥11.00 volts ≤18.00 volts	Steering Wheel Angle ARC samples every 10.00 milliseconds. Steering Angle Sensor CSUM samples every 10.00 milliseconds.	Type C, No SVS "Safety Emissions Neutral Diagnostic"

(Initial DTCs)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lateral Acceleration Sensor Circuit Low	C124F	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a short to ground or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	< -3.8500 g > -3.8500 g (< 0.5 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_VoltageDirec tProp = 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, No SVS "Emissio ns Neutral Diagnost ic - Type C"

(Initial DTCs)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lateral Acceleration Sensor Circuit High	C1250	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a short to power or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	> 3.8500 g < 3.8500 g (< 0.5 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 LI0073 test fail this key on	> 11.00 volts > 11.00 volts = 1 Boolean = CeLATR_e_VoltageDirec tProp = 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, No SVS "Emissio ns Neutral Diagnost ic - Type C"

(Initial DTCs)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lateral Acceleration Sensor Performance	C1251	<p>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.</p> <p>Emission neutral default state sets lateral acceleration signal = 0.0 g.</p>	<p>ABS(raw lateral acceleration signal) AND ABS(raw lateral acceleration signal)</p> <p>update raw lateral acceleration signal fail, 50 millisecond update rate</p>	<p>> 0.5300 g</p> <p>< 3.8500 g</p>	<p>battery voltage run crank voltage diagnostic monitor enable</p> <p>update raw lateral acceleration signal stability time: TOSS vehicle speed automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnotic 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</p> <p>ABS(raw lateral acceleration signal) update sample time</p> <p>LI0073 fault active U0073 test fail this key on DTCs not fault active</p>	<p>> 11.00 volts > 11.00 volts = 1 Boolean</p> <p>> 15.0 KPH = TRUE</p> <p>= TRUE = TRUE = FALSE</p> <p>= FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th</p> <p>< 0.5300 g</p> <p>= FALSE = FALSE VehicleSpeedSensor_FA</p>	<p>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</p>	<p>Type C, No SVS "Emissions Neutral Diagnostic - Type C"</p>

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Actuator Solenoid Circuit Open - Bank 1	P0010	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 Illum.
Intake Camshaft System Performance - Bank 1	P0011	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_CamPosErrorLimId)deg	Intake Cam Phsr Enable System Voltage Engine Running Power Take Off (PTO) active Desired cam position Desired AND Measured cam position Desired cam position variation No Active DTCs	= TRUE > 11.00 Volts = TRUE = FALSE > 0 deg > (P0011_CamPosErrorLimId1)deg AND < (CalculatedPerfMaxId) deg < 3.00 deg for (P0011_P05CC_StablePositionTimeId) seconds P0010 P2088 P2089	100.00 failures out of 125.00 samples 100 ms /sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Actuator Solenoid Circuit Open - Bank 1	P0013	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.	P0013 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 Illum.
Exhaust Camshaft System Performance - Bank 1	P0014	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.	(Exhaust cam Bank 1) Cam Position Error > (P0014_CamPosErrorLimEd)deg	Exhaust Cam Phsr Enable System Voltage Engine Running Power Take Off (PTO) active Desired cam position Desired AND Measured cam position Desired cam position variation No Active DTCs	= TRUE > 11.00 Volts = TRUE = FALSE > 0 deg > (P0014_CamPosErrorLimEd)deg AND < (CalculatedPerfMaxEcl) deg <3.00 deg for (P0014_P05CE_StablePositionTimeEd) seconds P0013 P2090 P2091	100.00 failures out of 125.00 samples 100 ms /sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 expected nominal cam position	≥ 4 cam edges < -7.1 Crank Degrees > 8.3 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser control indicates the phaser is 'parked' No Active DTCs: Time since last execution of a test IntCamECC_OilPresLow	Test is Enabled CrankSensor_FA P0340, P0341 > 1.0 sec $= \text{FALSE}$	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 Illum.
Crankshaft Position (CKP)- Camshaft Position (CMP) Correlation Bank 1 Sensor B	P0017	Detects cam to crank misalignment by monitoring if the cam sensor pulse for bank 1 sensor B 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 expected nominal cam position	 >= 4 cam edges < -8.4 Crank Degrees > 9.2 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser control indicates the phaser is 'parked' No Active DTCs: Time since last execution of a test ExhCamECC_OilPresLow	Test is Enabled CrankSensor_FA P0365, P0366 > 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

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 controlle rs P0031 may also set

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensor1	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 controlle rs P0030 may also set

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensor1	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 Illum.
Turbo/Super Charger Bypass Valve A Control Circuit	P0033	<p>Controller specific output driver circuit diagnostic, diagnosing the 'compressor recirculation valve 'A' actuator' low sided driver for an open circuit failure, when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.</p> <p>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.</p>	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	> 200 K Q impedance between output and controller ground	<p>Diagnostic enabled ***** Powertrain relay voltage ***** Engine does not crank Diagnostic system not disabled</p>	<p>True ***** ≥ 11.0Volts *****</p>	<p>10 failures out of 12 samples</p> <p>PWM CRV: 100ms / sample eCRV: 12.5ms / sample</p>	<p>Type A, 1 Trips</p> <p>Note: In certain controllers P0034 may also set turbo/super charger bypass valve control circuit low</p>

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Bypass Valve A Control Circuit Low	P0034	<p>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.</p> <p>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.</p>	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p> <p>In certain controllers this diagnosis runs only when the HWIO-output is driven by the application S/W.</p>	< 0.5 Q impedance between output and controller ground	<p>Diagnostic Enabled *****</p> <p>Powertrain relay voltage *****</p> <p>Engine does not crank</p> <p>Diagnostic system not disabled</p>	<p>True *****</p> <p>≥ 11.0Volts *****</p>	<p>10 failures out of 12 samples</p> <p>PWM CRV: 100ms / sample eCRV: 12.5ms / sample</p>	<p>Type A, 1 Trips Note: In certain controllers P0033 may also set turbo/super charger bypass balve control circuit</p>

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Bypass Valve A Control Circuit High	P0035	<p>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.</p> <p>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.</p>	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p> <p>In certain controllers this diagnosis runs only when the HWIO-output is driven by the application S/W.</p>	< 0.5 Q impedance between output and controller power.	<p>Diagnostic enabled 'KieKie'KieKie'K'KieKieKie'KieKie'KieKie'Kie'K'K'K'</p> <p>Powertrain relay voltage *****</p> <p>Engine does not crank Diagnostic system not disabled</p>	<p>True *****</p> <p>≥ 11.0Volts *****</p>	<p>10 failures out of 12 samples</p> <p>PWM CRV: 100ms / sample eCRV: 12.5ms / sample</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 controlle rs P0037 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 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 controlle rs P0036 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 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 Illum.
HO2S Heater Resistance Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0054	<p>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.</p> <p>This fault is set if the heater resistance is outside the expected range.</p>	Heater Resistance outside of the expected range of	5.8 < ohms < 12.5	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>Coolant - IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time</p>	<p>ECT_Sensor_FA P262B IAT_SensorFA < 8.0 °C > 28,800 seconds > -30.0 °C < 32.0 volts < 0.06 seconds</p>	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 Illum.
MAP / MAF / Throttle Position Correlation	P0068	Detect when MAP and MAF do not match estimated engine airflow as established by the TPS	<p>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</p> <p>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</p>	<p>Table, f(TPS). See supporting tables: P0068_Delta MAP Threshold f(TPS)</p> <p>Table, f(TPS). See supporting tables: P0068_Delta MAF Threshold f(TPS)</p> <p>Table, f(RPM). See supporting tables: P0068_Maximum MAF f(RPM)</p> <p>Table, f(Volts). See supporting tables: P0068_Maximum MAF f(Volts)</p>	<p>Engine Speed</p> <p>Run/Crank voltage</p>	<p>> 800 RPM</p> <p>> 6.41 Volts</p>	<p>Continuously fail MAP and MAF portions of diagnostic for 0.1875 s</p> <p>Continuous in MAIN processor</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Outside Air Temperature (OAT) Sensor Circuit Performance	P0071	<p>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.</p> <p>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.</p> <p>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.</p> <p>For applications that have ability to move without engaging the internal combustion</p>	<p>Engine Off:</p> <p>If IAT >= OAT: IAT - OAT</p> <p>If IAT < OAT: OAT - IAT</p> <p>If either of the following conditions are met, this diagnostic will pass:</p> <p>If IAT >= OAT: IAT - OAT</p> <p>If IAT < OAT: OAT - IAT</p>	<p>> 15.0 deg C</p> <p>> 15.0 deg C</p> <p><= 15.0 deg C</p> <p><= 15.0 deg C</p>	<p>Diagnostic is Enabled</p> <p>Time between current ignition cycle and the last time the engine was running</p> <p>Engine is not running</p> <p>Vehicle Speed</p> <p>Coolant Temperature - IAT</p> <p>IAT - Coolant Temperature</p> <p>OAT-to-IAT engine off equilibrium counter</p> <p>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</p> <p>No Active DTCs:</p>	<p>>= 28,800.0 seconds</p> <p>>= 15.5 MPH</p> <p>< 15.0 deg C</p> <p>< 15.0 deg C</p> <p>>= 300.0 counts</p> <p>VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA</p>	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 Illum.
		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.				EngineModeNotRunTimer Error		
		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.	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 airflow OAT-to-IAT engine running equilibrium counter The "OAT-to-IAT engine running equilibrium counter" is a counter that is incremented or decremented based on vehicle speed and engine air flow when the engine is running. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. The value that is added or subtracted to the counter every 100 msec is contained in table P0071: OAT Performance Drive Equilibrium Engine Running No Active DTCs:	>= 28,800.0 seconds >= 15.5 MPH >= 10.0 grams/second >= 300.0 counts	Executed every 100 msec until a pass or fail decision is made	
						VehicleSpeedSensor_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>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.</p> <p>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.</p> <p>While the "OAT-to-IAT engine running equilibrium counter" is counting, IAT and OAT are monitored for</p>				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 Illum.
		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 Illum.
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 Illum.
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	$\geq 427,757$ 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 Illum.
Outside Air Temperature (OAT) Sensor Intermittent In-Range	P0074	<p>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.</p> <p>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".</p> <p>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.</p>	<p>String Length</p> <p>Where:</p> <p>"String Length" = sum of "Diff" calculated over</p> <p>And where:</p> <p>"Diff" = ABS(current OAT reading - OAT reading from 100 milliseconds previous)</p>	<p>> 100 deg C</p> <p>10 consecutive OAT readings</p>	Diagnostic is Enabled		<p>4 failures out of 5 samples</p> <p>Each sample takes 1.0 seconds</p>	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

[illegible]

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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	<= 0.1 Amps between signal and controller ground	<p>Engine Speed</p> <p>Battery Voltage</p>	<p>>=50 RPM</p> <p>>=11 Volts</p> <p>Not in pump device control Enabled when a code clear is not active or not exiting device control</p>	<p>20 failures out of 40 samples 100 ms /sample Continuous</p>	Type A, 1 Trips

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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		ignition cycle if the enable conditions are met.	<p><u>Not Good Correlation, IAT3 in middle:</u></p> <p>Power Up IAT3 is between Power Up IAT and Power Up IAT2</p> <p>AND</p> <p>ABS(Power Up IAT - Power Up IAT2)</p> <p>AND</p> <p>ABS(Power Up IAT3 - Power Up IAT2) > ABS(Power Up IAT3 - Power Up IAT)</p>	> 25 deg C	<p>Diagnostic is Enabled</p> <p>Time between current ignition cycle and the last time the engine was running</p> <p>Powertrain Relay Voltage for a time</p> <p>No Active DTCs:</p> <p>LIN communications established with MAF</p>	<p>> 28,800 seconds</p> <p>>= 11.0 Volts</p> <p>>= 0.9 seconds</p> <p>PowertrainRelayFault ECT_SensorCkt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error</p>	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 Illum.
Intake Air Temperature Sensor Circuit 2 Low (applications with LIN MAF)	P0097	<p>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.</p> <p>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.</p>	IAT 2 Temperature	< -60 degrees C	<p>Diagnostic is Enabled</p> <p>Powertrain Relay Voltage for a time</p> <p>LIN communications established with MAF</p> <p>No Active DTCs:</p>	<p>>= 11.0 Volts >= 0.9 seconds</p> <p>PowertrainRelayFault</p>	<p>40 failures out of 50 samples</p> <p>1 sample every 100 msec</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 2 High (applications with LIN MAF)	P0098	<p>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.</p> <p>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.</p>	IAT 2 Temperature	> 150 degrees C	<p>Diagnostic is Enabled</p> <p>Powertrain Relay Voltage for a time</p> <p>LIN communications established with MAF</p> <p>No Active DTCs:</p>	<p>>= 11.0 Volts >= 0.9 seconds</p> <p>PowertrainRelayFault</p>	<p>40 failures out of 50 samples</p> <p>1 sample every 100 msec</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 2 Intermittent In-Range (applications with humidity)	P0099	<p>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.</p> <p>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.</p>	<p>String Length</p> <p>Where: "String Length" = sum of "Diff" calculated over</p> <p>And where: "Diff" = ABS(current IAT 2 reading - IAT 2 reading from 100 milliseconds previous)</p>	<p>> 100.00 deg C</p> <p>10 consecutive IAT 2 readings</p>	<p>Diagnostic is Enabled</p> <p>Powertrain Relay Voltage for a time</p> <p>No Active DTCs:</p> <p>LIN communications established with MAF</p>	<p>>= 11.0 Volts >= 0.9 seconds</p> <p>PowertrainRelayFault</p>	<p>4 failures out of 5 samples</p> <p>Each sample takes 1.0 seconds</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Pressure Start Diagnostic	P00C6	The DTC Diagnoses the high side fuel pressure during engine cranking.	<p>The ECM detects that the fuel pressure is not rising or has fallen beyond acceptable limits during engine cranking</p> <p>Pressure Rise Test: Sensed High Pressure Fuel Rail Pressure value</p> <p>Pressure Fall Test: Sensed High Pressure Fuel Rail Pressure value</p>	<p>< P00C6 - Minimum pressure in MPa that will exit High Pressure Start mode and allow fuel delivery (see Supporting Table)</p> <p><= P00C6 - Minimum acceptable value of fuel rail pressure after High Pressure Start (see Supporting Table)</p>	<p>High Pressure Rise Diagnostic During Start</p> <p>High Pressure Fall Diagnostic During Start</p> <p>Low side feed fuel pressure</p> <p>Engine Run Time Run/Crank Voltage Engine Coolant</p> <p>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.</p>	<p>Enabled</p> <p>Disabled</p> <p>>= 0 KPA</p> <p>< = 0 sec > 8 Volts -42 <= °C <= 132</p> <p>All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) 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</p>	<p>Pressure Rise Test: Crank Time >= P00C6 - High Pressure Pump Control Mode timeout (see Supporting Table) 6.25 ms per sample</p> <p>Pressure Fall Test: Injected cylinder events >= P00C6 - maximum acceptable counts of fuel rail pressure below KtFHPD_p_HPS_PressFallLoThresh after High Pressure Start (see Supporting Table)</p> <p>4 samples per engine rotation</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 Illum.
Intake Air Pressure Measurement System - Multiple Sensor Correlation (single turbo)	P00C7	<p>Detects an inconsistency between pressure sensors in the induction system in which a particular sensor cannot be identified as the failed sensor.</p> <p>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), Turbocharger Boost Pressure 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, Turbocharger Boost Pressure and BARO are compared to see if their values are similar.</p> <p>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</p>	<p>ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure)</p> <p>OR</p> <p>ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure)</p> <p>OR</p> <p>ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure)</p> <p>OR</p> <p>ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure)</p>	<p>> 10.0 kPa</p> <p><= 10.0 kPa</p> <p><= 10.0 kPa</p> <p><= 10.0 kPa</p> <p><= 10.0 kPa</p> <p>> 10.0 kPa</p> <p><= 10.0 kPa</p> <p><= 10.0 kPa</p> <p><= 10.0 kPa</p> <p>> 10.0 kPa</p> <p>> 10.0 kPa</p>	<p>Time between current ignition cycle and the last time the engine was running</p> <p>Engine is not rotating</p> <p>Manifold Pressure Manifold Pressure Baro Pressure Baro Pressure Turbocharger Boost Pressure Turbocharger Boost Pressure</p> <p>No Active DTCs:</p> <p>No Pending DTCs:</p> <p>Diagnostic is Enabled</p> <p>LIN communications established with MAF</p>	<p>> 10.0 seconds</p> <p>>= 50.0 kPa <= 115.0 kPa >= 50.0 kPa <= 115.0 kPa</p> <p>>= 50.0 kPa <= 115.0 kPa</p> <p>EngineModeNotRunTimer Error MAP_SnsrFA AAP_SnsrFA AAP2_SnsrFA AAP_LIN1_SnsrCktFA</p> <p>MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP AAP_LIN1_SnsrCktFP</p>	<p>4 failures out of 5 samples</p> <p>1 sample every 12.5 msec for applications without LIN MAF</p> <p>1 sample every 25 msec for applications with LIN MAF</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		of two of these three sensors reporting similar values and the failed sensor cannot be uniquely identified.	AND ABS(Turbocharger Boost Pressure - Baro Pressure)	> 10.0 kPa				
			Manifold Pressure OR Manifold Pressure OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost 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	> 10.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP2_SnsrCktFA AAP_LIN1_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP 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	
			Turbocharger Boost Pressure OR Turbocharger Boost Pressure OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure)	< 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:	> 10.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA 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	
			AN©-----					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			ABS(Turbocharger Boost Pressure - Baro Pressure)	> 10.0 kPa	No Pending DTCs: Diagnostic is Enabled LIN communications established with MAF	MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP AAP_LIN1_SnsrCktFP		
			Barometric Pressure OR Barometric Pressure OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost 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	> 10.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP2_SnsrCktFA AAP_LIN1_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP 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	

23OBDG03A Part2 ECM Summary Tables

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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 Illum.
Intake Air Temperature Sensor 3 Circuit Performance (applications with humidity sensor and manifold temperature sensor)	P00E9	<p>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.</p>	<p><u>Good Correlation Between IAT and IAT2:</u></p> <p>ABS(Power Up IAT - Power Up IAT2)</p> <p>AND</p> <p>ABS(Power Up IAT - Power Up IAT3)</p> <p>AND</p> <p>ABS(Power Up IAT2 - Power Up IAT3)</p>	<p><= 25 deg C</p> <p>> 25 deg C</p> <p>> 25 deg C</p>	<p>Diagnostic is Enabled</p> <p>Time between current ignition cycle and the last time the engine was running</p> <p>Powertrain Relay Voltage for a time</p> <p>(Engine Coolant Temp - Outside Ambient Temp)</p> <p>No Active DTCs:</p> <p>LIN communications established with MAF</p>	<p>> 28,800 seconds</p> <p>>= 11.0 Volts >= 0.9 seconds</p> <p><= 25.0 deg C</p> <p>PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error</p>	<p>Executes once at the beginning of each ignition cycle if enable conditions are met</p>	Type B, 2 Trips
		<p>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.</p> <p>This diagnostic is executed once per ignition cycle if the</p>	<p><u>Not Good Correlation, IAT in Middle:</u></p> <p>Power Up IAT is between Power Up IAT2 and Power Up IAT3</p> <p>AND</p> <p>ABS(Power Up IAT2 - Power Up IAT3)</p> <p>AND</p> <p>ABS(Power Up IAT - Power Up IAT3) > ABS(Power Up IAT - Power Up IAT2)</p>	<p>> 25 deg C</p>	<p>Diagnostic is Enabled</p> <p>Time between current ignition cycle and the last time the engine was running</p> <p>Powertrain Relay Voltage for a time</p> <p>No Active DTCs:</p>	<p>> 28,800 seconds</p> <p>>= 11.0 Volts >= 0.9 seconds</p> <p>PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error</p>	<p>Executes once at the beginning of each ignition cycle if enable conditions are met</p>	

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 Illum.
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	< 57.94 Ohms (-150 deg C)	Diagnostic is Enabled		40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	> 153,665 Ohms (~-60 deg C)	Diagnostic is Enabled		40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 3 Intermittent In-Range	POOEC	<p>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.</p> <p>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".</p> <p>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.</p>	<p>String Length</p> <p>Where: "String Length" = sum of "Diff" calculated over</p> <p>And where: "Diff" = ABS(current IAT 3 reading - IAT 3 reading from 100 milliseconds previous)</p>	<p>> 80.00 deg C</p> <p>10 consecutive IAT 3 readings</p>	Diagnostic is Enabled		<p>4 failures out of 5 samples</p> <p>Each sample takes 1.0 seconds</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Humidity Sensor Circuit Low (applications with LIN MAF)	P00F4	<p>Detects an erroneously 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.</p> <p>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.</p>	Relative Humidity	<= -6.25 %	<p>Diagnostic is Enabled</p> <p>Powertrain Relay Voltage for a time</p> <p>LIN communications established with MAF</p> <p>No Active DTCs:</p>	<p>>= 11.0 Volts >= 0.9 seconds</p> <p>PowertrainRelayFault</p>	<p>40 failures out of 50 samples</p> <p>1 sample every 100 msec</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Humidity Sensor Circuit High (applications with LIN MAF)	P00F5	<p>Detects an erroneously 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.</p> <p>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.</p>	Relative Humidity	>= 106.25 %	<p>Diagnostic is Enabled</p> <p>Powertrain Relay Voltage for a time</p> <p>LIN communications established with MAF</p> <p>No Active DTCs:</p>	<p>>= 11.0 Volts >= 0.9 seconds</p> <p>PowertrainRelayFault</p>	<p>40 failures out of 50 samples</p> <p>1 sample every 100 msec</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Humidity Sensor Circuit Intermittent	P00F6	<p>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.</p> <p>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".</p> <p>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.</p>	<p>String Length</p> <p>Where: "String Length" = sum of "Diff" calculated over</p> <p>And where: "Diff" = ABS(current Humidity reading - Humidity reading from 100 milliseconds previous)</p>	<p>> 80 %</p> <p>10 consecutive Humidity readings</p>	<p>Diagnostic is Enabled</p> <p>Powertrain Relay Voltage for a time</p> <p>No Active DTCs:</p> <p>LIN communications established with MAF</p>	<p>>= 11.0 Volts >= 0.9 seconds</p> <p>PowertrainRelayFault</p>	<p>4 failures out of 5 samples</p> <p>Each sample takes 1.0 seconds</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow System Performance (single turbo)	P0101	<p>Detects a performance failure in the Mass Air Flow (MAF) sensor, such as when a MAF value is stuck in range.</p> <p>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, Turbocharger Boost Pressure sensor and Throttle Position sensor (TPS).</p> <p>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</p>	<p>See table P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix for combinations of model failures that can set this DTC.</p> <p>MAF model fails when ABS(Measured Flow - Modeled Air Flow) Filtered</p> <p>MAPI model fails when ABS(Measured MAP - MAP Model 1) Filtered</p> <p>MAP2 model fails when ABS(Measured MAP - MAP Model 2) Filtered</p> <p>MAP3 model fails when ABS(Measured MAP - MAP Model 3) Filtered</p> <p>TIAP1 model fails when ABS(Measured TIAP - TIAP Model 1) Filtered</p> <p>TPS model fails when Filtered Throttle Model Error</p> <p>TIAP Correlation model fails when High Engine Air Flow is TRUE AND</p>	<p>>20.0 grams/sec</p> <p>> 23.0 kPa</p> <p>> 25.0 kPa</p> <p>> 25.0 kPa</p> <p>> 30.0 kPa</p> <p>> 175 kPa*(g/s)</p>	<p>Engine Speed Engine Speed</p> <p>(Coolant Temp OR OBD Coolant Enable Criteria</p> <p>(Coolant Temp OR OBD Max Coolant Achieved</p> <p>Intake Air Temp Intake Air Temp</p> <p>Powertrain Relay Voltage for a period of time</p> <p>Minimum total weight factor (all factors multiplied together)</p> <p>See Residual Weight Factor tables.</p>	<p>>= 400 RPM <= 6,100 RPM</p> <p>>= -9 Deg C</p> <p>= TRUE)</p> <p><= 130 Deg C</p> <p>= FALSE)</p> <p>>— -20 Deg C <= 125 Deg C</p> <p>>=9.1 Volts >= 0.2 Seconds</p> <p>>= 0.50</p> <p>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</p> <p>MAP Model 1 Error multiplied by</p>	<p>Continuous</p> <p>Calculation are performed every 12.5 msec</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		will fail.	<p>Measured TIAP - measured MAP - offset as a function of engine speed See table P0101, P0106, P0121, P0236, P1101: TIAP- MAP Correlation Offset</p> <p>OR</p> <p>Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table P0101, P0106, P0121, P0236, P1101: TIAP- Baro Correlation Offset</p> <p>TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time</p> <p>High Engine Air Flow is TRUE when Mass Air Flow</p> <p>-</p>	<p>> 30.0 kPa</p> <p>> 30.0 kPa</p> <p>> 1.0 seconds</p> <p>> 1.0 seconds</p> <p>> a threshold in gm/sec as a function of engine speed. See table</p>	No Active DTCs:	<p>P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM</p> <p>MAP Model 2 Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM</p> <p>MAP Model 3 Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM</p> <p>TIAP Model 1 Error multiplied by P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM</p> <p>Filtered Throttle Model Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM</p> <p>MAP_SensorCircuitFA EGRValvePerformance_F A MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC BoostPresSnsrCktFA</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>AND Manifold Pressure</p> <p>AND Filtered Mass Air Flow - Mass Air Flow</p> <p>Low Engine Air Flow is TRUE when Mass Air Flow</p> <p>AND Manifold Pressure</p> <p>AND Mass Air Flow - Filtered Mass Air Flow</p>	<p>P0101, P0106, P0121, P0236, P1101: TIAP- MAP Correlation Min Air Flow</p> <p>> a threshold in kPa as a function of engine speed. See table</p> <p>P0101, P0106, P0121, P0236, P1101: TIAP- MAP Correlation Min MAP</p> <p>< 1.3 gm/sec</p> <p>< a threshold in gm/sec as a function of engine speed. See table</p> <p>P0101, P0106, P0121, P0236, P1101: TIAP- Baro Correlation Max Air Flow</p> <p>< a threshold in kPa as a function of engine speed. See table</p> <p>P0101, P0106, P0121, P0236, P1101: TIAP- Baro Correlation Max MAP</p> <p>< 2.0 gm/sec</p>	<p>No Pending DTCs:</p> <p>Diagnostic is Enabled</p>	<p>AmbientAirDefault</p> <p>EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow Sensor Circuit Low Frequency (all MAF suppliers except for Continental)	P0102	<p>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.</p> <p>The MAF sensor monitors the temperature of a circuit in the airflow of the engine. The temperature of this circuit is related to the mass airflow across the sensor. The mass airflow 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.</p>	MAF Output	<= 450 Hertz (<= 0.03 gm/sec)	<p>Engine Run Time Engine Speed Powertrain Relay Voltage Above criteria present for a period of time</p> <p>Diagnostic is Enabled</p>	<p>> 0.0 seconds >= 300 RPM >=9.1 Volts >= 0.5 seconds</p>	<p>200 failures out of 250 samples</p> <p>1 sample every cylinder firing event</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow Sensor Circuit High Frequency (all MAF suppliers except for Continental)	P0103	<p>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.</p> <p>The MAF sensor monitors the temperature of a circuit in the airflow of the engine. The temperature of this circuit is related to the mass airflow across the sensor. The mass airflow 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.</p>	MAF Output	>= 14,500 Hertz (>=413.1 gm/sec)	<p>Engine Run Time Engine Speed Powertrain Relay Voltage Above criteria present for a period of time</p> <p>Diagnostic is Enabled</p>	<p>> 0.0 seconds >= 300 RPM >=9.1 Volts >= 0.5 seconds</p>	<p>200 failures out of 250 samples</p> <p>1 sample every cylinder firing event</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Performance (single turbo)	P0106	<p>Detects a performance failure in the Manifold Pressure (MAP) sensor, such as when a MAP value is stuck in range.</p> <p>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, Turbocharger Boost Pressure sensor and Throttle Position sensor (TPS).</p> <p>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</p>	<p>Engine Running:</p> <p>See table P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix for combinations of model failures that can set this DTC.</p> <p>MAF model fails when ABS(Measured Flow - Modeled Air Flow) Filtered</p> <p>MAP1 model fails when ABS(Measured MAP - MAP Model 1) Filtered</p> <p>MAP2 model fails when ABS(Measured MAP - MAP Model 2) Filtered</p> <p>MAP3 model fails when ABS(Measured MAP - MAP Model 3) Filtered</p> <p>TIAP1 model fails when ABS(Measured TIAP - TIAP Model 1) Filtered</p> <p>TPS model fails when Filtered Throttle Model Error</p> <p>TIAP Correlation model fails when</p> <p>High Engine Air Flow is</p>	<p>>20.0 grams/sec</p> <p>> 23.0 kPa</p> <p>> 25.0 kPa</p> <p>> 25.0 kPa</p> <p>> 30.0 kPa</p> <p>> 175 kPa*(g/s)</p>	<p>Engine Speed Engine Speed</p> <p>(Coolant Temp OR OBD Coolant Enable Criteria</p> <p>(Coolant Temp OR OBD Max Coolant Achieved</p> <p>Intake Air Temp Intake Air Temp</p> <p>Powertrain Relay Voltage for a period of time</p> <p>Minimum total weight factor (all factors multiplied together)</p> <p>See Residual Weight Factor tables.</p>	<p>>= 400 RPM <= 6,100 RPM</p> <p>>= -9 Deg C</p> <p>= TRUE)</p> <p><= 130 Deg C</p> <p>= FALSE)</p> <p>> -20 Deg C <= 125 Deg C</p> <p>>=9.1 Volts >= 0.2 Seconds</p> <p>>= 0.50</p> <p>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</p> <p>MAP Model 1 Error multiplied by</p>	<p>Continuous</p> <p>Calculation are performed every 12.5 msec</p>	<p>Type B, 2 Trips</p>

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		will fail.	<p>TRUE AND Measured TIAP - measured MAP - offset as a function of engine speed See table P0101, P0106, P0121, P0236, P1101: TIAP- MAP Correlation Offset</p> <p>OR</p> <p>Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table P0101, P0106, P0121, P0236, P1101: TIAP- Baro Correlation Offset</p> <p>TIAP Correlation is valid when</p> <p>High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time</p> <p>High Engine Air Flow is TRUE when Mass Air Flow</p>	<p>> 30.0 kPa</p> <p>> 30.0 kPa</p> <p>> 1.0 seconds</p> <p>> 1.0 seconds</p> <p>> a threshold in gm/sec as a function of engine speed See table</p>	No Active DTCs:	<p>P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM</p> <p>MAP Model 2 Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM</p> <p>MAP Model 3 Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM</p> <p>TIAP Model 1 Error multiplied by P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM</p> <p>Filtered Throttle Model Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM</p> <p>MAP_SensorCircuitFA EGRValvePerformance_F A MAFSensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTemoSensorFA</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>-</p> <p>AND Manifold Pressure</p> <p>AND Filtered Mass Air Flow - Mass Air Flow</p> <p>Low Engine Air Flow is TRUE when Mass Air Flow</p> <p>AND Manifold Pressure</p> <p>AND Mass Air Flow - Filtered Mass Air Flow</p>	<p>P0101, P0106, P0121, P0236, P1101: TIAP- MAP Correlation Min Air Flow</p> <p>> a threshold in kPa as a function of engine speed See table</p> <p>P0101, P0106, P0121, P0236, P1101: TIAP- MAP Correlation Min MAP</p> <p>< 1.3 gm/sec</p> <p>< a threshold in gm/sec as a function of engine speed See table</p> <p>P0101, P0106, P0121, P0236, P1101: TIAP- Baro Correlation Max Air Flow</p> <p>< a threshold in kPa as a function of engine speed See table</p> <p>P0101, P0106, P0121, P0236, P1101: TIAP- Baro Correlation Max MAP</p> <p>< 2.0 gm/sec</p>	<p>No Pending DTCs:</p> <p>Diagnostic is Enabled</p>	<p>TC_BoostPresSnsrCktFA AmbientAirDefault</p> <p>EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 7.5 kPa)	Diagnostic is Enabled		320 failures out of 400 samples 1 sample 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 Illum.
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	> 86.0 % of 5 Volt Range (This is equal to 372.0 kPa)	Diagnostic is Enabled		320 failures out of 400 samples 1 sample 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 Illum.
Intake Air Temperature Sensor Circuit Performance (applications with humidity sensor and manifold temperature sensor)	P0111	<p>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.</p>	<p><u>Good Correlation Between IAT2 and IAT3</u></p> <p>ABS(Power Up IAT - Power Up IAT2)</p> <p>AND</p> <p>ABS(Power Up IAT - Power Up IAT3)</p> <p>AND</p> <p>ABS(Power Up IAT2 - Power Up IAT3)</p>	<p>> 25 deg C</p> <p>> 25 deg C</p> <p><= 25 deg C</p>	<p>Diagnostic is Enabled</p> <p>Time between current ignition cycle and the last time the engine was running</p> <p>Powertrain Relay Voltage for a time</p> <p>No Active DTCs:</p> <p>LIN communications established with MAF</p>	<p>> 28,800 seconds</p> <p>>= 11.0 Volts >= 0.9 seconds</p> <p>PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error</p>	<p>Executes once at the beginning of each ignition cycle if enable conditions are met</p>	Type B, 2 Trips
		<p>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.</p> <p>This diagnostic is executed once per</p>	<p><u>Not Good Correlation, IAT2 in Middle:</u></p> <p>Power Up IAT2 is between Power Up IAT and Power Up IAT3</p> <p>AND</p> <p>ABS(Power Up IAT - Power Up IAT3)</p> <p>AND</p> <p>ABS(Power Up IAT2 - Power Up IAT) > ABS(Power Up IAT2 - Power Up IAT3)</p>	<p>> 25 deg C</p>	<p>Diagnostic is Enabled</p> <p>Time between current ignition cycle and the last time the engine was running</p> <p>Powertrain Relay Voltage for a time</p> <p>No Active DTCs:</p> <p>LIN communications established with MAF</p>	<p>> 28,800 seconds</p> <p>>= 11.0 Volts >= 0.9 seconds</p> <p>PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error</p>	<p>Executes once at the beginning of each ignition cycle if enable conditions are met</p>	

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		ignition cycle if the enable conditions are met.	<u>Not Good Correlation, IAT3 in Middle:</u> Power Up IAT3 is between Power Up IAT and Power Up IAT2 AND ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT3 - Power Up IAT) > ABS(Power Up IAT3 - Power Up IAT2)	> 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >=11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_SensorCkt_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 Illum.
Intake Air Temperature Sensor Circuit Low (applications with LIN MAF)	P0112	<p>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.</p> <p>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.</p>	IAT Temperature	< -60 degrees C	<p>Diagnostic is Enabled</p> <p>LIN Communications established with MAF</p>		<p>40 failures out of 50 samples</p> <p>1 sample every 100 msec</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit High (applications with LIN MAF)	P0113	<p>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.</p> <p>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.</p>	IAT Temperature	> 150 degrees C	<p>Diagnostic is Enabled</p> <p>LIN Communications established with MAF</p>		<p>40 failures out of 50 samples</p> <p>1 sample every 100 msec</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Intermittent In-Range	P0114	<p>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.</p> <p>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".</p> <p>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.</p>	<p>String Length</p> <p>Where: "String Length" = sum of "Diff" calculated over</p> <p>And where: "Diff" = ABS(current IAT reading - IAT reading from 100 milliseconds previous)</p>	<p>> 80.00 deg C</p> <p>10 consecutive IAT readings</p>	<p>Diagnostic is Enabled</p> <p>LIN communications established with MAF</p>		<p>4 failures out of 5 samples</p> <p>Each sample takes 1.0 seconds</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Sensor Performance (Non-ATM)	P0116	This DTC detects either a biased high or low ECT (Engine Coolant temperature) sensor. This is done by comparing the ECT sensor output to two other temperature sensor outputs after a soak condition.	<p>This sensor is compared to two other sensors for this diagnostic to function.</p> <p>This program uses a highly configurable sensor reading system.</p> <p>This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsrI</p> <p>Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsrI</p> <p>Temperature Sensor 2: CeEECR_e_NoUseAssg nmnt</p> <p>Temperature Sensor 3: CeEECR_e_NollseAssg nmnt</p> <p>Temperature Sensor 4: CeEECR_e_NollseAssg nmnt</p> <p>Temperature Sensor 5: CeEECR_e_NollseAssg nmnt</p> <p>The comparison sensors, temperature thresholds, and aux heater effects can be looked up by finding the location associated with the physical (Temperature)</p>		<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>Propulsion system Inactive timer error</p> <p>Sensor under diagnosis is not faulted</p> <p>Used comparison sensors are not currently faulted:</p> <ul style="list-style-type: none"> - BiasChkCylHdCIntSnsr - BiasChkBlockCIntSnsr - BiasChkEngInCIntSnsr - BiasChkEngOutCIntSnsr - BiasChkHtrCrInCIntSnsr - BiasChkHtrCrOutCInSnsr - BiasChkRadOutCIntSnsr - BiasChkBypInCIntSnsr - BiasChkEngMetalSnsr - BiasChkIntakeAirSnsr - BiasChkHumTmpSnsr - BiasChkManfldAirSnsr - BiasChkOutsideAirSnsr - BiasChkEngOilSnsr - BiasChk EGR UpStrmSn 	<p>OAT_PtEstFiltFA</p> <p>PSAR_PropSysInactiveCr s_FA</p> <p>= FALSE</p> <p>EECR_EngineOutlet_Ckt FA</p> <p>EECR_CylHeadCoolant_CktFA</p> <p>EECR_BlockCoolant_Ckt FA</p> <p>EECR_EngineInlet_CktFA</p> <p>EECR_EngineOutlet_Ckt FA</p> <p>EECR_HeaterCoreInlet_C ktFA</p> <p>EECR_HeaterCoreOutlet _CktFA</p> <p>EECR_RadiatorOutlet_Ck tFA</p> <p>EECR_BypassInlet_CktF A</p> <p>EECR_CylHeadMetal1_C ktFA</p> <p>IAT_SensorFA</p> <p>HumTempSnsrFA</p> <p>MnfdTempSensorFA</p> <p>OAT_AmbientSensorFA</p> <p>EngOilTempFA</p>	<p>1 failure to set DTC</p> <p>1 sec/ sample</p> <p>Once per valid cold start</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			sensor number. Auxiliary Radiator Outlet 1: CeEECR_e_NoPhysAssgnmnt Comparison sensor 1: CeEECR_e_BiasChkNoSelection Comparison sensor 2: CeEECR_e_BiasChkNoSelection Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterNoEffect Threshold A: Threshold B:	50.0 °C 15.0 °C	sr - BiasChk_EGR_DwnStmSnsr - BiasChk_EGR_LowPrsSnsr - BiasChkFuelSnsr Comparison sensors The following thresholds are based on the sensor under diagnosis Auxiliary Radiator Outlet 1: Propulsion Off Soak Time Ambient Air Temperature Auxiliary 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	EGRTempSensorIPSS_FA EGRTempSensorDNSS_FA LPE_TempSnsrFA HRTR_b_FuelSensor_FA_Bndl = Available >28,800 seconds >-9.0 °C >28,800 seconds >-9.0 °C >28,800 seconds >-9.0 °C >28,800 seconds >-9.0 °C >28,800 seconds >-9.0 °C		
			Auxiliary Radiator Outlet 2: CeEECR_e_NoPhysAssgnmnt Comparison sensor 1: CeEECR_e_BiasChkNoSelection Comparison sensor 2: CeEECR_e_BiasChkNoSelection Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterNoEffect Threshold A: Threshold B:	50.0 °C 15.0 °C	Comoarison sensor 1 & 2			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Engine Outlet: CeEECR_e_PhysSnsr1 Comparison sensor 1: CeEECR_e_BiasChkIntakeAirSnsr Comparison sensor 2: CeEECR_e_BiasChkOutsideAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B:	50.0 °C 20.0 °C	are not Aux Heat Detection Aux heat detection can only be enabled the following are met: No Active DTCs	= CeEECR_e_BiasChkNoSelection Same set as listed above and EngineModeNotRunTimerError EngineModeNotRunTimer_FA VehicleSpeedSensor_FA		
			Head Metal: CeEECR_e_NoPhysAssignment Comparison sensor 1: CeEECR_e_BiasChkNoSelection Comparison sensor 2: CeEECR_e_BiasChkNoSelection Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterNoEffect Threshold A: Threshold B:	50.0 °C 15.0 °C	At power-up a warm sensor and cool sensor are compared Warm sensor Cool sensor If the warm sensor is compared to the cool sensor Propulsion Off Soak Time Engine Off Soak Time Ambient Air Temperature There are 4 different types of aux heater detection for this application:	CeAEHR_e_BlkHtrEngOutputCntSnsr CeAEHR_e_BlkHtrOutsideAirSnsr >15.00 °C > 0 seconds >28,800 seconds >-9.00 °C		
			Radiator Outlet: CeEECR_e_NoPhysAssignment Comparison sensor 1:		2x2 signature Absolute Drog	Disabled Disabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			CeEECR_e_BiasChkNo Selection Comparison sensor 2: CeEECR_e_BiasChkNo Selection Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterNoEffect Threshold A: Threshold B:	25.00 °C 15.00 °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)	Enabled Disabled CeAEHR_e_BlkJHrCylHdClntSnsr CeAEHR_e_BlkJHrEngOutClntSnsr CeAEHR_e_BlkJHrOutsideAirSnsr CeAEHR_e_BlkJHrIntakeAirSnsr 5.0 °C 5.0 °C >10.0 °C		
			A failure will be reported if any of the following conditions are met. Evaluated in order:					
			1) This sensor is above both comparison sensors	>A °C				
			2) This sensor is below both comparison sensors	>A °C				
			3) This sensor is above both comparison sensors and an aux heat source has not been detected to cause this skew	>B °C				
			4) This sensor is below both comparison sensors and an aux heat source has not been detected to cause this skew	>B °C				
					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 Insufficient coolant flow is present for	CeAEHR_e_BlkJHrEngOutClntSnsr > 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 Illum.
					<p>A block heater is detected if a drop is</p> <p>IAT Drop Criteria:</p> <p>The sensor will be used as IAT for this method</p> <p>A block heater will be detected if:</p> <p>IAT has a drop of during a drive defined by: Drive time Vehicle speed</p> <p>Additional drive time is provided when vehicle speed drops below above threshold as follows</p> <p>This detection method will abort if the engine is off OR Engine runtime</p> <p>Temperature Derivative Criteria:</p> <p>Derivative will be monitored using</p> <p>Derivative will be monitored once coolant flow is AND Flow time is between AND either</p>	<p>>5.0 °C</p> <p>CeAEHR_e_BlkHtrManfl dAirSnsr</p> <p>>6.0 °C</p> <p>>400.0 seconds >24.0 kph</p> <p>0.5 times the seconds with vehicle speed below the threshold above</p> <p>> 180.0 seconds > 1,800 seconds</p> <p>CeAEHR_e_BlkHtrEngO utCIntSnsr</p> <p>> 0.00 L/min</p> <p>5.0 -15.0 seconds</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine runtime is OR Insufficient coolant flow is present for Derivative count will increment if derivative is If counts are a block heater is detected =====	< 75.0 seconds >300.0 seconds <-0.10°C/sec > 4 counts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 configurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr1 Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1 Temperature Sensor 2: CeEECR_e_NoUseAssg nmnt Temperature Sensor 3: CeEECR_e_NoUseAssg nmnt Temperature Sensor 4: CeEECR_e_NoUseAssg nmnt Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt	< 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 Illum.
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 configurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr1 Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1 Temperature Sensor 2: CeEECR_e_NoIseAssg nmnt Temperature Sensor 3: CeEECR_e_NoIseAssg nmnt Temperature Sensor 4: CeEECR_e_NoIseAssg nmnt Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt	> 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 Illum.
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.	<p>Temperature step change:</p> <p>1) positive step change is greater than calculated high limit</p> <p>OR</p> <p>2) negative step change is lower than calculated low limit.</p> <p>This program uses a highly configurable sensor reading system.</p> <p>This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsrI</p> <p>Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrI</p> <p>Temperature Sensor 2: CeEECR_e_NollseAssg nmnt</p> <p>Temperature Sensor 3: CeEECR_e_NollseAssg nmnt</p> <p>Temperature Sensor 4: CeEECR_e_NollseAssg nmnt</p> <p>Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt</p> <p>The calculated high and low limits for the next reading use the following calibrations:</p>		<p>Diagnostic is Enabled</p> <p>No Active DTC's</p>	ECT_Sensor_Ckt_FA EECR_EngineOut_Erratic _TFTKO	<p>5 seconds out of a 6 seconds window</p> <p>Continuously sampled</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 Illum.
			<p>calculated limits are 101 °C and 73 °C.</p> <p>The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid.</p> <p>*****</p>					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Throttle Position Sensor Performance (single turbo)	P0121	<p>Detects a performance failure in the Throttle Position sensor (TPS) sensor, such as when a TPS value is stuck in range.</p> <p>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, Turbocharger Boost Pressure sensor and Mass Air Flow (MAF) sensor.</p> <p>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</p>	<p>See table P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix for combinations of model failures that can set this DTC.</p> <p>MAF model fails when ABS(Measured Flow - Modeled Air Flow) Filtered</p> <p>MAPI model fails when ABS(Measured MAP - MAP Model 1) Filtered</p> <p>MAP2 model fails when ABS(Measured MAP - MAP Model 2) Filtered</p> <p>MAP3 model fails when ABS(Measured MAP - MAP Model 3) Filtered</p> <p>TIAP1 model fails when ABS(Measured TIAP - TIAP Model 1) Filtered</p> <p>TPS model fails when Filtered Throttle Model Error</p> <p>TIAP Correlation model fails when</p> <p>High Engine Air Flow is TRUE AND Measured TIAP -</p>	<p>>20.0 grams/sec</p> <p>> 23.0 kPa</p> <p>> 25.0 kPa</p> <p>> 25.0 kPa</p> <p>> 30.0 kPa</p> <p>> 175 kPa*(g/s)</p>	<p>Engine Speed Engine Speed</p> <p>(Coolant Temp OR OBD Coolant Enable Criteria</p> <p>(Coolant Temp OR OBD Max Coolant Achieved</p> <p>Intake Air Temp Intake Air Temp</p> <p>Powertrain Relay Voltage for a period of time</p> <p>Minimum total weight factor (all factors multiplied together)</p> <p>See Residual Weight Factor tables.</p>	<p>>= 400 RPM <= 6,100 RPM</p> <p>>= -9 Deg C</p> <p>= TRUE)</p> <p><= 130 Deg C</p> <p>= FALSE)</p> <p>> -20 Deg C <= 125 Deg C</p> <p>>=9.1 Volts >= 0.2 Seconds</p> <p>>= 0.50</p> <p>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</p> <p>MAP Model 1 Error multiplied by</p>	<p>Continuous</p> <p>Calculation are performed every 12.5 msec</p>	<p>Type A, 1 Trips</p>

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Performance diagnostic will fail.	<p>measured MAP - offset as a function of engine speed See table P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Offset</p> <p>OR</p> <p>Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Offset</p> <p>TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time</p> <p>High Engine Air Flow is TRUE when Mass Air Flow</p> <p>AND</p>	<p>> 30.0 kPa</p> <p>> 30.0 kPa</p> <p>> 1.0 seconds</p> <p>> 1.0 seconds</p> <p>> a threshold in gm sec as a function of engine speed See table P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow</p>	No Active DTCs:	<p>P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM</p> <p>MAP Model 2 Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM</p> <p>MAP Model 3 Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM</p> <p>TIAP Model 1 Error multiplied by P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM</p> <p>Filtered Throttle Model Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM</p> <p>MAP_SensorCircuitFA EGRValvePerformance_F A MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC BoostPresSnsrCktFA</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>Manifold Pressure</p> <p>> a threshold in kPa as a function of engine speed See table P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min MAP</p> <p>AND Filtered Mass Air Flow - Mass Air Flow</p> <p>< 1.3 gm/sec</p> <p>Low Engine Air Flow is TRUE when Mass Air Flow</p> <p>< a threshold in gm sec as a function of engine speed See table P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max Air Flow</p> <p>AND Manifold Pressure</p> <p>< a threshold in kPa as a function of engine speed See table P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max MAP</p> <p>AND Mass Air Flow - Filtered Mass Air Flow</p> <p>< 2.0 gm/sec</p>	<p>> a threshold in kPa as a function of engine speed See table P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min MAP</p> <p>< 1.3 gm/sec</p> <p>< a threshold in gm sec as a function of engine speed See table P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max Air Flow</p> <p>< a threshold in kPa as a function of engine speed See table P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max MAP</p> <p>< 2.0 gm/sec</p>	<p>No Pending DTCs:</p> <p>Diagnostic is Enabled</p>	<p>AmbientAirDefault</p> <p>EGRValve_FP</p> <p>ECT_Sensor_Ckt_FP</p> <p>IAT_SensorCircuitFP</p> <p>MnfdTempSensorCktFP</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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< (100% corresponds to 5.0 Volt)	6.50 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	>6.41 Volts 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 Illum.
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> (100% corresponds to 5.0 Volt)	95.00 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	>6.41 Volts P06A3	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 Illum.
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.	<p>Energy is accumulated after the first combustion event using Range 1, 2 or 3:</p> <p>If the maximum energy is greater than as shown in the supporting tables prior to the Engine outlet coolant achieving the target a fault will be indicated.</p> <p>Range 1 (Primary): Ambient air temperature is between 10.0 and 52.0 °C</p> <p>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 71.0° C</p> <p>Range 2 (Secondary): Ambient air temperature is between -9.0 and 10.0 °C</p> <p>Engine Outlet Coolant reaches the start to open temperature of the flow control device to the radiator (ie: thermostat) minus 20.0 °C. The target temperature for this range will not drop below 20.0 °</p>	<p>P0128 Maximum Accumulated Energy - Primary</p> <p>P0128 Maximum Accumulated Energy - Secondary</p>	<p>Diagnostic is Enabled</p> <p>No DTCs</p> <p>Engine soak time Engine run time Engine Outlet Coolant Temperature</p> <p>- Range 1: - Range 2: - Range 3:</p> <p>Devices in main cooling circuit are not in in device control</p> <p>If Engine RPM is continuously greater than for this time period</p> <p>Distance traveled</p>	<p>THMR_AWP_AuxPumpFA THMR_AHV_FA THMR_SWP_Co ntrol_FA THMR_SWP_FlowStuckOn_FA THMR_SWP_NoFlow_FA OAT_PtEstFiltFA VehicleSpeedSensor_FA EngineTorqueEstInaccuracy MAF_SensorFA ETHR_CoolantEnergyModel ETHR_RemedialActionLevel ETHR_RemedialActionLevel2 ETHR_RemedialActionLevel3 EECR_EngineOutlet_FA</p> <p>> 1,800.0 seconds 10.0-1,475.0 seconds</p> <p><53.6 °C <35.6 °C <35.6 °C</p> <p>9,999 rpm 5.0 seconds</p> <p>>1.0 km</p>	<p>1 failure to set DTC</p> <p>1 sec/ sample</p> <p>Once per ignition key cycle</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>C</p> <p>Range 3 (Tertiary): Ambient air temperature is between -9.0 and -9.0 °C</p> <p>Engine Outlet Coolant reaches the start to open temperature of the flow control device to the radiator (ie: thermostat) minus 20.0 °C. The target temperature for this range will not drop below 20.0 °C</p>	<p>P0128 Maximum Accumulated Energy - Tertiary</p> <p>This diagnostic models the net energy into and out of the cooling system during the warm-up process.</p> <p>The ten energy terms are: heat from combustion (with AFM correction), heat from after-run, heat loss to transmission oil, heat loss to environment, heat loss to cabin, heat loss to DFCO, heat loss to engine oil, heat loss to exhaust, and heat loss to autostop.</p>	<p>The diagnostic will abort if the temperature has dropped by after the customer has commanded the engine off</p>	>5.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Low Voltage Bank 1 Sensor 1 (WRAF & Gen4 ECM	P0131	<p>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).</p> <p>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.</p>	<p>B1S1 WRAF ASIC indicates a ground short to any of the following WRAF signals:</p> <p>A) Pump Current - short to ground fail counts are accumulated to determine fault status.</p> <p>B) Reference Cell Voltage - short to ground fail counts are accumulated to determine fault status.</p> <p>C) Reference Ground - short to ground fail counts are accumulated to determine fault status.</p> <p>D) Trim circuit - short to ground fail counts are accumulated to determine fault status.</p> <p><u>Note:</u> This ASIC is referred to asATIC142 (Continental).</p> <p><u>Note:</u> Aground short on the Pump Current or Reference Voltage signal may also set a P223C DTC.</p>	<p>The ASIC provides a fault indication when the pump current, reference cell or reference ground pin is < 150mV.</p> <p>Note: the faults must exist for previous 100 milli - seconds to qualify for a fail flag.</p> <p>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.</p>	<p>Diagnostic is Enabled</p> <p>B1S1 DTC's Not active this key cycle</p> <p>Measure Valid status (ASIC)</p> <p>Controller status (ASIC)</p> <p>Engine Run or Auto stop *****</p> <p>Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) *****</p>	<p>P0135, P0030, P0031 or P0032</p> <p>= Valid</p> <p>= Ready</p> <p>= True</p> <p>= Complete</p> <p>> 20.0 seconds</p>	<p>Signal A: 20 failures out of 24 samples</p> <p>OR</p> <p>Signal B: 20 failures out of 24 samples</p> <p>OR</p> <p>Signal C: 20 failures out of 24 samples</p> <p>OR</p> <p>Signal D: 20 failures out of 24 samples</p> <p>Continuous in 25 milli - second loop</p>	Type B, 2 Trips
			<p>B1S1 WRAF ASIC indicates a ground short to any of the following WRAF signals:</p>	<p>The ASIC provides a fault indication when the pump current, reference cell, reference ground or</p>	<p>Diagnostic is Enabled</p> <p>B1S1 DTC's Not active this key cycle</p>	<p>P0135, P0030, P0031 or P0032</p>	<p>Signal A: 20 failures out of 24 samples</p> <p>OR</p>	

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>A) Pump Current - short to ground fail counts are accumulated to determine fault status.</p> <p>B) Reference Cell Voltage - short to ground fail counts are accumulated to determine fault status.</p> <p>C) Reference Ground - short to ground fail counts are accumulated to determine fault status.</p> <p>D) Trim circuit - short to ground fail counts are accumulated to determine fault status.</p> <p><u>Note:</u> This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch).</p>	<p>trim circuit fails the following criteria;</p> <p> Nernst signal - 0.45 >1.0 volts</p> <p>OR</p> <p> Voltage drop over Rgnd - (internal current source *Rgnd) >0.5 volts</p> <p>OR</p> <p>CJ136 H/W detection</p> <p>Note: the faults must exist for previous 10 milli - seconds to qualify for a fail flag.</p> <p>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.</p>	<p>Measure Valid status (ASIC)</p> <p>Controller status (ASIC)</p> <p>Engine Run or Auto stop *****</p> <p>Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) *****</p>	<p>= Valid</p> <p>= Ready</p> <p>= True</p> <p>= Complete</p> <p>> 20.0 seconds</p>	<p>Signal B: 20 failures out of 24 samples</p> <p>OR</p> <p>Signal C: 20 failures out of 24 samples</p> <p>OR</p> <p>Signal D: 20 failures out of 24 samples</p> <p>Continuous in 25 milli - second loop</p>	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit High Voltage Bank 1 Sensor 1 (WRAF & Gen4 ECM	P0132	<p>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).</p> <p>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.</p>	<p>B1S1 WRAF ASIC indicates a short to power on any of the following WRAF signals:</p> <p>A) Pump Current - short to power fail counts are accumulated to determine fault status.</p> <p>B) Reference Cell Voltage - short to power fail counts are accumulated to determine fault status.</p> <p>C) Reference Ground - short to power fail counts are accumulated to determine fault status.</p> <p>D) Trim Circuit - short to power fail counts are accumulated to determine fault status</p> <p><u>Note:</u> This ASIC is referred to asATIC142 (Continental)..</p>	<p>The ASIC provides a fault indication when the pump current, reference cell, reference ground or trim circuit pin is > 5.2V.</p> <p>Note: the faults must exist for more than 100 msec to qualify for a fail flag.</p> <p>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.</p>	<p>Diagnostic is Enabled</p> <p>B1S1 DTC's Not active this key cycle</p> <p>Measure Valid Status (ASIC)</p> <p>Controller status (ASIC)</p> <p>Engine Run or Auto stop *****</p> <p>Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) *****</p>	<p>P0135, P0030, P0031 or P0032</p> <p>= Valid</p> <p>= Ready</p> <p>= True</p> <p>= Complete</p> <p>> 20.0 seconds</p>	<p>Signal A: 20 failures out of 24 samples</p> <p>OR</p> <p>Signal B: 20 failures out of 24 samples</p> <p>OR</p> <p>Signal C: 20 failures out of 24 samples</p> <p>OR</p> <p>Signal D: 20 failures out of 24 samples</p> <p>Frequency: Continuous in 25 milli - second loop</p>	Type B, 2 Trips

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>B1S1 WRAF ASIC indicates a short to power on any of the following WRAF signals:</p> <p>A) Pump Current - short to power fail counts are accumulated to determine fault status.</p> <p>B) Reference Cell Voltage - short to power fail counts are accumulated to determine fault status.</p> <p>C) Reference Ground - short to power fail counts are accumulated to determine fault status.</p> <p>D) Trim Circuit - short to power fail counts are accumulated to determine fault status</p> <p><u>Note:</u> This ASIC is referred to as CJ136 (next Gen of CJ135 from Bosch).</p>	<p>The ASIC provides a fault indication when the pump current, reference cell, reference ground or trim circuit pin fail the following criteria;</p> <p>CJ136 H/W detection</p> <p>Note: the faults must exist for more than 10 msec to qualify for a fail flag.</p> <p>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.</p>	<p>Diagnostic is Enabled</p> <p>B1S1 DTC's Not active this key cycle</p> <p>Measure Valid Status (ASIC)</p> <p>Controller status (ASIC)</p> <p>Engine Run or Auto stop *****</p> <p>Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) *****</p>	<p>P0135, P0030, P0031 or P0032</p> <p>= Valid</p> <p>= Ready</p> <p>= True</p> <p>= Complete</p> <p>> 20.0 seconds</p>	<p>Signal A: 20 failures out of 24 samples</p> <p>OR</p> <p>Signal B: 20 failures out of 24 samples</p> <p>OR</p> <p>Signal C: 20 failures out of 24 samples</p> <p>OR</p> <p>Signal D: 20 failures out of 24 samples</p> <p>Frequency: Continuous in 25 milli - second loop</p>	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Performance Bank 1 Sensor 1	P0135	<p>This DTC determines if the O2 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.</p> <p>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.</p>	Heater Current outside of the expected range of	$0.1 < \text{Amps} < 4.3$	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>System Voltage Heater Warm-up delay O2S Heater device control</p> <p>B1S1 O2S Heater Duty Cycle</p> <p>All of the above met for</p>	<p>ECT_Sensor_FA</p> <p>> 10.5 Volts = Complete</p> <p>= Not active</p> <p>> zero</p> <p>> 120 seconds</p>	<p>/failures out of 9 samples</p> <p>Frequency: 2 tests per trip 10 seconds delay between tests and 1 second execution rate</p>	Type B, 2 Trips

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Low Voltage Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0137	<p>This DTC determines if the O2 sensor signal circuit is shorted low. When enabled, the diagnostic monitors the O2S signal and compares it to the threshold.</p> <p>The diagnostic failure counter is incremented if the O2S signal is below the threshold value. This DTC is set based on the fail and sample counters.</p>	Oxygen Sensor Signal	< 40 mvolts	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>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</p> <p>Low Fuel Condition Only when FuelLevelDataFault</p> <p>Commanded Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active</p>	<p>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</p> <p>= Not active = Not active = Not active = Not active 10.5 < Volts = Not active = Not active = Not active = Not active</p> <p>= False = False</p> <p>0.991 < ratio <1.040 50 < mgrams < 500 = Closed Loop = TRUE (Please see “Closed Loop Enable”</p>	<p>320 failures out of 400 samples</p> <p>Frequency: Continuous in 100 milli-second loop</p>	Type B, 2 Trips

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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit High Voltage Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0138	<p>This DTC determines if the O2 sensor signal circuit is shorted high or open. When enabled, the diagnostic monitors the O2S signal and compares it to the threshold.</p> <p>The diagnostic failure counter is incremented if the O2S signal is above the threshold value. This DTC is set based on the fail and sample counters.</p>	Oxygen Sensor Signal	> 1,050 mvolts	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>System Voltage</p> <p>AFM Status</p> <p>Heater Warm-up delay</p> <p>Engine Run Time</p> <p>Engine Run Accum</p> <p>Low Fuel Condition</p> <p>Only when</p> <p>FuelLevelDataFault</p> <p>*****</p> <p>Secondary delay after above conditions are complete (cold start condition)</p> <p>Secondary delay after above conditions are complete (not cold start condition)</p> <p>Commanded Equivalence Ratio</p> <p>***** k-kk -k-k-k kkk kkk kkk</p> <p>All of the above met for</p>	<p>TPS_ThrottleAuthorityDefaulted</p> <p>MAF_SensorFA</p> <p>MAP_SensorFA</p> <p>EvapExcessPurgePsbl_FA</p> <p>FuelInjectorCircuit_FA</p> <p>Ethanol Composition Sensor FA</p> <p>AIR System FA</p> <p>10.5 < Volts</p> <p>= All Cylinders active</p> <p>= Complete</p> <p>> 5.0 seconds</p> <p>> 30.0 seconds</p> <p>= False</p> <p>= False</p> <p>*****</p> <p>> 130.0 seconds when engine soak time > 28,800 seconds</p> <p>> 130.0 seconds when engine soak time < 28,800 seconds</p> <p><1.040 EQR</p> <p>*****</p> <p>> 3.0 seconds</p>	<p>100 failures out of 125 samples</p> <p>Frequency: Continuous in 100 milli-second loop</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
02 Sensor Slow Response Rich to Lean Bank 1 Sensor 2	P013A	<p>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.</p> <p>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.</p> <p>Primary method: The P013A diagnostic measures the secondary 02 sensor voltage response rate</p>	<p>Primary Method: The EWMA of the Post 02 sensor normalized integral value. The EWMA repass limit is The EWMA calculation uses a 0.30 coefficient.</p> <p>OR</p> <p>Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)</p>	<p>> 8.0 units < 7.0 units</p> <p>> 45.0 grams (upper voltage threshold is 450 mvolts and lower voltage threshold is 150 mvolts)</p>	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>B1S2 DTC's Not Active this key cycle</p> <p>System Voltage Learned heater resistance</p> <p>Green O2S Condition</p>	<p>TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemBI_TFTK0 FuelTrimSystemB2_TFTK0 EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_1_TFTKO O2S_Bank_2_TFTKO</p> <p>P013B, P013E, P013F, P2270 or P2271</p> <p>>10.5 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 air flow is greater than Multiple DTC Use_Green Sensor Delay Criteria - Limit for the following locations: B1S2, B2S2 (if applicable)</p>	<p>Frequency: Once per trip Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.</p>	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>between an upper and lower voltage threshold. The response rate is then normalized to mass air flow rate and scaled resulting in a normalized integral value. The normalized integral is fed into a 1st order lag filter to update the final EWMA result. DTCP013A 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.</p> <p>Secondary method:</p>			<p>Low Fuel Condition Only when FuelLevelDataFault</p> <p>Post fuel cell</p> <p>Crankshaft Torque DTC's Passed</p> <p>After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).</p>	<p>in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 11.0 grams/sec.</p> <p>= False</p> <p>= False</p> <p>= Enabled, refer to Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests for additional info. <100.ONm</p> <p>P2270 (and P2272 if applicable) P013E (and P014A if applicable)</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		This fault is set if the secondary O2 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 Illum.
02 Sensor Slow Response Lean to Rich Bank 1 Sensor 2	P013B	<p>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.</p> <p>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.</p> <p>Primary method: The P013B diagnostic measures the secondary 02 sensor voltage response rate</p>	<p>Primary Method: The EWMA of the Post 02 sensor normalized integral value. The EWMA repass limit is The EWMA calculation uses a 0.30 coefficient.</p> <p>OR</p> <p>Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)</p>	<p>> 8.0 units < 7.0 units</p> <p>> 120 grams (lower voltage threshold is 350 mvolts and upper voltage threshold is 600 mvolts)</p>	<p>Diagnostic is Enabled</p> <p>No Active DTCs</p> <p>B1S2 DTCs Not Active this key cycle</p> <p>System Voltage Learned heater resistance</p> <p>Green O2S Condition</p>	<p>TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemBI_TFTK0 FuelTrimSystemB2_TFTK0 EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_1_TFTKO O2S_Bank_2_TFTKO</p> <p>P013A, P013E, P013F, P2270 or P2271</p> <p>>10.5 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs")</p> <p>= Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than Multiple DTC Use_Green Sensor Delay Criteria - Limit for the following locations:</p>	<p>Frequency: Once per trip Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.</p>	<p>Type A, 1 Trips EWMA</p>

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>between an lower and upper voltage threshold. The response rate is then normalized to mass air flow rate and scaled resulting in a normalized integral value. The normalized integral is fed into a 1st order lag filter to update the final EWMA result. DTCP013Bis set when the EWMA value exceeds the EWMA threshold.</p> <p>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.</p> <p>Secondary method:</p>			<p>Green Cat System Condition</p> <p>Low Fuel Condition Only when FuelLevelDataFault</p> <p>Post fuel cell</p> <p>DTC's Passed</p> <p>After above conditions are met: Fuel Enrich mode continued.</p>	<p>B1S2, B2S2 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 11.0 grams/sec.</p> <p>= Not Valid, Green Cat System condition is considered valid until accumulated airflow is greater than 360,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 11.0grams/sec.</p> <p>(Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).</p> <p>= False</p> <p>= False</p> <p>= Enabled, refer to Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests for additional info.</p> <p>P2270 P013E P013A P2271 P013F</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		This fault is set if the secondary O2 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: 0.960 < Base Commanded EQR < 1.080			
					During this test: Engine Airflow must stay below: and the delta Engine Airflow over 12.5msec must be :	85 gps < 15.0 gps		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
02 Sensor Delayed Response Rich to Lean Bank 1 Sensor 2	P013E	<p>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.</p> <p>This fault is set if the secondary 02 sensor does not achieve the required voltage before the accumulated mass airflow threshold is reached.</p>	<p>Post 02 sensor voltage</p> <p>AND</p> <p>The Accumulated mass airflow monitored during the Delayed Response Test under DFCO</p> <p>DFCO begins after: 1) Catalyst has been rich for a minimum of AND 2) Catalyst Rich Accumulation Air Flow is</p>	<p>> 450 mvolts</p> <p>> 66 grams</p> <p>> 2 secs</p> <p>> 12.0 grams</p>	<p>Diagnostic is Enabled</p> <p>No Active DTCs</p> <p>B1S2 DTCs Not Active this key cycle</p> <p>System Voltage Learned heater resistance</p> <p>Green 02S Condition</p>	<p>TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR_System FA FuelInjectorCircuit_FA FuelTrimSystemBI_TFTK0 FuelTrimSystemB2_TFTK0 EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_ 1_TFTK0 02S_Bank_ 2_TFTK0</p> <p>P013A, P013B, P013F, P2270 or P2271</p> <p>>10.5 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "H02S Heater Resistance DTCs")</p> <p>= 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:</p>	<p>Frequency: Once per trip Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_Rap idResponseActiv e = TRUE, multiple tests per trip are allowed.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Low Fuel Condition Only when FuelLevelDataFault Post fuel cell Crankshaft Torque DTC's Passed Number of fueled cylinders	B1S2, B2S2 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 11.0 grams/sec. = False = False = Enabled, refer to Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests for additional info. <100.ONm P2270 <2 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 Illum.
02 Sensor Delayed Response Lean to Rich Bank 1 Sensor 2	P013F	<p>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.</p> <p>This fault is set if the secondary 02 sensor does not achieve the required voltage before the accumulated mass airflow threshold is reached.</p>	<p>Post 02 sensor voltage</p> <p>AND</p> <p>The Accumulated mass airflow monitored during the Delayed Response Test</p>	<p>< 350 mvolts</p> <p>>425 grams</p>	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>B1S2 DTC's Not Active this key cycle</p> <p>System Voltage Learned heater resistance</p> <p>Green 02S Condition</p>	<p>TPS_ThrottleAuthorityDefaulted</p> <p>ECT_Sensor_FA</p> <p>IAT_SensorFA</p> <p>MAF_SensorFA</p> <p>MAP_SensorFA</p> <p>AIR System FA</p> <p>FuelInjectorCircuit_FA</p> <p>FuelTrimSystemBI_TFTK0</p> <p>FuelTrimSystemB2_TFTK0</p> <p>EngineMisfireDetected_FA</p> <p>Ethanol Composition Sensor FA</p> <p>02S_Bank_ 1_TFTK0</p> <p>02S_Bank_ 2_TFTK0</p> <p>P013A, P013B, P013E, P2270 or P2271</p> <p>>10.5 Volts</p> <p>= Valid (the heater resistance has learned since NVM reset, see enable conditions for "H02S Heater Resistance DTC's")</p> <p>= Not Valid,</p> <p>Green 02S condition is considered valid until the accumulated air flow is greater than</p> <p>Multiple DTC Use_Green Sensor Delay Criteria - Limit</p> <p>for the following locations:</p>	<p>Frequency: Once per trip</p> <p>Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>Green Cat System Condition</p> <p>Low Fuel Condition Only when FuelLevelDataFault</p> <p>Post fuel cell</p> <p>DTC's Passed</p> <p>Number of fueled cylinders</p> <p>After above conditions are met: Fuel Enrich mode</p>	<p>B1S2, B2S2 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 11.0 grams/sec.</p> <p>= Not Valid, Green Cat System condition is considered valid until accumulated airflow is greater than 360,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 11.0grams/sec. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).</p> <p>= False</p> <p>= False</p> <p>= Enabled, refer to Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests for additional info.</p> <p>P2270 P013E P013A P2271</p> <p>> 1 cylinders</p>		

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					entered.			
					During this test the following must stay TRUE or the test will abort: 0.960 < Base Commanded EQR < 1.080			
					During this test: Engine Airflow must stay below: and the delta Engine Airflow over 12.5msec must be :	85 gps < 15.0 gps		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Performance Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0141	<p>This DTC determines if the O2 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.</p> <p>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.</p>	Heater Current outside of the expected range of	0.2 > amps > 1.1	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>System Voltage</p> <p>Heater Warm-up delay</p> <p>O2S Heater device control</p> <p>B1S1 O2S Heater Duty Cycle</p> <p>All of the above met for</p>	<p>ECT_Sensor_FA</p> <p>>10.5 Volts</p> <p>= Complete</p> <p>= Not active</p> <p>> zero</p> <p>> 120 seconds</p>	<p>/failures out of 9 samples</p> <p>Frequency: 2 tests per trip</p> <p>10 seconds delay between tests and 1 second execution rate.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
02 Sensor Delayed Response Rich to Lean Bank 1 Sensor 1) (WRAF	P015A	<p>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.</p> <p>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.</p> <p><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,</p>	<p>Primary method: The EWMA of the Pre 02 sensor normalized R2L time delay value. The EWMA repass limit is The EWMA calculation uses a 0.26 coefficient. This method calculates the result when the WRAF 02 sensor measured EQR is</p> <p>OR</p> <p>Secondary Method: The Accumulated time monitored during the R2L Delayed Response Test.</p> <p>AND</p> <p>Pre WRAF 02 sensor measured EQR is</p>	<p>> 0.68 EWMA (sec) < 0.50 EWMA (sec)</p> <p>< 0.670 EQR</p> <p>> 2.5 Seconds</p> <p>> 0.300 EQR</p>	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control</p> <p>Low Fuel Condition Only when FuelLevelDataFault</p>	<p>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_TFTK0 FuelTrimSystemB2_TFTK0 EthanolCompositionSensor_FA EngineMisfireDetected_FA WRAF_Bank_1_FA P0131, P0132, P013A, P013B, P013E, P013F, P2270, P2271</p> <p>>10.5 Volts = Not active = Not active = Not active = Not active</p> <p>= False</p>	<p>Frequency: Once per trip Note: if NaESPD_b_Fast InitResplsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponsesActive = TRUE, multiple tests per trip are allowed</p>	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>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.</p> <p>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.</p> <p><u>Secondary method:</u> This fault is set if the primary WRAF 02 sensor does not achieve the required lower measured EQR</p>			<p>Green 02S Condition</p> <p>02 Heater (pre sensor) on for</p> <p>Engine Coolant (Or OBD Coolant Enable Criteria</p> <p>IAT Engine run Accum</p> <p>Engine Speed to initially enable test</p> <p>Engine Speed range to keep test enabled (after initially enabled)</p> <p>Engine Airflow Vehicle Speed to initially enable test</p> <p>Vehicle Speed range to keep test enabled (after initially enabled)</p> <p>Closed loop integral Closed Loop Active</p>	<p>= False</p> <p>= Not Valid, Green 02S condition is considered valid until the accumulated air flow is greater than</p> <p>Multiple DTC Use_Green Sensor Delay Criteria - Limit</p> <p>for the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 11.0 grams/sec.</p> <p>> 30 seconds</p> <p>> 55 °C</p> <p>= TRUE)</p> <p>> -40 °C</p> <p>> 30 seconds</p> <p>1,100 < RPM < 3,200</p> <p>1,200 < RPM < 3,350</p> <p>2.0 < gps < 10.0</p> <p>40.4 < MPH < 80.8</p> <p>37.3 < MPH < 83.9</p> <p>0.74 < C/L Int < 1.08</p> <p>= TRUE</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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	(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). > 70kpa = 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 EQRB1S1 at end of Cat Rich stage Fuel State Number of fueled cylinders	> 1.100EQR = DFCO active < 3 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 Illum.
02 Sensor Delayed Response Lean to Rich Bank 1 Sensor 1) (WRAF	P015B	<p>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.</p> <p>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.</p> <p><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</p>	<p>Primary method: The EWMA of the Pre 02 sensor normalized L2R time delay value. The EWMA repass limit is The EWMA calculation uses a 0.26 coefficient.</p> <p>OR</p> <p>Secondary method: The Accumulated time monitored during the L2R Delayed Response Test.</p> <p>AND</p> <p>Pre WRAF 02 sensor measured EQR is</p> <p>OR</p> <p>At end of Cat Rich stage the Pre WRAF 02 sensor measured EQR is</p>	<p>> 0.68 EWMA (sec) < 0.50 EWMA (sec)</p> <p>> 4.0 Seconds</p> <p>< 1.000 EQR</p> <p>< 1.100EQR</p>	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>P015Atest is complete and</p> <p>System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control</p> <p>Low Fuel Condition</p>	<p>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_TFTK0 FuelTrimSystemB2_TFTK0 EthanolCompositionSensor_FA EngineMisfireDetected_FA WRAF_Bank_1_FA P0131, P0132, P013A, P013B, P013E, P013F, P015A, P2270, P2271</p> <p>= Passed</p> <p>>10.5 Volts = Not active = Not active = Not active = Not active</p>	<p>Frequency: Once per trip Note: if NaESPD_b_FastInitResplsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponsesActive = TRUE, multiple tests per trip are allowed</p>	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>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.</p> <p><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 delavtime threshold is</p>			<p>Only when FuelLevelDataFault</p> <p>Green 02S Condition</p> <p>02 Heater (pre sensor) on for</p> <p>Engine Coolant (Or OBD Coolant Enable Criteria</p> <p>IAT Engine run Accum</p> <p>Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled)</p> <p>Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled)</p>	<p>= False</p> <p>= False</p> <p>= 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 11.0 grams/sec.</p> <p>> 30 seconds > 55 °C</p> <p>= TRUE) > -40 °C > 30 seconds</p> <p>1,100 < RPM < 3,200</p> <p>1,200 < RPM < 3,350</p> <p>2.0 < gps < 10.0</p> <p>40.4 < MPH < 80.8</p> <p>37.3 < MPH < 83.9</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		reached.			<p>Closed loop integral Closed Loop Active</p> <p>Evap</p> <p>Ethanol Estimation in Progress</p> <p>Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on time</p> <p>Predicted Catalyst temp Fuel State Number of fueled cylinders</p> <p>When above conditions are met: Fuel Enrich mode is entered.</p> <p>During this test: Engine Airflow must stay between: and the delta Engine Airflow over 12.5msec must be :</p>	<p>0.74 < C/L Int < 1.08 = TRUE (Please see “Closed Loop Enable Clarification” in Supporting Tables).</p> <p>not in control of purge = Not Active (Please see “Ethanol Estimation in Progress” in Supporting Tables).</p> <p>> 70kpa = enabled = not active</p> <p>= not active</p> <p>> 60.0 sec</p> <p>550 < °C < 900 = DFCO inhibit</p> <p>> 1 cylinders</p> <p>0 < gps < 50</p> <p>< 15.0 gps</p>		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel System Too Lean Bank 1	P0171	<p>Determines if the primary fuel control system for Bank 1 is in a lean condition, based on the filtered long-term purge-on, long term purge-off 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 therefore values > 1.0 indicates a Lean condition.</p> <p>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.</p>	<p>The filtered, adjusted for purge flow, long-term fuel trim metric, OR the filtered, non-adjusted purge-on long-term fuel trim metric</p> <p>AND</p> <p>The filtered short-term fuel trim metric (Note: any value below 0.95 effectively nullifies the short-term fuel trim criteria)</p> <p>If a fault has been detected the filtered, adjusted for purge flow, long-term fuel trim metric, AND the filtered, non-adjusted purge on long-term fuel trim metric</p> <p>AND</p> <p>The filtered short-term fuel trim metric to repass the diagnostic.</p>	<p>>= 1.370</p> <p>>= 1.370</p> <p>>= 0.102</p> <p>< 1.320</p> <p>< 1.250</p> <p>< 2.000</p>	<p>The primary fuel trim diagnostic is enabled</p> <p>Engine speed BARO Coolant Temp</p> <p>Coolant Temp MAP Inlet Air Temp MAF Fuel Level</p> <p>Long Term Fuel Trim data accumulation:</p> <p>Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control and/or diagnosis</p>	<p>400 <rpm< 6,100 > 70 kPa >-20 °C (or OBD Coolant Enable Criteria = TRUE) < 150 °C 5 <kPa< 255 -20 <°C< 150 1 <g/s< 990 > 10 % or if fuel sender is faulty the diagnostic will bypass the fuel level criteria.</p> <p>> 27.00 seconds of data must accumulate on each trip, with at least 15.00 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 adjustment to Minimum accumulation time.</p> <p>(Please see P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage in Supporting Tables for a list of cells utilized for diagnosis)</p>	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 Illum.
					<p>Closed Loop Long Term FT</p> <p>EGR Diag. Catalyst Diag. Post 02 Diag. Device Control EVAP Diag.</p> <p>Delay during GPF Regeneration</p> <p>Standard startup delays are re-initialized following completion of GPF Regen to allow system stabilization. (See "Long Term Fuel Trim data accumulation" above.)</p> <p>No active DTC:</p>	<p>Enabled Enabled (Please see "Closed Loop Enable Clarification" and "Long Term FT Enable Criteria" and "Long Term Fuel Trim Enable Criteria" in Supporting Tables.)</p> <p>Intrusive Test Not Active Intrusive Test Not Active Intrusive Test Not Active Not Active Large Leak Diagnostic (P0455) Not Active</p> <p>No Delay</p> <p>IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAFSensorTFTKO AIR_System FA EvapExcessPurgePsbl_F A</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_F A EGRValvePerformance_F A EGRValveCircuit_FA MAP_EngineVacuumStat us AmbPresDfltStatus TC_BoostPresSnsrFA O2S_Bank_1_Sensor_1_ FA		

[illegible]

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>term fuel trim metric is only monitored on programs that have acceptable emissions when the long-term fuel metric reaches its full authority.</p> <p>Once purge is enabled if the filtered Purge Long Term Fuel Trim metric > 0.720 , 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 <= 0.720 , 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 <= 0.705 the fault will set.</p> <p>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</p>		term fuel trim metric must be > 0.000 to repass the diagnostic. The intrusive test will be enabled at long-term fuel metric values < 0.77 until the diagnostic repasses after a failure.		If the accumulated purge volume is > 1,000.0 grams, the intrusive test will not be inhibited even if Purge Vapor Fuel is > 20.0 %.	time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge Long Term Fuel Trim metric > 0.720 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 Illum.
		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 Illum.
SENT Fuel Rail Temperature Sensor 1 Circuit Low Fault	P0182	<p>This DTC diagnose SENT fuel rail temperature sensor 1 that is too low out of range.</p> <p>If the sensor digital value (representing the reference 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.</p>	Fuel Temperature Sensor 1 SENT digital read value	< 145	<p>Fuel Temperature Out of Range Diagnostic Enabled</p> <p>No Fault Active on</p> <p>No Fault Pending on</p>	<p>True</p> <p>Enabled when a code clear is not active or not exiting device control</p> <p>SENT Communication Fault Active (U0625, U101B, U0670, U0671)</p> <p>SENT Internal Error Fault Active (P126E)</p> <p>Fuel Temperature Sensor SENT Message Error Fault Active (P128C)</p> <p>SENT Internal Error Fault Pending (P126E)</p> <p>Fuel Temperature Sensor SENT Message Error Fault Pending (P128C)</p>	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 Illum.
SENT Fuel Rail Temperature Sensor 1 Circuit High Fault	P0183	<p>This DTC diagnose SENT fuel rail temperature sensor 1 that is too high out of range.</p> <p>If the sensor digital value (representing the reference 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.</p>	Fuel Temperature Sensor 1 SENT digital read value	> 1,585	<p>Fuel Temperature Out of Range Diagnostic Enabled</p> <p>No Fault Active on</p> <p>No Fault Pending</p>	<p>True</p> <p>Enabled when a code clear is not active or not exiting device control</p> <p>SENT Communication Fault Active (U0625, U101B, U0670, U0671)</p> <p>SENT Internal Error Fault Active (P126E)</p> <p>Fuel Temperature Sensor SENT Message Error Fault Active (P128C)</p> <p>SENT Internal Error Fault Pending (P126E)</p> <p>Fuel Temperature Sensor SENT Message Error Fault Pending (P128C)</p>	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 Illum.
SENT Fuel Rail Temperature Sensor 2 Circuit Low Fault	P0187	<p>This DTC diagnose SENT fuel rail temperature sensor 2 that is too low out of range.</p> <p>If the sensor digital value (representing the reference 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.</p>	Fuel Temperature Sensor 1 SENT digital read value	< 145.00	<p>Fuel Temperature Out of Range Diagnostic Enabled</p> <p>No Fault Active on</p> <p>No Fault Pending</p>	<p>True</p> <p>Enabled when a code clear is not active or not exiting device control</p> <p>SENT Communication Fault Active (U0625, U101B, U0670, U0671)</p> <p>SENT Internal Error Fault Active (P126F)</p> <p>Fuel Temperature Sensor SENT Message Error Fault Active (P128D)</p> <p>SENT Internal Error Fault Pending (P126F)</p> <p>Fuel Temperature Sensor SENT Message Error Fault Pending (P128D)</p>	<p>50.00 failures out of 62.00 samples 100 ms per Sample Continuous</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Temperature Sensor 2 Circuit High Fault	P0188	<p>This DTC diagnose SENT fuel rail temperature sensor 2 that is too high out of range.</p> <p>If the sensor digital value (representing the reference 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.</p>	Fuel Temperature Sensor 1 SENT digital read value	> 1,585.00	<p>Fuel Temperature Out of Range Diagnostic Enabled</p> <p>No Fault Active on</p> <p>No Fault Pending</p>	<p>True</p> <p>Enabled when a code clear is not active or not exiting device control</p> <p>SENT Communication Fault Active (U0625, U101B, U0670, U0671) SENT Internal Error Fault Active (P126F)</p> <p>Fuel Temperature Sensor SENT Message Error Fault Active (P128D)</p> <p>SENT Internal Error Fault Pending (P126F)</p> <p>Fuel Temperature Sensor SENT Message Error Fault Pending (P128D)</p>	<p>50.00 failures out of 62.00 samples 100 ms per Sample Continuous</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Sensor "B" Circuit Range/ Performance	P018B	<p>This DTC detects a fuel pressure sensor response stuck within the normal operating range using an intrusive test (as follows)</p> <p>a] Intrusive Test Trigger: 1] Fuel Pump Duty Cycle Clamped Time (min or max duty cycle) >= 5 sec</p> <p>Or 2] Fuel Pres Err Variance <= calibration value KeFDBR_cmp_FPSS_MinPres</p> <p>Variance ; Otherwise, Report status as Pass</p> <p>b] Intrusive test freq limit: 60 sec between intrusive tests that pass,</p> <p>c] Intrusive test Fuel Flow limit: Fuel Flow Actual < Max allowed Fuel Flow rate</p>	<p>Sensed fuel pressure change</p> <p>[absolute value, during intrusive test]</p>	>= 30.00 kPa	<p>a) Diagnostic is ..</p> <p>b) Timer Engine Running</p> <p>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 [DTCP12A6] c6) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255] c7) Fuel Pump Speed Fault Active [DTCP129F] c8) CAN Sensor Bus message \$0C3 Comm Fault [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</p>	<p>a) ENABLED</p> <p>b) >= 5.00 seconds</p> <p>c1) == TRUE c2) == False</p> <p>c3) == False</p> <p>c4) == False</p> <p>c5) == False</p> <p>c6) == False</p> <p>c7) == False</p> <p>c8) == False</p> <p>c9) == False</p> <p>c10) == False</p> <p>c11) == CeFDBR_e_WiredTo_FT ZM c12) == TRUE</p> <p>d) == False</p> <p>e) == TRUE f) == Normal Control OR == Fuel Pres Sensor Stuck Control g) >= 0.05 gm/sec</p>	<p>1 sample / 12.5 millisec</p> <p>Intrusive Test Duration:</p> <p>Fuel Flow - related (5 to 12 sec)</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 Illum.
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_FT ZM == 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_FT ZM == WiredTo FTZM Else see Case1 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 Illum.
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_FT ZM == 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_FT ZM == 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 Illum.
SENTSID1 High Pressure Sensor Performance	P0191	The DTC determines if there is a skewed control fuel rail sensor (Sensor1) via a comparison to diagnostic sensor (sensor2) continuously when the engine is running and the commanded pressure is steady.	<p>Primary sensor (P1) vs. Secondary sensor (P2) performance rationality</p> <p>((Low Limit fail Filtered Fuel Control Error)</p> <p>OR</p> <p>(High Limit Fail: Filtered Fuel Control Error))</p> <p>AND</p> <p>(Filtered Absolute delta between sensor1 and sensor2</p>	<p>\leq</p> <p>P0191 - Low fail limit of fuel control due to pressure sensor skewed low (See supporting table)</p> <p>\geq</p> <p>P0191 - High fail limit of fuel control due to high pressure sensor skewed High (see Supporting table)</p> <p>$\geq 1.00\text{mpa}$</p> <p>Note: fuel control error is calculated based on the square root of sensor1 divided by sensor2, this value is filter to ensure proper failure detection.</p> <p>Absolute delta between sensor1 and sensor2 value is filter to ensure proper failure detection.</p>	<p>Commanded Pressure rate of change (increasing or decreasing)</p> <p>for a period of time</p>	<p>$<0.70\text{ mpa}$</p> <p>$\geq 1.25\text{ seconds}$</p> <p>Enabled when a code clear is not active or not exiting device control</p>	<p>Filter Fuel Control Error term and Absolute delta between sensor1 and sensor2 exceed Low or High Fail limit for a duration $\geq 1.50\text{ seconds}$</p> <p>This is diagnostic runs Continuous</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Pressure Sensor 1 Out of Range	P0192	<p>This DTC diagnose SENT high pressure sensor 1 that is too low out of range.</p> <p>If the sensor digital value (representing the reference 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.</p>	High Pressure Rail Sensor 1 SENT digital read value	=< 94			<p>Time Based: 400 Failuerout of 500 Samples 6.25 ms per Sample Continuous</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	< 60.0 Deg C	Diagnostic is Enabled No Active DTC's Engine Runtime Distance traveled this key cycle Ambient air pressure Ambient air temperature ***** Engine coolant temperature At least once during the key cycle ***** Heat to coolant DFCO time RPM Active Fuel Management	ECT_Sensor_Ckt_FA VehicleSpeedSensor_FA OAT_PtEstFiltFA THMR_AWP_AuxPumpF A THMR_AHV_FA THMR_SWP_Control_FA EngineTorqueEstlnaccu te ECT_Sensor_Perf_FA THMR_SWP_NoFlow_FA THMR_SWP_FlowStuckO n_FA >30.0 seconds >1.0 km > 55.0 kPa >-9.0 Deg C >71.0 Deg C ≥ P01F0 - Heat To Coolant Min 2D < 3.0 seconds < 8,192	48 seconds out of a 60 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					is not in	Half Cylinder Mode		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Open Circuit - (SIDI)	P0201	<p>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.</p> <p>Or</p> <p>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.</p>	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p> <p>Or</p> <p>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	<p>≥ 200 KOhms impedance between signal and controller ground</p> <p>≥ 200 KOhms impedance between signal and controller ground</p>	Battery Voltage Engine Run Time	<p>≥ 11 Volts</p> <p>≥ 1 Seconds</p> <p>P062B not FA or TFTK</p>	<p>10.00 failures out of 20.00 samples</p> <p>100 ms /sample Continuous</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Open Circuit - (SIDI)	P0202	<p>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.</p> <p>Or</p> <p>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.</p>	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p> <p>Or</p> <p>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	<p>>= 200 KOhms impedance between signal and controller ground</p> <p>>= 200 KOhms impedance between signal and controller ground</p>	Battery Voltage Engine Run Time	<p>>=11 Volts >= 1 Seconds</p> <p>P062B not FA or TFTK</p>	<p>10.00 failures out of 20.00 samples</p> <p>100 ms /sample Continuous</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Open Circuit - (SIDI)	P0203	<p>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.</p> <p>Or</p> <p>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.</p>	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p> <p>Or</p> <p>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	<p>≥ 200 KOhms impedance between signal and controller ground</p> <p>≥ 200 KOhms impedance between signal and controller ground</p>	Battery Voltage Engine Run Time	<p>≥ 11 Volts</p> <p>≥ 1 Seconds</p> <p>P062B not FA or TFTK</p>	<p>10.00 failures out of 20.00 samples</p> <p>100 ms /sample Continuous</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Open Circuit - (SIDI)	P0204	<p>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.</p> <p>Or</p> <p>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.</p>	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p> <p>Or</p> <p>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	<p>≥ 200 KOhms impedance between signal and controller ground</p> <p>≥ 200 KOhms impedance between signal and controller ground</p>	Battery Voltage Engine Run Time	<p>≥ 11 Volts ≥ 1 Seconds P062B not FA or TFTK</p>	<p>10.00 failures out of 20.00 samples</p> <p>100 ms /sample Continuous</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 < (100% corresponds to 5.0 Volt)	5.00 % 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 Illum.
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 > (100% corresponds to 5.0 Volt)	91.80 % 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 Illum.
Turbo/Super Charger Engine Overboost Pressure setpoint deviation; not used for supercharge r with mechanical compressor.	P0234	This DTC indicates an over boost failure. Two failure paths are considered. When pressure control closed loop control being active, a negative boost pressure deviation indicates overboost conditions at constant driving conditions. In case boost pressure close loop control not being active and with desired boost pressure below basic boost pressure, overboost conditions can be detected when actual boost pressure is higher than basic boost pressure plus a diagnostic offset.	Desired boost pressure - Actual boost pressure	< refer to P0234: Overboost pressure deviation limit as a function of engine speed and desired boost pressure + P0234 P0299: Ambient pressure correction (Overboost) as a function of engine speed and ambient pressure in Supporting tables.	Dev. diagnostic enable <i>'kikic'kicic'k'kicicic'icicic'kicicicic'kic'kic'</i> (Coolant temperature OR OBD Coolant enable criteria) AND (Coolant temperature OR OBD max Coolant Temp achieved) ***** Engine speed in range ***** Desired boost pressure in range Desired boost pressure derivative in range ***** All conditions have to be fulfilled for: ***** No active DTCs:	True ***** >-40.0 °C = TRUE <126.0 °C =FALSE ***** P0234 P0299: Engine speed low limit over Ambient pressure to enable the boost pressure control >deviation diagnosis, rpm < 6 500 rpm ***** >100.0 kPa <280.0 kPa >-70.0 kPa/s <55.0 kPa/s ***** > refer to P0234 P0299: Boost deviation diagnostic enable delay as a function of engine speed and ambient pressure in Supporting tables. ***** BSTR_b_PCA_CktFA	24 failures out of 30 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 Illum.
					<p>*****</p> <p>Pressure control has to be in closed loop.</p> <p>No device control active for WG and compressor recirculation valve.</p>	<p>BSTR_b_TurboBypassCkt FA ECT_Sensor_FA IAT_SensorFA BSTR_b_BoostSnsrFA AmbientAirDefault *****</p>		
			Actual boost pressure	<p>> refer to P0234: Overboost pressure limit below basic pressure as a function of engine speed and ambient pressure in Supporting tables. +Basic Pressure</p>	<p>Basic pressure diag enable and Dev diagnostic enable *****</p> <p>(Coolant temperature OR OBD Coolant enable criteria) AND (Coolant temperature OR OBD max Coolant Temp achieved *****</p> <p>Engine speed in range *****</p> <p>All conditions have to be fulfilled for: *****</p>	<p>False</p> <p>True *****</p> <p>>-40.0 °C = TRUE</p> <p><126.0 °C = FALSE *****</p> <p>P0234 P0299: Boost deviation in open Loop or ratelimit >diagnose enable limit rpm < 3 500 rpm *****</p> <p>>2.00 Seconds *****</p>	<p>20 failures out of 25 samples</p> <p>100ms / sample</p>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No active DTCs: ***** Pressure control has to be in open loop. No device control active for WG and compressor recirculation valve.	BSTR_b_PCA_CktFA BSTR_b_TurboBypassCkt FA ECT_Sensor_FA IAT_SensorFA BSTR_b_BoostSnsrFA AmbientAirDefault BSTR_b_PCA_TFTKO *****		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger Boost Pressure (TIAP) Sensor Performance (single turbo)	P0236	<p>Detects a performance failure in the Turbocharger Boost Pressure sensor, such as when a Turbocharger Boost Pressure value is stuck in range.</p> <p>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).</p> <p>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 Turbocharger Boost</p>	<p>Engine Running:</p> <p>See table P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix</p> <p>for combinations of model failures that can set this DTC.</p> <p>MAF model fails when ABS(Measured Flow - Modeled Air Flow) Filtered</p> <p>MAPI model fails when ABS(Measured MAP - MAP Model 1) Filtered</p> <p>MAP2 model fails when ABS(Measured MAP - MAP Model 2) Filtered</p> <p>MAP3 model fails when ABS(Measured MAP - MAP Model 3) Filtered</p> <p>TIAP1 model fails when ABS(Measured TIAP - TIAP Model 1) Filtered</p> <p>TPS model fails when Filtered Throttle Model Error</p> <p>TIAP Correlation model fails when High Engine Air Flow is TRUE AND</p>	<p>>20.0 grams/sec</p> <p>> 23.0 kPa</p> <p>> 25.0 kPa</p> <p>> 25.0 kPa</p> <p>> 30.0 kPa</p> <p>> 175 kPa*(g/s)</p>	<p>Engine Speed Engine Speed</p> <p>(Coolant Temp OR OBD Coolant Enable Criteria</p> <p>(Coolant Temp OR OBD Max Coolant Achieved</p> <p>Intake Air Temp Intake Air Temp</p> <p>Powertrain Relay Voltage for a period of time</p> <p>Minimum total weight factor (all factors multiplied together)</p> <p>See Residual Weight Factor tables.</p>	<p>>= 400 RPM <= 6,100 RPM</p> <p>>= -9 Deg C</p> <p>= TRUE)</p> <p><= 130 Deg C</p> <p>= FALSE)</p> <p>> -20 Deg C <= 125 Deg C</p> <p>>=9.1 Volts >= 0.2 Seconds</p> <p>>= 0.50</p> <p>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</p> <p>MAP Model 1 Error multiplied by</p>	<p>Continuous</p> <p>Calculation are performed every 12.5 msec</p>	<p>Type A, 1 Trips</p>

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Pressure sensor. In this case, the Turbocharger Boost Pressure Performance diagnostic will fail.	<p>Measured TIAP - measured MAP - offset as a function of engine speed See table P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Offset</p> <p>OR</p> <p>Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Offset</p> <p>TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time</p> <p>High Engine Air Flow is TRUE when Mass Air Flow</p>	<p>> 30.0 kPa</p> <p>> 30.0 kPa</p> <p>> 1.0 seconds</p> <p>> 1.0 seconds</p> <p>> a threshold in gm/sec as a function of engine speed See table</p>	No Active DTCs:	<p>P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM</p> <p>MAP Model 2 Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM</p> <p>MAP Model 3 Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM</p> <p>TIAP Model 1 Error multiplied by P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM</p> <p>Filtered Throttle Model Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM</p> <p>MAP_SensorCircuitFA EGRValvePerformance_F A MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC BoostPresSnsrCktFA</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>AND Manifold Pressure</p> <p>AND Filtered Mass Air Flow - Mass Air Flow</p> <p>Low Engine Air Flow is TRUE when Mass Air Flow</p> <p>AND Manifold Pressure</p> <p>AND Mass Air Flow - Filtered Mass Air Flow</p>	<p>P0101, P0106, P0121, P0236, P1101: TIAP- MAP Correlation Min Air Flow</p> <p>> a threshold in kPa as a function of engine speed See table</p> <p>P0101, P0106, P0121, P0236, P1101: TIAP- MAP Correlation Min MAP</p> <p>< 1.3 gm/sec</p> <p>< a threshold in gm/ sec as a function of engine speed See table</p> <p>P0101, P0106, P0121, P0236, P1101: TIAP- Baro Correlation Max Air Flow</p> <p>< a threshold in kPa as a function of engine speed See table</p> <p>P0101, P0106, P0121, P0236, P1101: TIAP- Baro Correlation Max MAP</p> <p>< 2.0 gm/sec</p>	<p>No Pending DTCs:</p> <p>Diagnostic is Enabled</p>	<p>AmbientAirDefault</p> <p>EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharge r Boost Pressure Sensor Circuit Low	P0237	Detects a continuous short to ground in the Turbocharger Boost Pressure signal circuit by monitoring the Turbocharger Boost Pressure sensor output voltage and failing the diagnostic when the Turbocharger Boost Pressure voltage is too low. The Turbocharger Boost Pressure sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	Turbocharger Boost Pressure Voltage	< 14.4% of 5 Volt Range (This is equal to 50.0 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 Illum.
Turbocharger Boost Pressure Sensor Circuit High	P0238	Detects a continuous short to power or open circuit in the Turbocharger Boost Pressure signal circuit by monitoring the Turbocharger Boost Pressure sensor output voltage and failing the diagnostic when the Turbocharger Boost Pressure voltage is too high. The Turbocharger Boost Pressure sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	Turbocharger Boost Pressure Voltage	>86.0 % of 5 Volt Range (This is equal to 372.0 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 Illum.
Turbocharge r Wastegate / Supercharge r Boost Solenoid A Control Circuit	P0243	<p>Controller specific output driver circuit diagnostic, diagnosing the 'turbocharger boost solenoid'A' actuator' low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.</p> <p>In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In a parallel application, turbocharger 'A' is associated with engine bank 1.</p>	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	> 200 K Q impedance between output and controller ground	<p>Diagnostic enabled 'KieKie'KieKie'K'KieKieKie'KieKieKieKie'Kie'K'K'K'</p> <p>Powertrain relay voltage</p> <p>Ignition run crank voltage *****</p> <p>Engine does not crank</p> <p>Diagnostic system not disabled</p>	<p>True *****</p> <p>>=11.0 Volts</p> <p>>5.00 Volts *****</p>	<p>10 failures out of 14 samples</p> <p>100ms / sample</p>	<p>Type A, 1 Trips</p> <p>Note: In certain controllers P0245 may also set turbocharger wastegate / supercharger boost solenoid A control circuit low</p>

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger Wastegate / Supercharger Boost Solenoid A Control Circuit Low	P0245	Controller specific output driver circuit diagnostic, diagnosing the 'turbocharger boost solenoid '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 applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In a parallel application, 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 <i>'kikic'kicic'k'kicicic'icicic'kicicicickic'kic'k'k'</i> Powertrain relay voltage Ignition run crank voltage <i>*****</i> Engine does not crank Diagnostic system not disabled	True <i>*****</i> =>=11.0 Volts >5.00Volts <i>*****</i>	10 failures out of 14 samples 100ms / sample	Type A, 1 Trips Note: In certain controllers P0243 may also set turbocharger wastegate / supercharger boost solenoid A control circuit

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger r Wastegate / Supercharge r Boost Solenoid A Control Circuit High	P0246	Controller specific output driver circuit diagnostic, diagnosing the 'turbocharger boost solenoid '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 applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In a parallel application, 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 <i>'kikic'kicic'k'kicicic'icicic'kicicicickic'kic'k'k'</i> Powertrain relay voltage Ignition run crank voltage <i>*****</i> Engine does not crank Diagnostic system not disabled	True <i>*****</i> =>11.0 Volts >5.00Volts <i>*****</i>	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 Illum.
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 >= 1 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 Illum.
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 >= 1 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 Illum.
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 >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 >= 1 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 Illum.
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 >= 1 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 Illum.
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 >= 1 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 Illum.
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 >= 1 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 Illum.
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 >= 1 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 Illum.
Turbo/Super Charger Engine Underboost Pressure setpoint deviation; Not used for supercharge r with mechanical compressor.	P0299	This DTC indicates an under boost failure. Two failure paths are considered. At steady state engine operating conditions with boost pressure closed loop control being active, a positive boost pressure deviation indicates underboost conditions. During transient conditions, in case the boost pressure increase gradient is below a diagnostic threshold, underboost conditions will be detected.	Desired boost pressure - Actual boost pressure	<refr to P0299: Underboost pressure deviation limit as a function of engine speed and desired boost pressure + P0234 P0299: Ambient pressure correction (Underboost) as a function of engine speed and ambient pressure in Supporting tables.	Dev. Diagnostic enable <i>'KieKie'KieKie'K'KieKieKie'KieKieKieKie'Kie'K'K'</i> Coolant temperature or OBD Coolant Enable Criteria and Coolant temperature Intake air temperature is in range Ambient air pressure is in range ***** Engine speed in range ***** Desired boost pressure in range Desired boost pressure derivative in range ***** All conditions haveto be fulfilled for: ***** No active DTCs:	True ***** >-40.0 °C = TRUE) <126.0 °C >-40.0 °C <80.0 °C > 60.0 kPa <120.0 kPa ***** P0234 P0299: Engine speed low limit over Ambient pressure to enable the boost pressure control > deviation diagnosis, rpm < 6 500rpm ***** >100.0 kPa <280.0 kPa >-70.0 kPa/s < 55.0 kPa/s ***** >refer to P0234 P0299: Boost deviation diagnostic enable delay as a function of engine speed and ambient pressure in Supporting tables ***** BSTR_b_PCA_CktFA BSTR_b_TurboBypassCkt FA	24 failures out of 30 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 Illum.
					ECT_Sensor_FA IAT_SensorFA BSTR_b_BoostSnsrFA AmbientAirDefault ***** Pressure control has to be in closed loop. No device control active for WG and compresseor recirculation valve.	ECT_Sensor_FA IAT_SensorFA BSTR_b_BoostSnsrFA AmbientAirDefault *****		
			Actual boost pressure delta the delta is limited by these tables: refer to Max: P0299: Underboost high rate limit as a function of engine speed Min: P0299: Underboost low rate limit as a function of engine speed in supporting tables.	<15.00	Rate base diagostic enable and Dev. Diagnostic enable ***** Coolant temperature or OBD Coolant enable criteria and Coolant temperature Intake air temperature is in range Ambient air pressure is in range Desired boost pressure in range Desired boost pressure derivative in hysteresis range ***** Engine speed is in range	False True ***** >-40.0 °C = TRUE) <126.0 °C >-40.0 °C <80.0 °C > 60.0 kPa <120.0 kPa >100.0 kPa <280.0 kPa Enable Limit: 20.0 Disable Limit: -20.0 ***** P0234 P0299: Boostdeviation in open Loop or ratelimit >diagnose enable limit rpm	20 failures out of 25 samples 100ms / sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>..... if</p> <p>All conditions have to be fulfilled for:</p> <p>*****</p> <p>No active DTCs:</p> <p>*****</p> <p>Pressure control has to be in closed loop.</p> <p>No device control active for WG and compressor recirculation valve.</p>	<p>< 3,500 rpm</p> <p>if</p> <p>> 0.20 Seconds</p> <p>*****</p> <p>BSTR_b_PCA_CktFA</p> <p>BSTR_b_TurboBypassCktFA</p> <p>ECT_Sensor_FA</p> <p>IAT_SensorFA</p> <p>BSTR_b_BoostSnsrFA</p> <p>AmbientAirDefault</p> <p>*****</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	<p>Injector voltage feedback is not able to detect an opening magnitude</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude</p> <p>OR</p> <p>Injector voltage feedback is not able to detect a closing time</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector closing time</p> <p>OR</p> <p>Measured Voltage</p>	<p>=<</p> <p>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude (See supporting table)</p> <p>>=</p> <p>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude (See supporting table)</p> <p>=<</p> <p>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time (See supporting table)</p> <p>>=</p>	<p>Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)</p> <p>Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below)</p> <p>Injection Pulse Width</p>	<p>= True</p> <p>>=</p> <p>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width</p>	<p>50.00 to 100.00 samples</p> <p>Continuous Cylinder event sample rate</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 Illum.
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	<p>Injector voltage feedback is not able to detect an opening magnitude</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude</p> <p>OR</p> <p>Injector voltage feedback is not able to detect a closing time</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector closing time</p> <p>OR</p> <p>Measured Voltage</p>	<p>=<</p> <p>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude (See supporting table)</p> <p>>=</p> <p>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude (See supporting table)</p> <p>=<</p> <p>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time (See supporting table)</p> <p>>=</p>	<p>Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)</p> <p>Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below)</p> <p>Injection Pulse Width</p>	<p>= True</p> <p>>=</p> <p>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width</p>	<p>50.00 to 100.00 samples</p> <p>Continuous Cylinder event sample rate</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 Illum.
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	<p>Injector voltage feedback is not able to detect an opening magnitude</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude</p> <p>OR</p> <p>Injector voltage feedback is not able to detect a closing time</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector closing time</p> <p>OR</p> <p>Measured Voltage</p>	<p>=<</p> <p>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude (See supporting table)</p> <p>>=</p> <p>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude (See supporting table)</p> <p>=<</p> <p>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time (See supporting table)</p> <p>>=</p>	<p>Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)</p> <p>Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below)</p> <p>Injection Pulse Width</p>	<p>= True</p> <p>>=</p> <p>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width</p>	<p>50.00 to 100.00 samples</p> <p>Continuous Cylinder event sample rate</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 Illum.
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	<p>Injector voltage feedback is not able to detect an opening magnitude</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude</p> <p>OR</p> <p>Injector voltage feedback is not able to detect a closing time</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector closing time</p> <p>OR</p> <p>Measured Voltage</p>	<p>=<</p> <p>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude (See supporting table)</p> <p>>=</p> <p>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude (See supporting table)</p> <p>=<</p> <p>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time (See supporting table)</p> <p>>=</p>	<p>Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)</p> <p>Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below)</p> <p>Injection Pulse Width</p>	<p>= True</p> <p>>=</p> <p>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width</p>	<p>50.00 to 100.00 samples</p> <p>Continuous Cylinder event sample rate</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 Illum.
Random Misfire Detected	P0300	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring various terms derived from crankshaft velocity. The rate of misfire over an interval is compared to both emissions and catalyst damaging thresholds. The pattern of crankshaft acceleration after the misfire is checked to differentiate between real misfire and other sources of crank shaft noise.	Crankshaft Deceleration Value(s) vs. Engine Speed and Engine load		Engine Run Time	> 2 crankshaft revolution	Emission Exceedence = any (5) failed 200 rev blocks out of (16) 200 rev block tests	Type B, 2 Trips (Mil Flashes with Catalyst damage level of Misfire)
Cylinder 1 Misfire Detected	P0301		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.		Engine Coolant Temp	"ECT" If OBD Max Coolant Achieved = FALSE -12 °C < ECT Or if OBD Max Coolant Achieved = TRUE -12°C < ECT < 127°C		
Cylinder 2 Misfire Detected	P0302				Or If ECT at startup Then	< -12 °C If OBD Max Coolant Achieved = FALSE 21 °C < ECT If OBD Max Coolant Achieved = TRUE 21 °C < ECT < 127°C		
Cylinder 3 Misfire Detected	P0303					Failure reported for (1) Exceedence in 1st (16) 200 rev block tests, or (4) Exceedences thereafter.		
Cylinder 4 Misfire Detected	P0304							
		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		- see details of thresholds on Supporting Tables Tab	System Voltage + Throttle delta - Throttle delta	9.00 < volts < 32.00 < 60.00 % per 25 ms < 60.00 % per 25 ms		
			SINGLE CYLINDER CONTINUOUS MISFIRE((Medres_Decel Medres_Jerk	> RufSCD_Decel AND > RufSCD_Jerk)	Early Termination option: (used on plug ins that may not have enough engine run time at end of trip for normal interval to complete.)	Not Enabled	OR when Early Termination Reporting = Enabled and engine rev > 1,000 revs and < 3,200 revs at end of trip	
			OR (Medres_Decel Medres_Jerk	>SCD_Decel AND > SCD_Jerk)				
			OR (Lores_Decel LoresJerk	> RufCyl_Decel AND > RufCyl_Jerk)				
			OR (Lores_Decel LoresJerk	> CylModeDecel AND > CylModeJerk)				
		Default Action: If Misfire P030x sets on some hybrid applications, the isolation damper	OR RevBalanceTime	>RevMode_Decel				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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.	<p>*****</p> <p>**This Feature not used on Gasoline engines**</p> <p>Combustion Modes that force selection of Idle Tables</p> <p>*****</p> <p>Other patterns of misfire use adjustments to the single cylinder continuous misfire threshold tables:</p> <p>RANDOM MISFIRE Use random misfire thresholds If no misfire for</p> <p>(Medres_Decel</p> <p>AND</p> <p>Medres_Jerk)</p> <p>OR (Medres_Decel</p> <p>AND</p> <p>Medres_Jerk)</p> <p>OR (Lores_Decel</p> <p>AND</p> <p>Lores_Jerk)</p>	<p>*****</p> <p>**This Feature not used on Gasoline engines**</p> <p>CombustModelIdleTbl in Supporting Tables</p> <p>*****</p> <p>> 3 Engine Cycles</p> <p>> RufSCD_Decel * Random_SCD_Decel</p> <p>> RufSCD_Jerk * Random_SCD_Jerk</p> <p>> SCD_Decel * Random_SCD_Decel</p> <p>> SCD_Jerk * Random_SCD_Jerk</p> <p>> RufCyl_Decel * RandomCylModDecel</p> <p>> RufCyl_Jerk * RandomCylModJerk</p>			<p>any Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage.</p> <p>Catalyst Failure reported with (1 or 3) Exceedences in FTP, or (1) Exceedence outside FTP.</p> <p>Continuous</p>	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR (Revmode Active AND (within one engine cycle: 2nd largest Lores_Decel)	> CylModeDecel * PairCylModeDecel				
			BANK MISFIRE Cylinders above Bank Thresholds	>= 3 cylinders				
			(Medres_Decel 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 (Lores_Decel 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 Illum.
			<p>CONSECUTIVE CYLINDER MISFIRE 1st cylinder uses single cyl continuous misfire thresholds; 2nd Cylinder uses: (Medres_Decel</p> <p>AND Medres_Jerk)</p> <p>OR (Medres_Decel</p> <p>AND Medres_Jerk)</p> <p>OR (Lores_Decel</p> <p>AND Lores_Jerk)</p> <p>OR (Lores_Decel</p> <p>AND Lores_Jerk)</p>	<p>> RufSCD_Decel * ConsecSCD_Decel</p> <p>> RufSCD_Jerk * ConsecSCD_Jerk</p> <p>> SCD_Decel * ConsecSCD_Decel</p> <p>> SCD_Jerk * ConsecSCD_Jerk</p> <p>> RufCyl_Decel * ConsecCylModDecel</p> <p>> RufCyl_Jerk * ConsecCylModeJerk</p> <p>> CylModeDecel * ConsecCylModDecel</p> <p>> CylModeJerk * ConsecCylModeJerk</p>				

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			CylBeforeDeacCyl_Jerk)	<p>> CylModeJerk * ClyBeforeAFM_Jerk * RandomAFM_Jerk</p> <p>OR IF option Crank based IMEP estimate is Enabled and CrankBasedJMEP is</p> <p>Not Enabled</p> <p>< Misfire_IMEP_Thresh _vs_BinID (Note: Thresholds uses following tables to pick threshold vs BinID. See supporting tables for more information on how BinID works to select appropriate calibration threshold) Misfire_IMEP_BinID_ vs_RPM_Load Misfire_IMEP_BinID_ RPM_Axis Misfire_IMEP_BinID_ Load_Axis</p> <p>- see details on Supporting Tables Tab</p> <p>Misfire Percent Emission Failure Threshold</p> <p>>2.63 % P0300</p> <p>Misfire Percent Catalvst</p> <p>></p>				

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>Damage</p> <p>When engine speed and load are less than the FTP calcs (3) catalyst damage exceedences are allowed.</p>	<p>Catalyst_Damage_Misfire_Percentage in Supporting Tables whenever secondary conditions are met.</p> <p>< 1,350 FTP rpm AND < 20 FTP % load</p>	<p>(at low speed/loads, one cylinder may not cause cat damage)</p> <p>Engine Speed Engine Load Misfire counts</p> <p>Engine Speed</p> <p>No active DTCs:</p>	<p>> 0 rpm AND > 0 % load AND <180 counts on one cylinder</p> <p>665 < rpm < ((Engine Over Speed Limit) - 400) OR 8,191)</p> <p>Engine speed limit is a function of inputs like Gear and temperature</p> <p>see EngineOverSpeedLimit in supporting tables</p> <p>TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensor_TFTKO CrankSensor_FA CamLctnIntFA</p>	<p>4 cycle delay</p> <p>4 cycle delay</p>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						CamLctnExhFA CamSensorAnyLctnTFTK 0 AnyCamPhaser_FA AnyCamPhaser_TFTKO AmbPresDfIttdStatus		
					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	> 7,000 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	< 2.0% (< 1.4% in AFM) > 30 mph (> 19 mph AFM)	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NEGATIVE TORQAFM 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	> 98.00 %	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 Illum.
					<p>Driver cranks before Wait to Start lamp extinguishes</p> <p>Brake Torque *****</p> <p>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:</p> <p>Stop filter early:</p> <p>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).)</p> <p>Used Off Idle, and while not shifting, TPS Engine Speed Veh Speed Auto Transmission</p> <p>individual candidate deemed abnormal if number of</p>	<p>IF TRUE</p> <p>> 199.99 % Max Torque *****</p> <p>> "Ring Filter" # of engine cycles after misfire in Supporting Tables</p> <p>> "Number of Normals" # of engine cycles after misfire in Supporting Tables tab</p> <p>> 3 % > 1,000 rpm > 3 mph not shifting</p>	<p>WaitToStart cycle delay</p> <p>0 cycle delay *****</p>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>consecutive decelerating cylinders after "misfire": (Number of decels can vary with misfire detection equation) Consecutive decels while in SCD Mode Cyl Mode Rev Mode</p> <p>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,</p> <p>abnormal candidates/ total candidates</p> <p>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</p>	<p>> Abnormal SCD Mode > Abnormal Cyl Mode > Abnormal Rev Mode in Supporting Tables</p> <p>>0.50 ratio</p>	discard 100 engine cycle test	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>the 100 engine cycles. Typically used for checking a single misfire per engine cycle but can support some other patterns on some packages</p> <p>Pattern Recog Enabled:</p> <p>Pattern Recog Enabled during Cylinder Deac</p> <p>Pattern Recog Enabled consecutive cyl patrn</p> <p>Engine Speed Veh Speed</p> <p>The 1st check for "recognized" is the 1st fired cylinder after the misfire candidate should both accelerate and jerk an amount based acceleration and jerk of Single Cylinder Misfire thresholds in effect at that speed and load. (CylAfter_Accel AND CylAfter_Jerk)</p> <p>Additionalv. the crankhaft</p>	<p>Enabled</p> <p>Not Enabled</p> <p>Disabled</p> <p>900 < rpm < 6,100 > 1.6 mph</p> <p>> Misfire_decel * 1st_FireAftrMisfr_Acel</p> <p>> Misfire_Jerk * 1st_FireAftrMisfr_Jerk</p> <p>Or if AFM mode is active: > Misfire_decel * 1stFireAftrMisAcelAFM > Misfire_Jerk * 1stFireAfterMisJerkAFM</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>is checked again a small calibratable number of cylinders later to see if the disturbance 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.</p> <p>Num of Cylinders after misfire to start check of crankshaft snap</p> <p>"misfire" recognized if: Crankshaft snap after: isolated "misfire"</p> <p>repetative "misfire"</p> <p>At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present.</p> <p>Ratio of Unrecog/Recog</p>	<p>2 Cylinders</p> <p>< Misfire_Jerk * SnapDecayAfterMisfire</p> <p>< Misfire_Jerk * SnapDecayAfterMisfire * RepetSnapDecayAdjst in Supporting Tables</p> <p>>0.60</p>	<p>discard 100 engine cycle test</p>	

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

23OBDG03A Part2 ECM Summary Tables

[illegible]

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 circumference. Loss or controller non-volatile 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 Illum.
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 Cumulative Number of Engine Revs Above Min Eng Speed (per key cycle)	Yes > 2.0 seconds > 400 RPM AND < 8,500 RPM >40 mg/cylinder AND < 2,000 mg/cylinder > -40 deg's C = TRUE > -40 deg's C > 500 revs	First Order Lag Filters with Weight Coefficient = 0.0400 Updated each engine event	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Circuit Bank 1	P0325	<p>This diagnostic checks for an open in the knock sensor circuit Sensor 1/Bank 1. There are two possible methods used:</p> <p>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 propagate 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</p>	<p>Open Circuit Method chosen (2 possible methods: 20 kHz or Normal Noise):</p> <p>Filtered FFT Output</p> <p>Filtered FFT Output</p>	<p>= P0325_P0330_OpenMethod_2</p> <p>Case 1 (20 kHz Method): > P0325_P0330_OpenCktThrshMin (20 kHz) AND < P0325_P0330_OpenCktThrshMax (20 kHz)</p> <p>Case 2 (Normal Noise Method): > P0325_P0330_OpenCktThrshMin (Normal Noise) AND < P0325_P0330_OpenCktThrshMax (Normal Noise)</p>	<p>Diagnostic Enabled?</p> <p>Engine Run Time</p> <p>Engine Speed</p> <p>Cumulative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above)</p> <p>Engine Air Flow</p> <p>Engine Coolant Temperature</p> <p>or</p> <p>OBD Coolant Enable Criteria</p> <p>Inlet Air Temperature</p>	<p>Yes</p> <p>> 2.0 seconds</p> <p>> 400 RPM and < 8,500 RPM</p> <p>> 100 revs</p> <p>> 20 mg/cylinder and < 2,000 mg/cylinder</p> <p>> -40 deg's C</p> <p>= TRUE</p> <p>> -40 deg's C</p>	<p>First Order Lag Filter with Weight Coefficient</p> <p>Weight Coefficient = 0.0058</p> <p>Updated each engine event</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>the 20 kHz injected signal is detected only on one of the sensor inputs).</p> <p>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.</p> <p>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.</p> <p>See Supporting Tables for method definition: P0325 P0330 OoenM</p>						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		ethod defines which of the two diagnostic methods is used as a function of engine speed (RPM). Typical implementations: A. Use 20 kHz method at all engine 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 Illum.
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.	<p>Filtered FFT Intensity</p> <p>(where 'FFT Intensity' = Non-knocking, background engine noise for a selected frequency)</p> <p>Filtered FFT Intensity</p>	<p>Case 1: Engine <u>not</u> in AFM mode</p> <p>< P0326_P0331_AbnormalNoise_Threshold (Supporting Table)</p> <p>OR</p> <p>Case 2: Engine <u>is</u> in AFM mode</p> <p>< P0326_P0331_AbnormalNoise_Thresh_AFM (Supporting Table; Engine js in AFM mode)</p>	<p>Diagnostic Enabled?</p> <p>Engine Run Time</p> <p>Engine Speed</p> <p>Engine Air Flow</p> <p>Engine Coolant Temperature</p> <p>or</p> <p>OBD Coolant Enable Criteria</p> <p>Inlet Air Temperature</p> <p>Individual Cylinders enabled for Abnormal Noise</p> <p>Cumulative Number of Engine Revs Above Min Eng Speed (per key cycle)</p>	<p>Yes</p> <p>> 2.0 seconds</p> <p>> 2,500 RPM (not in AFM mode) OR > 2,500 (in AFM mode)</p> <p>AND < 8,500 RPM</p> <p>> 65mg/cylinder AND < 2,000 mg/cylinder</p> <p>> -40 deg's C</p> <p>= TRUE</p> <p>> -40 deg's C</p> <p>P0326_P0331_AbnormalNoiseCylsEnabled (Supporting Table)</p> <p>> 245 Revs</p>	<p>First Order Lag Filters with Weight Coefficient =</p> <p>0.0120</p> <p>Updated each engine event</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Circuit Bank 2	P0330	<p>This diagnostic checks for an open in the knock sensor circuit Sensor 2/Bank 2</p> <p>There are two possible methods used:</p> <p>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 propagate 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:</p> <p>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</p>	<p>Individual Sensor Thresholds Enabled?</p> <p>Open Circuit Method chosen (2 possible methods: 20 kHz or Normal Noise):</p> <p>Filtered FFT Output</p> <p>Filtered FFT Output</p>	<p>= 0, Use Case 1 and 2</p> <p>= P0325_P0330_OpenMethod_2 (supporting table)</p> <p>Case 1 (20 kHz Method): > P0325_P0330_OpenCktThrshMin (20 kHz) AND < P0325_P0330_OpenCktThrshMax (20 kHz)</p> <p>Case 2 (Normal Noise Method): > P0325_P0330_OpenCktThrshMin (Normal Noise) AND < P0325_P0330_OpenCktThrshMax (Normal Noise)</p> <p>Case 3 (20 kHz Method):</p>	<p>Diagnostic Enabled?</p> <p>Engine Run Time</p> <p>Engine Speed</p> <p>Cumulative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above)</p> <p>Engine Air Flow</p> <p>Engine Coolant Temperature</p> <p>or</p> <p>OBD Coolant Enable Criteria</p> <p>Inlet Air Temperature</p>	<p>Yes</p> <p>> 2.0 seconds</p> <p>> 400 RPM and < 8,500 RPM</p> <p>≥ 100 revs</p> <p>> 20 mg/cylinder and < 2,000 mg/cylinder</p> <p>> -40 deg's C</p> <p>= TRUE</p> <p>> -40 deg's C</p>	<p>First Order Lag Filter with Weight Coefficient</p> <p>Case 1 & 2: Weight Coefficient = 0.0058</p> <p>Updated each engine event</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>Open Circuit (because the 20 kHz injected signal is detected only on one of the sensor inputs).</p> <p>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.</p> <p>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.</p> <p>See SuoDortino Tables</p>	<p>Filtered FFT Output</p> <p>Filtered FFT Output</p>	<p>> P0330_OpenCktThrs hMin2 (20 kHz)</p> <p>AND</p> <p>< P0330_OpenCktThrs hMax2 (20kHz)</p> <p>Case 4 (Normal Noise Method):</p> <p>> P0330_OpenCktThrs hMin2 (NN)</p> <p>AND</p> <p>< P0330_OpenCktThrs hMax2 (NN)</p>			<p>Case 3 & 4 Weight Coefficient = 0.01</p> <p>Updated each engine event</p>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>for method definition: P0325_P0330_OpenMeth defines which of the two diagnostic methods is used as a function of engine speed (RPM). Typical implementations: A. Use 20 kHz method at all engine 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</p> <p>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.</p>						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Performance Bank 2	P0331	<p>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.</p> <p>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.</p>	<p>Individual Sensor Thresholds Enabled?</p> <p>Filtered FFT Intensity (where 'FFT Intensity' = Non-knocking, background engine noise)</p> <p>Filtered FFT Intensity</p>	<p>= 0, Use Case 1 and 2</p> <p>Case 1: Engine <u>not</u> in AFM mode < P0326_P0331_Abnor malNoise_Threshold (Supporting Table)</p> <p>OR</p> <p>Case 2: Engine <u>is</u> in AFM mode < P0326_P0331_Abnor malNoise_Thresh_AF M (Supporting Table)</p> <p>Case 3: Engine <u>not</u> in AFM mode < P0331_AbnormalLo2 (Supporting Table)</p> <p>OR</p> <p>Case 4: Engine <u>is</u> in AFM mode < P0331_AbnormalLoA FM_2 (Supporting Table)</p>	<p>Diagnostic Enabled?</p> <p>Engine Run Time</p> <p>Engine Speed</p> <p>Engine Air Flow</p> <p>Engine Coolant Temperature or</p> <p>OBD Coolant Enable Criteria</p> <p>Inlet Air Temperature</p> <p>Individual Cylinders enabled for Abnormal Noise</p> <p>Cumulative Number of Engine Revs Above Min Eng Speed (per key cycle)</p>	<p>Yes</p> <p>> 2.0 seconds</p> <p>> 2,500 RPM (not in AFM mode) OR > 2,500 (in AFM mode)</p> <p>AND < 8,500 RPM</p> <p>> 65mg/cylinder AND < 2,000 mg/cylinder</p> <p>> -40 deg's C</p> <p>= TRUE</p> <p>> -40 deg's C</p> <p>P0326_P0331_Abnormal NoiseCylsEnabled (Supporting Table)</p> <p>> 245 Revs</p>	<p>First Order Lag Filter with Weight Coefficient</p> <p>Case 1 & 2: Weight Coefficient = 0.0058</p> <p>Updated each engine event</p> <p>Case 3 & 4: Weight Coefficient = 0.01</p> <p>Updated each engine eventFirst</p>	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	Test is Enabled = FALSE > 1.5 grams/second))	Continuous every 100 msec	Type A, 1 Trips
			No crankshaft pulses received	≥ 0.3 seconds	Engine is Running Starter is not engaged	Test is Enabled	Continuous every 12.5 msec	
			No crankshaft pulses received		Engine is Running OR Starter is engaged No DTC Active:	Test is Enabled P0365 P0366	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 Illum.
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 4 or more crank re-synchronizations occur	< 5.0 seconds	Engine Air Flow Cam-based engine speed No DTC Active:	Test is Enabled >= 1.5 grams/second > 100 RPM P0335	Continuous every 250 msec	Type A, 1 Trips
			No crankshaft synchronization gap found	>= 0.4 seconds	Engine is Running Starter is not engaged	Test is Enabled	Continuous every 12.5 msec	
			Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Starter engaged AND (cam pulses being received OR (MAF_SensorFA AND Engine Air Flow	Test is Enabled = FALSE > 1.5 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:	Test is Enabled P0365 P0366	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 Illum.
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	>= 5.5 seconds	Starter engaged AND (crank pulses being received OR (MAF_SensorFA AND Engine Air Flow	Test is Enabled = FALSE > 1.5 grams/second))	Continuous every 100 msec	Type A, 1 Trips
			OR Time that starter has been engaged without a camshaft sensor pulse	>= 4.0 seconds				
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged	Test is Enabled	Continuous every 100 msec	
			No camshaft pulses received during 12 MEDRES events (There are 12 MEDRES events per engine cycle) Test begins when MEDRES region AND accumulated number of MEDRES events	= region 3 >= 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:	Test is Enabled CrankSensor_FA	Continuous, every MEDRES event until 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 Illum.
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 12 MEDRES events is OR (There are 12 MEDRES events per engine cycle) Test begins when MEDRES region AND accumulated number of MEDRES events	< 4 pulses > 6 pulses = region 3 >= 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:	Test is Enabled CrankSensor_FA	Continuous, every MEDRES event until test completes, one test at every start attempt	Type A, 1 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 Illum.
Crankshaft Position Sensor - Crankshaft Start Position Incorrect	P034A	Monitors the position of the crankshaft during auto-start's to verify that the crankshaft is in the expected position-diagnostic will fail if the crankshaft is not in the expected range otherwise the diagnostic will pass	Crankshaft position is in error by a number of crankshaft wheel teeth	> 1 crankshaft teeth	Engine has started rotating during a hybrid auto-start Crankshaft position is being verified No Active DTCs:	Test is Enabled CrankSensor_FA	2 failures out of 3 samples a sample occurs at each hybrid auto-start	Type B, 2 Trips
			Crankshaft position is in error by at least one crankshaft wheel tooth		Engine has started rotating during a hybrid auto-start Crankshaft position is being verified No Active DTCs:	Test is Enabled CrankSensor_FA	4 failures out of 5 samples a sample occurs each hybrid auto-start	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position Sensor - Crankshaft Direction Incorrect	P034B	Detects if the crankshaft is not rotating in the correct direction- will fail if the engine is reported to be spinning backwards while the engine is running otherwise the diagnostic will pass.	Number of crankshaft sensor reversals within a period of time	>= 3 pulses <= 10.0 seconds	Engine Speed Engine Speed Engine Air Flow Engine Movement Detected No Active DTCs:	Test is Enabled > 400 RPM < 2,000 RPM >= 1.5 grams/second CrankSensor_FA	Continuous Every 250 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	> 30 kQ impedance between signal and controller ground	<p>Engine running</p> <p>Ignition Voltage</p>	> 11.0 Volts	<p>50 Failures out of 63 Samples</p> <p>100 msec rate</p>	Type A, 1 Trips

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	> 30 kQ impedance between signal and controller ground	<p>Engine running</p> <p>Ignition Voltage</p>	> 11.0 Volts	<p>50 Failures out of 63 Samples</p> <p>100 msec rate</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	> 30 kQ impedance between signal and controller ground	<p>Engine running</p> <p>Ignition Voltage</p>	> 11.0 Volts	<p>50 Failures out of 63 Samples</p> <p>100 msec rate</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	> 30 kQ impedance between signal and controller ground	<p>Engine running</p> <p>Ignition Voltage</p>	> 11.0 Volts	<p>50 Failures out of 63 Samples</p> <p>100 msec rate</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor B	P0365	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	≥ 5.5 seconds	Starter engaged AND (crank pulses being received OR (MAF_SensorFA AND Engine Air Flow	Test is Enabled = FALSE > 1.5 grams/second))	Continuous every 100 msec	Type A, 1 Trips
			OR Time that starter has been engaged without a camshaft sensor pulse	≥ 4.0 seconds				
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged	Test is Enabled	Continuous every 100 msec	
			No camshaft pulses received during 12 MEDRES events (There are 12 MEDRES events per engine cycle) Test begins when MEDRES region AND accumulated number of MEDRES events	= region 3 ≥ 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:	Test is Enabled CrankSensor_FA	Continuous, every MEDRES event until 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 Illum.
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor B	P0366	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 12 MEDRES events is OR (There are 12 MEDRES events per engine cycle) Test begins when MEDRES region AND accumulated number of MEDRES events	< 4 pulses > 6 pulses = region 3 ≥ 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:	Test is Enabled CrankSensor_FA	Continuous, every MEDRES event until test completes, one test at every start attempt	Type A, 1 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 Illum.
Catalyst System Low Efficiency Bank 1 - Intrusive (legacy)	P0420	INTRUSIVE CATALYST MONITOR ALGORITHM (a deceleration fuel cutoff condition triggers the diagnostic at least once per trip) Oxygen Storage concept: The catalyst washcoat contains Cerium Oxide which reacts with NO and O ₂ during lean A/F excursions to store the excess oxygen (i.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H ₂ to release this stored oxygen (i.e. Cerium Reduction). This condition is defined as Oxygen Storage Capacity (OSC). The CatMon strategy involves a “measure” of OSC by intrusive Rich A/F followed by Lean A/F excursions (due to decel fuel cutoff). A Normalized Ratio of 1 indicates a good part and a ratio of 0 indicates a very bad part. Normalized Ratio Calculation = (C1-C2) / (C3-C2)	Normalized Ratio OSC Value (See P0420 Normalized OSC Ratio calc tab) (the EWMA calculation uses a 0.13 coefficient)	< 0.35	A1) Core catalyst diagnostic is A2) TWC Passive Observer diagnostic Disabled ? B) Enable criteria : See Trouble Code P2270 - (O ₂ Sensor Signal Stuck Lean Bank 1 Sensor 2) - C) Rapid Step Response (RSR) feature will initiate multiple tests: C1) If the difference between current EWMA value and the current OSC Normalized Ratio value is C2) and the current OSC Normalized Ratio value is C3) while the number of RSR tests is (maximum number of tests allowed to detect failure after RSR is triggered) D1) Mass Air Flow is D2) and Mass Air Flow is E) Predicted catalyst temperature F) Pre-catalyst O ₂ Sensor or Pre-cat WRAF Sensor	A1) Enabled A2) Check : Disabled C1) > 0.66 sec C2) < 0.10 sec C3) < 8 counts D1) > 2.50 g/s D2) < 9.50 g/s E) < 900 deg C F) > 825.00 mV or > 1.10 EQR	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 Illum.
		<p>where</p> <p>C1: Raw OSC Calculation = (post-cat 02 Response time) - (pre-cat 02 Response time)</p> <p>02: BestFailing OSC value:: calibration table (based on temp and exhaust gas flow)</p> <p>C3: WorstPassing OSC value : calibration table (based on temp and exhaust gas flow)</p> <p>The Intrusive Catalyst Monitoring test is completed during a decel fuel cutoff event following a rich intrusive fueling event which is initiated by the 02 Sensor Signal Stuck Lean Bank 1 Sensor 2 test (See P2270 conditions for details)</p>			<p>G) Post-catalyst 02 Sensor</p> <p>-----</p> <p>General Enable Criteria: In addition to Code P2272 conditions, the following Code Bundles shall not be true :</p> <p>H1) For Switching 02 Sensors:</p> <p>H2) For WRAF Sensors:</p>	<p>G) > 825.00 mV</p> <p>-----</p> <p>H1) O2S_Bank_1_Sensor_1_ FA O2S_Bank_1_Sensor_2_ FA O2S_Bank_2_Sensor_1_ FA O2S_Bank_2_Sensor_2_ FA</p> <p>H2) WRAF_Bank_1_FA, WRAF_Bank_2_FA</p>		

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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.			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 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 varv based on	> 8 hours 0 °C<Temperature<35 °C ***** <0°C > 7,200 seconds < 3,600 seconds 0 °C < difference < 2 °C > 240 seconds < 2 °C		

[illegible]

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>See P0464 Fault Code for information on fuel level refueling.</p> <p>OR</p> <p>4. Vacuum Out of Range and No Refueling</p> <p>See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling.</p> <p>OR</p> <p>5. Vacuum Out of Range and Refueling Detected</p> <p>See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling.</p> <p>OR</p> <p>6. Vent Valve Override Failed</p> <p>Device control using an off-board tool to control the vent solenoid, cannot exceed during the EONV test</p> <p>OR</p> <p>7. Key up during EONV test</p> <p>No active DTCs:</p>	0.50 seconds		
						MAF_SensorFA ECT Sensor FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No Active DTC's TFTKO	IAT_SensorFA VehicleSpeedSensor_FA ModuleOffTime_FA AmbientAirDefault FuelLevelDataFault P0443 P0446 P0449 P0452 P0453 P0455 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 Illum.
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 controlle rs P0458 may also set (Caniste r Purge Solenoid Short to Ground)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) Vent System Performance (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM) - Cab Chassis Dual Fuel Tank with Electric Fuel Transfer Pump)	P0446	<p>This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or EVAP canister.</p> <p>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.</p>	<p>Vent Restriction Prep Test: Vented Vacuum for OR Vented Vacuum for</p> <p>Vent Restriction Test: Tank Vacuum for before Purge Volume</p> <p>After setting the DTC for the first time, 0 liters of fuel must be consumed before setting the DTC for the second time.</p>	<p>< -623 Pa 60 seconds</p> <p>> 1,245 Pa 60 seconds</p> <p>> 2,989 Pa 5 seconds > 3 liters</p>	<p>Diagnostic is Enabled</p> <p>Total Fuel Level Note: when starting with both fuel tanks at full, the actual total fuel level to enable EVAP diagnostics will be closer to 87% prior to the initial fuel transfer. After the initial fuel transfer the rear fuel tank fuel level will be < 90 %.</p> <p>Rear Fuel Tank Fuel Level</p> <p>System Voltage Startup IAT Startup ECT BARO</p> <p>No active DTCs:</p> <p>No Active DTC's TFTKO</p>	<p>10 % < Percent < 90 %</p> <p>Percent < 90 %</p> <p>> 10.0 volts 4 °C<Temperature<35 °C <35 °C >70 kPa</p> <p>MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited FuelLevelDataFault</p> <p>P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0498 P0499 P1001 P1005 P11FF</p>	<p>Once per Cold Start</p> <p>Time is dependent on driving conditions</p> <p>Maximum time before test abort is 1,400 seconds</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P130F U18A2		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 impedance 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 controlle rs 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 Illum.
Fuel Tank Pressure (FTP) Sensor Circuit Performance (No ELCP - Conventional EVAP Diagnostic)	P0451	<p>The DTC will be set if the fuel tank vacuum sensor is out of range when it tries to re-zero prior to the phase-1 or phase-2 portions of the engine-off natural vacuum small leak test.</p> <p>During the EONV test, the fuel tank vacuum sensor is re-zeroed. A re-zero occurs:</p> <ol style="list-style-type: none"> 1) At the transition from the volatility phase to the pressure phase. 2) At the transition from the pressure phase to the vacuum phase. <p>The re-zero test determines if the tank vacuum signal falls within a calibratable window about atmospheric pressure. If after some time, the tank vacuum signal does not fall to within the window, the re-zero test exits to the refueling rationality test.</p> <p>The refueling rationality test determines if a refueling event caused the re-zero problem. If so, the re-zero problem is ignored. If a refueling event is not</p>	<p>The tank vacuum sensor voltage is compared to a window about the nominal sensor voltage offset (~1.5 volts)</p> <p>Upper voltage threshold (voltage addition above the nominal voltage)</p> <p>Lower voltage threshold (voltage subtraction below the nominal voltage)</p> <p>The difference between tank vacuum sensor voltage and the nominal offset voltage is then normalized against the appropriate threshold listed above to produce a ratio between 0.0 and 1.0. This normalized re-zero ratio is then filtered with a EWMA (with 0= perfect pass and 1=perfect fail).</p> <p>When EWMA is the DTC light is illuminated.</p> <p>The EWMA calculation uses a 0.20 weighting coefficient.</p> <p>The DTC light can be turned off if the EWMA is and stays below the</p>	<p>0.2 volts</p> <p>0.2 volts</p> <p>> 0.73 (EWMA Fail Threshold),</p> <p>< 0.40 (EWMA Re-Pass Threshold)</p>	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		<p>This test is executed during an engine-off natural vacuum small leak test. The number of times that it executes can range from zero to two 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.</p>	<p>Type A, 1 Trips</p> <p>EWMA</p> <p>Average run length: 6 Run length is 2 trips after code clear or non-volatile reset</p>

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>detected, then the results of the re-zero test are used to determine if there is a re-zero problem.</p> <p>1) An individual re-zero test generates a re-zero ratio. The ratio goes from 0.0 to 1.0.</p> <p>2) A 0.0 means that the re-zero pressure signal achieved exactly atmospheric pressure.</p> <p>3) A ratio of 1.0 means that the re-zero pressure did not get within the window.</p> <p>4) Re-zero pressure within the window generates values between 0.0 and 1.0.</p> <p>If a refueling event is not detected, then the resulting re-zero ratio is filtered using an exponentially weighted moving average (EWMA). When the EWMA exceeds a fail threshold, the vacuum re-zero test reports a failure. Once the vacuum re-zero test fails, the EWMA fall below a lower re-pass threshold before it can pass the vacuum re-zero test again.</p>	EWMA fail threshold for 3 additional consecutive trips.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Pressure (FTP) Sensor Circuit Low Voltage (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0452	<p>This DTC will detect a Fuel Tank Pressure (FTP) sensor signal that is too low out of range.</p> <p>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.</p> <p>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.</p>	<p>FTP sensor signal</p> <p>The normal operating range of the FTP sensor is 0.5 volts (-1245 Pa) to 4.5 volts (~ -3736 Pa).</p>	< 0.15 volts (3.0 % of Vref or - 1,495 Pa)	No active DTC's:	P1001 P1005 U18A2	<p>640 failures out of 800 samples</p> <p>12.5 ms / sample</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0453	<p>This DTC will detect a Fuel Tank Pressure (FTP) sensor signal that is too high out of range.</p> <p>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.</p> <p>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.</p>	<p>FTP sensor signal</p> <p>The normal operating range of the FTP sensor is 0.5 volts (-1245 Pa) to 4.5 volts (~ -3736 Pa).</p>	> 4.85 volts (97.0 % of Vref or - -3,985 Pa)	No active DTCs:	P1001 P1005 U18A2	<p>640 failures out of 800 samples</p> <p>12.5 ms / sample</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Pressure (FTP) Sensor Circuit Intermittent (No ELCP - Conventional EVAP Diagnostic)	P0454	<p>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.</p> <p>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.</p> <p>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."</p> <p>The vacuum change rationality diagnostic is an "X out of Y" test.</p> <p>1) Each time the EONV test completes, the (Y) sample counter is incremented.</p> <p>2) Each time the</p>	<p>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</p> <p>in 12.5 msec. A refueling event is confirmed if the fuel level has a persistent change of</p> <p>for 30 seconds during a 600 second refueling rationality test.</p>	<p>> 112 Pa</p> <p>< 249 Pa</p> <p>>15 %</p>	<p>This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes and the canister vent solenoid is closed</p>		<p>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.</p> <p>12.5 ms / sample</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 Illum.
Evaporative Emission (EVAP) System Large Leak Detected (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0455	<p>This DTC will detect a weak vacuum condition (large leak or purge blockage) in the EVAP system.</p> <p>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.</p> <p>The algorithm accumulates purge flow during the test to determine a displaced purge volume as the test proceeds.</p> <p>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.</p> <p>On fuel systems with fuel caps</p> <p>If the first failure of</p>	<p>Purge volume while Tank vacuum</p> <p>After setting the DTC for the first time, 0 liters of fuel must be consumed before setting the DTC for the second time.</p> <p>Weak Vacuum Follow-up Test (fuel cap replacement test) Weak Vacuum Test failed.</p> <p>Passes if tank vacuum</p> <p>Note: Weak Vacuum Follow-up Test can only report a pass.</p>	<p>> 15 liters</p> <p>< 2,740 Pa</p> <p>> 2,740 Pa</p>	<p>Diagnostic is Enabled</p> <p>Fuel Level System Voltage BARO Purge Flow</p> <p>No active DTCs:</p> <p>No Active DTC's TFTKO</p> <p>If ECT > IAT, Startup temperature delta (ECT-IAT): Startup IAT Startup ECT</p> <p>Weak Vacuum Follow-up Test This test can run following</p>	<p>10 % < Percent < 90 % > 10.0 volts > 70 kPa > 1.50 %</p> <p>MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited FuelLevelDataFault</p> <p>P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0498 P0499 P1001 P1005 P11FF P130F U18A2</p> <p>< 8 °C 4 °C < Temperature < 35 °C < 35 °C</p>	<p>Once per cold start</p> <p>Time is dependent on driving conditions</p> <p>Maximum time before test abort is 1,400 seconds</p> <p>Weak Vacuum Follow-up Test</p> <p>With large leak detected, the follow-up test is limited to 0 seconds. Once the MIL is on, the follow-up test runs indefinitely.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>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.</p> <p>On fuel systems without fuel caps</p> <p>The P0455 MIL will be commanded off on the ignition cycle after the third consecutive pass of P0455 is reported.</p>			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 Illum.
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 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 controlle rs P0443 may also set (Caniste r Purge Solenoid Open Circuit)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 impedance 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 Illum.
Fuel Level Sensor 1 Performance (For use on vehicles with two fuel senders and mechanical transfer pump)	P0461	This DTC will detect a primary fuel tank level sensor stuck in-range.	<p>1)*****</p> <p>Fuel Level in Primary and Secondary Tanks Remain in an Unreadable Range too Long*****</p> <p>1a) If Deadband diagnostic subtest enabled 1b) If fuel volume in primary tank is 1c) and if fuel volume in secondary tank is 1d) and if 1b and 1c indications do not change while fuel volume consumed by engine is</p> <p>OR</p> <p>2)*****</p> <p>Fuel consumed without a Primary Fuel Level Change*****</p> <p>2a) If indicated fuel volume change is 2b) while fuel consumed by the engine is</p>	<p>1a) == Disabled status</p> <p>1b) >1,024.0 liters</p> <p>1c) <2.0 liters</p> <p>1d) > 18.0 liters</p> <p>2a) < 3 liters</p> <p>2b) > 29.2 liters</p>	<p>1a) Diagnostic is Disabled</p> <p>1b) Engine Operational State</p> <p>1c) Device control state for the electric transfer pump</p> <p>2a) Diagnostic is Enabled</p>	<p>1b) == Running</p> <p>1c) ==False</p>	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 Illum.
Fuel Level Sensor 1 Circuit Low Voltage (For use on vehicles with a fuel float connected to an FTZM)	P0462	This DTC will detect a primary fuel tank sensor out-of-range low.	Fuel level Sender % of 5V range	< 10 %	a) Diagnostic is Enabled b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	b) == True c) == True d) <> True	40 failures out of 50 samples 250 ms / sample	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Circuit Intermittent (No ELCP - Conventional EVAP Diagnostic)	P0464	<p>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.</p> <p>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.</p> <p>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."</p> <p>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</p>	<p>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.</p> <p>An intermittent fuel level signal problem is defined as:</p> <p>The fuel level changes by and does not remain for 30 seconds during a 600 second refueling rationality test.</p>	> 15 % > 15 %	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		<p>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.</p> <p>100 ms / sample</p>	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan Speed Low [LIN Bus Electric PWM Fans Only- Internal or External controller]	P0494	This diagnostic is to detect if the fan system is undercooling. It does so by determining if the measured fan speed is sufficiently lower than the expected fan speed. The expected fan speed is modeled applying startup/ rampup/transport time delays, applying rate limiting to increasing and decreasing fan commands, and applying supply voltage compensation. If the actual fan speed is lower than the modeled fan speed by a calibratable threshold, the fault maturation for the corresponding DTC increments. The diagnostic employs a standard "X of Y" approach, where the diagnostic reports a failure to the diagnostic data manager if "X" faulted evaluations occur within each test consisting of "Y" samples. Only after first diagnostic activation per key cycle, the fan will be held commanded on for enough time to ensure this monitor has an	This DTC compares the Measured Fan Speed and the Expected Fan Speed and ensures that it falls within an acceptable margin of error (low side error comparison)	<= Speed Low Limit [Supporting Table] P0494_LIN_Threshold d	a] Diagnostic Enabled b] Fan Commanded On c] Diagnostic System Disabled(via service tool) d] Battery Voltage In-Range e] LIN Bus based Fan Operation Enabled f] LIN Bus Lost Communication Fault Active (DTC U063200) g] LIN Bus Continuous Operation Fault Active (DTC P135C) h] Fan Out of Range High Fault Active (DTC P30EF) i] Fan Out Of Range Low Fault Active (DTC P30EE) j] Fan speed is above a min fan speed threshold (rpm)	a] = 1 [True if 1; False if 0] b] =TRUE c] =FALSE d] =TRUE e] =TRUE f] =FALSE g] =FALSE h] = FALSE i] = FALSE j] >=700.00	16 failures / 20 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 Illum.
		opportunity to mature a decision.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) System Flow During Non- Purge (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0496	<p>This DTC will determine if the purge solenoid is leaking to engine manifold vacuum.</p> <p>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.</p> <p>Additional Information</p> <p>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).</p> <p>The purge valve leak diagnostic exists to help service replace</p>	<p>Tank Vacuum for</p> <p>Test time</p>	<p>> 2,491 Pa 5 seconds</p> <p>< refer to P0496 Purge Valve Leak Test Engine Vacuum Test Time (Cold Start) as a Function of Fuel Level in Supporting Tables.</p> <p>Test time only increments when engine vacuum > 10.0 kPa.</p>	<p>Diagnostic is Enabled</p> <p>Fuel Level System Voltage BARO Startup IAT</p> <p>Startup ECT Engine Off Time</p> <p>No active DTCs:</p> <p>No Active DTC's TFTKO</p>	<p>10 % < Percent < 90 % > 10.0 volts > 70 kPa 4 °C < Temperature < 35 °C</p> <p>< 35 °C > 28,800.0 seconds</p> <p>MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited FuelLevelDataFault</p> <p>P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0498 P0499 P1001 P1005 P11FF P130F U18A2</p>	<p>Once per cold start</p> <p>Cold start: max time is 1,400 seconds</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 Illum.
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 impedance 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 controlle rs 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 Illum.
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 impedance 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 Illum.
Low Engine Speed Idle System	P0506	This DTC indicates that actual engine speed is lower than desired engine speed at idle so that it is out of speed control capability. Testing is performed when basic conditions are met. If filtered engine speed error exceeds a calibrated threshold for a calibrated duration, code is set. This testing is performed continuously per trip if basic conditions are met	Filtered Engine Speed Error. It is calculated with a calibrated filter coefficient Filter coefficient	> 91.00 rpm 0.00300	Baro Coolant Temp Engine run time Ignition voltage Time since gear change Time since a TCC mode change IAT Vehicle speed Commanded RPM delta Idle time For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 70 kPa > 60 °C > 30 sec 32 > volts > 11 > 3 sec > 3 sec > -20 °C < 1.24 mph, 2kph < 25 rpm > 5 sec > 88.00 pct or < 12.00 pct PTC not active Transfer Case not in 4WD LowState	Diagnostic runs in every 12.5 ms loop Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 > 88.00 pct or < 12.00 pct PTO 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 Illum.
					No active DTCs	<p>following conditions not TRUE: (VeTESR_e_EngSpdReqI ntvType = CeTESR_e_EngSpdMinLi mitAND VeTESR_e_EngSpdReqR espType = CeTESR e NoSuggestio n)</p> <p>Clutch is not depressed</p> <p>TCJBoostPresSnrFA ECT_Sensor_FA EnginePowerLimited EGRValveCircuit_FA EGRValvePerformance_F A IAT_SensorCircuitFA EvapFlowDuringNonPurg e_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA FuelInjectorCircuit_FA MAF_SensorFA EngineMisfireDetected_F A IgnitionOutputDriver_FA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA FuelLevelDataFaultLow FuelConditionDiagnostic Clutch SensorFA AmbPresDfltldStatus P2771</p>		
					All of the above met	> 5 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 Illum.
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.	<p>Deceleration index vs. Engine Speed Vs Engine load</p> <p>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.</p> <p>Incomplete combustion identified by P0300 threshold tables:</p>	<p>(>Idle SCD AND >Idle SCD ddt Tables) OR (>Idle Cyl Mode AND > Idle Cyl Mode ddt Tables)</p>	<p>Misfire Algorithm Enabled (Refer to P0300 for Enablement Requirements)</p> <p>OBD Manufacturer Enable Counter</p> <p>To enable the diagnostic, the Cold Start Emission Reduction Strategy Must Be Active per the following:</p> <p>Catalyst Temperature AND Engine Coolant AND Engine Coolant AND Barometric Pressure AND NumCLOEvents</p> <p>In addition, Dual Pulse Strategy Is Enabled and Active Per the following:</p> <p>Engine Speed</p> <p>Accel Position</p> <p>Engine Run Time</p> <p>For the engine speeds and loads in which Dual</p>	<p>= 0</p> <p>< 550.00 degC > -12.00degC <= 66.00 degC >= 72.00 KPa < 1.00</p> <p>>= 450.00 RPM <= 2,600.00 RPM</p> <p><= 100.00 Pct</p> <p>< 20 seconds</p>	<p>Runs once per trip when the cold start emission reduction strategy is active and Dual Pulse is enabled and active.</p> <p>Frequency: 100ms</p> <p>Test completes after Dual Pulse is no longer active OR The first 500 engine cycles have been reached</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Pulse is active: Dual Pulse Error induced misfires percentage Dual Pulse Error induced misfires percentage Engine Cycles 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	>= catalyst damaging misfire < 90% of the maximum achievable catalyst damaging misfire. >= 50.00 <501 >= 900.00 degC >= 20.00 seconds > 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. < 72.00 KPa		

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Dual Pulse Strategy will exit per the following: Engine Speed OR Accel Position Engine Run Time 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 Misfire Converter Protection strategy Engine Metal Overtemp strategy Fuel control state Output State Control DOD Or DFCO Power Enrichment Dynamic Power Enrichment Piston Protection Hot Coolant Enrichment	> 2,800.00 RPM > 100.00 Pct >= 20 seconds Not Enabled Not being requested Not being requested Open Loop Not being requested for fuel Not Active Not Active Not Active Not Active Not Active		

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Injector Flow Test General Enable DTC's Not Set:	Not Active EngineMisfireDetected_FA AcceleratorPedalFailure ECT_Sensor_FA IAT_SensorCircuitFA MnfdTempSensorCktFA CrankSensor_FA FuelInjectorCircuit_FA MAF_SensorFA MAP_SensorFA AnyCamPhaser_TFTKO ClutchPstnSnsr FA IAC_System RPM_FA IgnitionOutputDriver_FA TPS_FA VehicleSpeedSensor_FA FuelInjectorCircuit_TFTK 0 FHPR_b_FRP_SnsrCkt_FA FHPR_b_FRP_SnsrCkt_T FTKO FHPR_b_PumpCkt_FA FHPR b PumpCkt TFTK 0 TransmissionEngagedState_FA EngineTorqueEstInaccurate FuelPumpRlyCktFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure (EOP) Sensor Performance - Two Stage Oil Pump	P0521	<p>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 running test and engine off test.</p> <p>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.</p>	<p>Two Stage Oil Pump EOP Sensor Test with Engine Running, High Pressure State</p> <p><u>To Fail when previously passing with the engine running:</u></p> <p>Filtered Engine Oil Pressure below expected threshold</p> <p>OR</p> <p>Filtered Engine Oil Pressure above expected threshold</p> <p><u>To pass when previously failing:</u></p> <p>Filtered Engine Oil Pressure above low threshold plus an offset</p> <p>OR</p>	<p>Filtered Oil Pressure < (P0521_P06DD_P06DE_OP_HiStatePressure * 1.00 - 133.0 kPa)</p> <p>OR</p> <p>Filtered Oil Pressure > (P0521_P06DD_P06DE_OP_HiStatePressure * 1.00 + 133.0 kPa)</p> <p>Filtered Oil Pressure > (P0521_P06DD_P06DE_OP_HiStatePressure * 1.00 - 133.0 kPa + 10.0 kPa)</p> <p>OR</p> <p>Filtered Oil Pressure < (P0521_P06DD_P06DE_OP_HiStatePressure * 1.00 + 133.0 kPa)</p>	<p>Two Stage Oil Pump is Present = TRUE</p> <p>Pump is in high pressure state</p> <p>Engine Running Diagnostic Status</p> <p>Engine Off Rationality Test Diagnostic Reporting Status</p> <p>Oil Pressure Sensor In Use</p> <p>Engine Running</p> <p>Ambient Air Pressure</p> <p>Oil Aeration (= TRUE if engine speed > 10,000 RPM for longer than 30.0 seconds)</p> <p>Filtered Engine Speed within range</p> <p>Modelled Oil Temperature within range</p> <p>Pump state change complete</p> <p>No active DTC's</p>	<p>TRUE</p> <p>Enabled</p> <p>Test not report a fail state</p> <p>Yes</p> <p>> 10.0 seconds</p> <p>>70.0 kPa</p> <p>FALSE</p> <p>1,000 RPM < Filtered Engine Speed < 4,500 RPM</p> <p>40.0 deg C < Modelled Oil Temperature < 120.0 deg C</p> <p>Time since state change > 1.00 s</p> <p>Fault bundles: MAFSensorFA ECT_Sensor_FA IAT_SensorFA</p>	<p>> 40 errors out of 50 samples.</p> <p>Performed every 100 msec</p> <p>> 10passes out of 50 samples.</p> <p>Performed every 100 msec</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Filtered Engine Oil Pressure below high threshold minus an offset	P0521_P06DD_P06DE_OP_HiStatePressure * 1.00 + 133.0 kPa - 10.0 kPa) (Details on Supporting Tables Tab: P0521_P06DD_P06DE_OP_HiStatePressure)		EngOilPressureSensorCkt FA AmbientAirDefault EngOilTempFA CrankSensor_FA		
			Two Stage Oil Pump EOP Sensor Test with Engine Running, Low 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	Filtered Oil Pressure < (P0521_P06DD_P06DE_OP_LoStatePressure * 1.00 - 133.0 kPa) OR Filtered Oil Pressure > (P0521_P06DD_P06DE_OP_LoStatePressure * 1.00 + 133.0 kPa)	Two Stage Oil Pump is Present = TRUE Pump is in low 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 > 10,000 RPM for longer than 30.0 seconds) Filtered Engine Speed within range	TRUE Enabled Test not report a fail state Yes >10.0 seconds >70.0 kPa FALSE 1,000 RPM < Filtered Engine Speed < 4,500 RPM	> 40 errors out of 50 samples. Performed every 100 msec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p><u>To pass when previously failing:</u></p> <p>Filtered Engine Oil Pressure above low threshold plus an offset</p> <p>OR</p> <p>Filtered Engine Oil Pressure below high threshold minus an offset</p>	<p>Filtered Oil Pressure > (P0521_P06DD_P06DE_OP_LoStatePressure * 1.00 - 133.0 kPa + 10.0 kPa)</p> <p>OR</p> <p>Filtered Oil Pressure < (P0521_P06DD_P06DE_OP_LoStatePressure * 1.00 + 133.0 kPa - 10.0 kPa)</p> <p>(Details on Supporting Tables Tab: P0521_P06DD_P06DE_OP_LoStatePressure)</p>	<p>Modelled Oil Temperature within range</p> <p>Pump state change complete</p> <p>No active DTC's</p>	<p>40.0 deg C < Modelled Oil Temperature < 120.0 deg C</p> <p>Time since state change > 1.00 s</p> <p>Time since state change > Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA CrankSensor_FA</p>	<p>> 10passes out of 50 samples.</p> <p>Performed every 100 msec</p>	
			<p>Two Stage Oil Pump EOP Sensor Test with Engine Off</p> <p>If enabled:</p> <p><u>To Fail when previously passing with the engine off:</u></p> <p>Filtered Engine Oil Pressure greater than threshold</p>	<p>Filtered Oil Pressure > 40.0 kPa</p>	<p>Two Stage Oil Pump is Present = TRUE</p> <p>Engine Off Rationality Test Diagnostic Status</p> <p>Engine Running Rationality Test Diagnostic Status</p> <p>Modelled Oil Temperature No Engine Movement No active DTC's</p>	<p>TRUE</p> <p>Enabled</p> <p>Test not report a fail state</p> <p>> 70.0 deg C > 10.0 seconds EngineModeNotRunTimer_FA EngOilTempFA</p>	<p>> 20 errors out of 40 samples.</p> <p>Run once per trip</p>	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	<p>< 5.00 percent</p> <p>Deadband: < 5 percent or > 95 percent</p>	<p>Engine Speed Enable Engine Speed Disable</p> <p>Oil Pressure Sensor In Use</p> <p>Diagnostic Status</p>	<p>> 400 rpm < 350 rpm</p> <p>Yes</p> <p>Enabled</p>	<p>1,280 failures out of 1,600 samples</p> <p>Performed every 3.125 msec</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 Illum.
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, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Mutil- Function Switch Circuit Legacy	P0564	<p>Detect when cruise control multi-function switch circuit (analog) voltage is in an invalid range.</p> <p>"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."</p>	Cruise Control analog circuit voltage must be "between ranges" for greater than a calibratable period of time over a sample period.	<p>The cruise control analog voltage A/D count ratio is considered to be "between ranges" when the ratio is measured in the following ranges:</p> <p>0.28 -0.31, 0.415-0.445, 0.585-0.615 0.78-0.81, 1.005- 1.035</p>	<p>Diagnostic is enabled.</p> <p>CAN cruise switch diagnostic enable in ECM</p>	1.00	indicate failure for 0.50 seconds over the sample period / 25.00 seconds.	Type C, No SVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control On Switch Circuit	P0565	<p>Detects a failure of the cruise on/off switch in a continuously applied state</p> <p>"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.</p>	Cruise Control On switch remains applied for greater than a calibratable period of time over a sample period.	fail in the applied state for greater than 20.00 seconds over the sample period of 25.00 seconds	<p>Diagnostic is enabled.</p> <p>CAN cruise switch diagnostic enable in ECM</p>	1.00	fail for greater than 20.00 seconds / 25.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Resume Circuit	P0567	<p>Detects a failure of the cruise resume switch in a continuously applied state</p> <p>"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."</p>	Cruise Control Resume switch remains applied for greater than a calibratable period of time over a sample period.	fail in the applied state for greater than 89.00 seconds over the sample period of 99.00 seconds	<p>Diagnostic is enabled.</p> <p>CAN cruise switch diagnostic enable in ECM</p>	1.00	fail for greater than 89.00 seconds / 99.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Set Circuit	P0568	Detects a failure of the cruise set switch in a continuously 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 over a sample period	fail in the applied state for greater than 89.00 seconds over the sample period of 99.00 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail for greater than 89.00 seconds / 99.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Cancel Switch Circuit	P056C	<p>Detects a failure of the cruise cancel switch in a continuously applied state</p> <p>"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."</p>	Cruise Control Cancel switch remains applied for greater than a calibratable period of time over a sample period	fail in the applied state for greater than 20.00 seconds over the sample period of 25.00 seconds	<p>Diagnostic is enabled.</p> <p>CAN cruise switch diagnostic enable in ECM</p>	1.00	fail for greater than 20.00 seconds / 25.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Input Circuit Switch Legacy	P0575	Determines if cruise switch state received from the BCM is valid. "Emissions Neutral Default Action : When the ECM determines that a serial communication fault from the BCM has occurred with frame \$1E1, ECM sets the code and cruise control will be disabled and disengaged until the diagnostic passes and recovery conditions are satisfied."	If x of y rolling count/ protection value faults occur, disengage cruise for duration of fault	Message <> 2's complement of message Message milling countprevious message rolling count value plus one	Serial communication to BCM Power Mode Engine Running 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	No loss of communication = RUN = TRUE => 3,000.00 milliseconds =>11.00 volts	CrsCntrlSwStAlv RollCnt: 6.00 fail counts out of 0.00 sample counts CrsCntrlSwStatP rotVal: 6.00 fail counts out of 0.00 sample counts CrsSecSwStatA RC: 6.00 fail counts out of 15.00 sample counts CrsSecSwStatPV al : 6.00 fail counts out of 15.00 sample counts CrsSpdLmtrSwSt atARC: 6.00 fail counts out of 15.00 sample counts CrsSpdLmtrSwSt atPVal: 6.00 fail counts out of 15.00 sample counts	Type C, No SVS , "Emissio ns Neutral Diagnost ics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 threshold after calibratable number of tests have completed to report a "test passed" for P057B	EWMA value looked up in supporting table P057B KtBRKI_K_FastTestP ointWeight 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 > 3.88 OR (for slow test) shift lever has been in park once this key cycle vehicle speed >= 5.40 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_CmpltTest PointWeight P057B as a function of calculated brake pedal position delta EWMA value is less than 0.40	no DTC's active (P057C, P057D)	shift lever has been in park once this key cycle vehicle speed >= 5.40 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 Illum.
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 Sensor 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 Illum.
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 Illum.
Brake Pedal Position Sensor Circuit Intermittent/ Erratic	P057E	detects noisy / erratic output 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	21.60	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 Illum.
Cruise Control Multi- function Circuit Low Voltage Legacy	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 over a sample period.	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 ranges: 0-0.185	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	indicate failure for 2.00 seconds / 25.00 seconds.	Type C, No SVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi- function Circuit High Voltage Legacy	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 an "Open Short To Ground" range for greater than a calibratable period of time over a sample period.	The cruise control analog voltage A/D count ratio is considered to be "short to power" when the ratio is measured in the following range: 1.005- 1.035	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	indicate failure for 2.00 seconds / 25.00 seconds.	Type C, No SVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Performance	P058A	This DTC monitors for a battery module internal fault	Battery Module signals an internal fault via LIN bus.		The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	Enabled = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Current Monitoring Performance	P058B	This DTC monitors for a battery module current fault	Battery Module signals an internal fault via LIN bus		The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	Enabled = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Temperature Monitoring Performance	P058C	This DTC monitors for a battery module temperature fault	Difference between Battery Module raw temperature values	> 10.00 Celsius	The historical mode diagnostic is enabled and / or The continuous mode diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit For Historical Mode IBS Down Counter (over LIN bus) For Continuous Mode IBS Down Counter (over LIN bus) IBS Temperature Data Available over LIN bus Internal Temperature Circuit Low Fault Active (P16DE) Internal Temperature	Enabled Enabled = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True Between 1 and 24 = Zero = True = False	8 failed samples within 10 total samples Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Circuit High Fault Active (P16DF) Battery Module Temperature Too High Fault Active (P058E) Battery Module Temperature Too Low Fault Active (P058F)	= False = False = False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Voltage Monitoring Performance	P058D	This DTC monitors for a battery module voltage fault	Difference between 12V System Reference Voltage and IBS 12V Battery Voltage values	> 5.00 Volts	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit IBS Voltage and Current Data Available over LIN bus Battery Monitor Module Circuit Low Voltage Fault Active (P16D4) Battery Monitor Module Circuit High Voltage Fault Active (P16D5)	Enabled = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True = True = False = False	32 failed samples within 40 total samples Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Temperature Too High	P058E	This DTC monitors for a battery module temperature too high fault	Battery Module raw temperature 2 value	> 120.00 Celsius	<p>The historical mode diagnostic is enabled and / or The continuous mode diagnostic is enabled</p> <p>System Diagnostics Disabled</p> <p>Power Mode</p> <p>12V System Reference Voltage</p> <p>LIN Bus Off or Battery Module Communication Faults Active</p> <p>Outside Air Temperature</p> <p>Outside Air Temperature Validity Bit</p> <p>For Historical Mode IBS Down Counter (over LIN bus) For Continuous Mode IBS Down Counter (over LIN bus)</p> <p>IBS Measure Temperature Data Available over LIN bus</p>	<p>Enabled</p> <p>Enabled</p> <p>= False</p> <p>Not equal off</p> <p>> 9.00 Volts</p> <p>= False</p> <p>> -20.00 Celsius and < 50.00 Celsius</p> <p>= True</p> <p>Between 1 and 24</p> <p>= zero</p> <p>= True</p>	<p>4 failed samples within 5 total samples</p> <p>Diagnostic runs in the 250 ms loop</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Temperature Too Low	P058F	This DTC monitors for a battery module temperature too low fault.	Battery Module raw temperature 2 value	< -43.00 Celsius	The historical mode diagnostic is enabled and / or The continuous mode diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit For Historical Mode IBS Down Counter (over LIN bus) For Continuous Mode IBS Down Counter (over LIN bus) IBS Measure Temperature Data Available over LIN bus	Enabled Enabled = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True Between 1 and 24 = Zero = True	4 failed samples within 5 total samples Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Active Grill Air Shutter A Performance /Stuck OFF	P059F	A2-part diagnostic. Part 1 continuously monitors for failure to achieve a commanded shutter actuator position [Suspect Stuck Condition] 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 position [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.	<p>[Smart Shutter Actuator 1 Position Response</p> <p>OR</p> <p>Shutters Not Initialized</p> <p>OR</p> <p>The absolute difference between Smart Shutter Actuator 1 Position Response and Shutter response and Commanded Position percent]</p> <p>AND</p> <p>Shutter 1 Diagnostic Delay Threshold count</p>	<p>[Indeterminate</p> <p>OR</p> <p>= TRUE</p> <p>OR</p> <p>> 5.00]</p> <p>AND</p> <p>Counter > 99.00 counts</p>	<p>a. Command Shutter Enable.</p> <p>b. Shutter Performance Diagnostic Enabled</p> <p>c. Off Vehicle Communication Service Request Diagnostic Enabled</p> <p>Any of the following conditions are met:</p> <p>d. Run Crank Active</p> <p>All of the following conditions are met:</p> <p>e. Run Crank Active</p> <p>f. Command On and Key Off</p> <p>g. ECU Awake</p> <p>h. Run Crank Voltage in Range</p> <p>i. Ignition Powertrain Relay Voltage in Range</p> <p>j. Actuator Initialization Complete</p> <p>Any of the following conditions are met</p> <p>k. If Enabled, performance diagnostics will be enabled even in the</p>	<p>a. = TRUE</p> <p>b. = Enabled</p> <p>c. = TRUE</p> <p>d. = TRUE</p> <p>e. = FALSE</p> <p>f. = TRUE</p> <p>g. = TRUE</p> <p>h. >=11.00 AND <= 32.00</p> <p>i. >= 11.00 AND <= 32.00</p> <p>j. = TRUE</p> <p>k. = Disabled</p>	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 Illum.
					<p>presence of a communication fault.</p> <p>All of the following conditions are met:</p> <p>l. LIN communication NOT faulted.(DTC: U028400, U058500)</p> <p>m. No LIN communication Fault Pending</p> <p>n. LIN communication Data is Ready</p>	<p>1. = TRUE</p> <p>m. =TRUE</p> <p>n. = TRUE</p>		
			Shutter 1 Performance Test count	= 5.00 counts	<p>a. Command Shutter1 Enable.</p> <p>b. Shutter1 Performance Diagnostic Enabled</p> <p>c. Off Vehicle Communication Service Request Diagnostic Enabled</p> <p>Any of the following conditions are met:</p> <p>d. Run Crank Active</p> <p>All of the following conditions are met:</p> <p>e. Run Crank Active</p> <p>f. Command On and Key Off</p>	<p>a. = TRUE</p> <p>b. = Enabled</p> <p>c. = TRUE</p> <p>d. = TRUE</p> <p>e. = FALSE</p> <p>f. = TRUE</p>	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 Illum.
					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 Illum.
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration 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. 5.00 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 Illum.
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 Illum.
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 Illum.
ECM RAM Failure	P0604	Indicates that the ECM has detected a RAM fault. This includes Primary Processor System RAM Fault, Primary Processor Cache RAM Fault, Primary Processor TPU RAM Fault, Primary Processor Update Dual Store RAM Fault, Primary Processor Write Protected RAM Fault, and Secondary Processor RAM Fault. This diagnostic runs continuously.	Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	Type A, 1 Trips
			Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	65,534 counts			Diagnostic runs continuously (background loop)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 processors.	Time new seed not received exceeded			always running	500 milliseconds	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 150 milliseconds 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 occurred 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 Illum.
			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 occurred 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: P0606 PFM_Enable f (Loop Time) (If 0, this test is disabled)	Fail Table, f(Loop Time). See supporting tables: P0606 PFM Sequence Fail f (Loop Time) / Sample Table, f (Loop Time)See supporting tables: P0606 PFM Sequence Sample f(Loop Time) counts 50 ms/count in the ECM main processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal ECM Processor Integrity Performance	P0607	Indicates that the ECM has detected an internal processor integrity performance.	Performs the failure diagnostic for the offline and online BIST results.			Test is enabled: 1. (If 0, this test is disabled)	5 counts background task/ count in the ECM main processor	Type A, 1 Trips
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occurred 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 occurred 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 Illum.
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 Illum.
			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 Illum.
Internal Control Module Main Processor Performance (Gasoline applications ONLY)	P060C	Detect Processor Calculation faults due to RAM corruptions, ALU failures and ROM failures For all of the following cases: If the individual diagnostic threshold is equal to 2048 ms, this individual case is not applicable. If any of the following cases are X out of Y diagnostics and the fail (x) is greater than the sample (Y), this individual case is also not applicable.	Equivance Ratio torque compensation exceeds threshold	-60.52 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	Type A, 1 Trips
			Absolute difference between Equivance Ratio torque compensation and its dual store out of bounds given by threshold	60.52 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			Absolute difference of Accessory torque and its redundant calculation is out of bounds given by threshold range	60.52 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Absolute difference of Filtered Air-per-cylinder and its redundant calculation is out of bounds given by threshold range	64.18 mg	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			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 425 ms continuous, 0.5 down time multiplier	
			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 multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				Nm				
			One step ahead calculation of air-per-cylinder and two step ahead is greater than threshold	80.00 mg		Engine speed > 815 rpm	Up/down timer 451 ms continuous, 0.5 down time multiplier	
			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 multiplier	
			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 multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 808.00 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			Creep Coast Axle Torque is out of bounds given by threshold range	High Threshold 808.00 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Absolute difference of Friction torque and its redundant calculation is out of bounds given by threshold range	60.52 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 multiplier	
			Launch spark is active but the launch spark redundant path indicates it should not be active	N/A		Engine speed < 7,800.00 or 7,900.00 rpm (hysteresis pair)	Up/down timer 151 ms continuous, 0.5 down time multiplier	
			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	

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 multiplier	
			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 multiplier	
			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 Illum.
			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 451 ms continuous, 0.5 down time multiplier	
			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 multiplier	
			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) + 60.52	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				Nm				
			Engine Predicted Request Without Motor is greater than its redundant calculation plus threshold	59.52 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			Engine Immediate Request Without Motor is greater than its redundant calculation plus threshold	59.52 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Positive Torque Offset is greater than its redundant calculation plus threshold OR Positive Torque Offset is less than its redundant calculation minus threshold	60.52 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			Commanded Predicted Engine Request is greater than its redundant calculation plus threshold	60.52 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, down time multiplier 0.5	

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			1. Cylinder Torque Offset exceeds step size threshold OR 2. Sum of Cylinder Torque Offset exceeds sum threshold	1. 60.52 Nm 2. 60.52 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			Engine Capacity Minimum Immediate Without Motor is greater than its dual store plus threshold	60.52 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			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 multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 multiplier	
			Commanded Immediate Engine Request is greater than its redundant calculation plus threshold	60.52 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Engine Speed Lores Intake Firing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than Orpm	Up/down timer 151 ms continuous, 0.5 down time multiplier	
			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 151 ms continuous, 0.5 down time multiplier	
			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) + 60.52 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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) + 60.52 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	808.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Driver Immediate Request is less than its redundant calculation minus threshold	808.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded Immediate Request is greater than its redundant calculation plus threshold OR Commanded Immediate Request is less than its redundant calculation minus threshold	808.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			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 multiplier	
			Difference between Cruise Axle Torque Arbitrated Request and	30.30 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 Illum.
			Cruise Axle Torque Request exceeds threshold			seconds	0.5 down time multiplier	
			Desired engine torque request greater than redundant calculation plus threshold	59.52 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Engine min capacity above threshold	60.52 Nm	Ignition State	Accessory, run or crank	Up/down timer 98 ms continuous, 0.5 down time multiplier	
			No fast unmanaged retarded spark above the applied spark plus the threshold	15.00 Degree		Engine speed greater than Orpm	Up/down timer 425 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 135 ms continuous, 0.5 down time multiplier	
			1. Absolute difference of redundant calculated engine speed above threshold	500 RPM		Engine speed greater than 0 RPM	Up/down timer 151 ms continuous, 0.5 down time multiplier	
			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 multiplier	
			Speed Control's Predicted 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 Illum.
			do not match				0.5 down time multiplier	
			Engine oil temperature and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 319 ms continuous, 0.5 down time multiplier	
			Desired throttle position greater than redundant calculation plus threshold	10.00 percent	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			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 multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Throttle desired torque above desired torque plus threshold	60.52 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Desired filtered throttle torque exceeds the threshold plus the higher of desired throttle torque or modeled throttle torque	60.52 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Torque feedback proportional term is out of allowable range or its dual store copy does not match	High Threshold 30.26 Nm Low Threshold -30.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Torque feedback integral term magnitude or rate of change is out of allowable range or its dual store copy do not match	High Threshold 56.74 Nm Low Threshold -60.52 Nm Rate of change threshold 3.78 Nm/loop	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Difference of Final Torque feedback proportional plus integral term and its redundant calculation is out of bounds given by threshold range	High Threshold 60.52 Nm Low Threshold -60.52 Nm				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Difference of torque desired throttle area and its redundant calculation is out of bounds given by threshold range	High Threshold 5.02 % Low Threshold - 5.02 %	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Difference of torque model coefficients and its redundant calculation is out of bounds given by threshold range	High Threshold 0.0000605 Low Threshold -0.0000605	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			Difference of base friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 60.52 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				Low Threshold -60.52 Nm				
			Accessory drive friction torque is out of bounds given by threshold range	High Threshold 60.52 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			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 multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Difference of Oil temperature delta friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 60.52 Nm Low Threshold -60.52 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Generator friction torque is out of bounds given by threshold range	High Threshold 60.52 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Absolute difference between the Supercharger friction torque and its redundant	60.52 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 Illum.
			calculation greater than threshold				down time multiplier	
			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 60.52 Nm Low Threshold -60.52 Nm Rate of change threshold 3.78 Nm/loop		Engine speed >0rpm MAF, MAP and Baro DTCs are false	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Torque error compensation is out of bounds given by threshold range	High Threshold 60.52 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Delta Torque Baro compensation is out of bounds given by threshold range	High Threshold 7.59 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 exceed threshold OR 3. Rate of change of reserve torque exceeds threshold, increasing direction only OR 4. Reserve engine torque above allowable capacity threshold	1.59.52 Nm 2. N/A 3.59.52 Nm 4.59.52 Nm	3. &4.: Ignition State	1. &2.: Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 60.52 Nm 3. &4.: Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Engine Vacuum and its dual store do not match	N/A		Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			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 151 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			event is greater than threshold	P060C_Delta MAP Threshold f(Desired Engine Torque)			down time multiplier	
			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 multiplier	
			Driver Predicted Request is greater than its redundant calculation plus threshold OR Driver Predicted Request is less than its redundant calculation minus threshold	808.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 multiplier	
			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) + 60.52 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			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 multiplier	
			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 Illum.
						changing and one loop after React command Engine speed >0rpm	0.5 down time multiplier	
			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 multiplier	
			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 151 ms continuous, 0.5 down time multiplier	
			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 425 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Absolute difference between Estimated Engine Torque and its dual store are above a threshold	60.52 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Absolute difference between Estimated Engine Torque without reductions due to torque control and its dual store are above a threshold	60.52 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			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) > 60.52 Nm	Up/down timer 451 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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	61 Nm		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			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 > 815 rpm	Up/down timer 451 ms continuous, 0.5 down time multiplier	
			Rate limited cruise axle torque request and its dual store do not match within a threshold	30.30 Nm	Ignition State	Accessory, run or crank	Up/down timer 163 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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	1. 5.00 % 2. N/A 3. N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			OR					
			2. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its dual store do not equal					
			OR		Ignition State	Accessory, run or crank	Up/down timer	
			3. Absolute difference of Calculated accelerator pedal position and its dual store do not equal					
			Commanded axle torque	808.00	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 Illum.
			is greater than its redundant calculation by threshold	Nm			475 ms continuous, 0.5 down time multiplier	
			Commanded axle torque is less than its redundant calculation by threshold	1,212.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Preload timer and its redundant calculation do not equal	N/A	Ignition State	Accessory, run or crank AFM apps only	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			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 multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 multiplier	
			Absolute difference of the calculated spark offset for equivalence ratio and its redundant calculation is greater than a threshold	15.00 degrees		Engine speed >0rpm	Up/down timer 151 ms continuous, 0.5 down time multiplier	
			Transmission Torque Request calculations 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 calculation is greater than a threshold	0.01 Nm			Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Absolute difference of maximum throttle area	15 mm2			Up/down timer 135	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			and its redundant calculation is greater than a threshold				ms continuous, 0.5 down time multiplier	
			Absolute difference of Desired TIAP and its redundant calculation is greater than a threshold	5.00 kPa			Up/down timer 475 ms continuous, 0.5 down time multiplier	
			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 multiplier	
			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 multiplier	
			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 multiplier	
			Calculated or Commanded Engine to Axle ratio is lower than a threshold -OR- Engine to Axle Offset is greater than a threshold	0.9 60.52 Nm	Ignition State	Accessory, run or crank	Up/down timer 175.00 ms continuous, 0.5 down time multiplier	
			Difference between	30.30 Nm	Ignition State	Accessory, run or crank	Up/down timer	

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Cruise Arbitration Request and its redundant calculation exceeds a threshold -OR- Difference between Cruise Acceleration Request and its redundant calculation exceeds a threshold	0.05 KPH/Second			500.00 ms continuous, 0.5 down time multiplier	
			Delivered fraction does not match commanded fraction within a specified time limit	0.0100	Engine State	Running	Up/down timer 2,047.97 ms continuous, 0.5 down time multiplier	
			Difference between delivered cylinder deactivation does not match commanded cylinder deactivation is greater than a threshold	64.00	Engine State	Running	Up/down timer 2,047.97 ms continuous, 0.5 down time multiplier	
			Difference between commanded Axle Torque and its redundant calculation is greater than a threshold -OR- Difference between commanded Axle Torque and its redundant calculation is less than a threshold	808.00 Nm 1,212.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,047.97 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Starter Relay Control Circuit Open (12VSS)	P0615	Controller specific output driver circuit diagnoses the Starter relay (12VSS) low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	>= 200 KOhms impedance between signal and controller ground.	<p>Starter control diag enable</p> <p>Engine speed</p> <p>Run Crank voltage</p>	<p>Enabled</p> <p>>=0.00 RPM</p> <p>>=11.00 volts</p>	<p>40 failures out of 50 samples</p> <p>50 ms / sample</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Starter Relay Control Circuit Low Voltage (12VSS)	P0616	Controller specific output driver circuit diagnoses the Starter relay (12VSS) 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.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	<= 0.5 Ohms impedance between signal and controller ground	<p>Starter control diag enable</p> <p>Engine speed</p> <p>Run Crank voltage</p>	<p>Enabled</p> <p>>=0.00 RPM</p> <p>>=6.41 volts</p>	<p>8 failures out of 10 samples</p> <p>50 ms / sample</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Starter Relay Control Circuit High Voltage (12VSS)	P0617	Controller specific output driver circuit diagnoses the Starter relay 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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	<= 0.5 Ohms impedance between signal and controller power	<p>Starter control diag enable</p> <p>Engine speed</p> <p>Run Crank voltage</p>	<p>Enabled</p> <p>>=0.00 RPM</p> <p>>=6.41 volts</p>	<p>40 failures out of 50 samples</p> <p>50 ms / sample</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	Open circuit condition: circuit attached to the Controller external connection has an impedance between voltage source pin and controller ground of ≥ 200 K [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)	==1.00 [Boolean] ==1.00 [Boolean] == FALSE ≥ 11.00 [V] CrankSensor_FA CamSensorAnyLocationF A == FALSE == FALSE == FALSE > 1.00 [s]	5.00 [s] (Debouncing performed based on cumulative time in fault condition) Task rate = 250 [ms]	Type C, No SVS
			OR Impedance across voltage source pin and controller 5V source during on or off state indicates shorted to power	OR Power shot condition: circuit attached to the Controller external connection has an impedance between voltage source pin and controller 5V source of ≤ 0.5 [Ohm]				
			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)	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.	
Internal Control Module Fuel Injector Control Performance	P062B	This DTC determines the internal fuel injector 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	>= 90 Volts	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	Type A, 1 Trips	
			OR						Low Voltage - 160 failures out of 200 samples
			Internal ECU Boost Voltage	<= 40 Volts					Driver Status Not Ready- 160 failures out of 200 samples
			OR						Driver Status Uninitialized - Uninitialized state for >= 100 counts
			Driver Status	= Not Ready					All at 12.5ms per sample
			Driver Status	= Uninitialized					

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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
5 Volt Reference #1 Circuit	P0641	Detects a continuous or intermittent short on the 5 volt reference circuit #1 by monitoring the reference percent Vrefl and failing the diagnostic when the percent Vrefl is too low or too high or if the delta between the filtered percent Vrefl and non-filtered percent Vrefl is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vrefl < or ECM percent Vrefl > or the difference between ECM filtered percent Vrefl and percent Vrefl > (100% corresponds to 5.5 Volt)	88.64 % Vrefl 93.18% Vrefl 0.90 % Vrefl	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 >6.41 Volts = 25.00 Seconds = FALSE >8.41 Volts = TRUE	19/39 counts; or 187.5000 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 Illum.
Internal Control Module 02 Sensor Processor Performance Bank 1) (For use with WRAF	P064D	<p>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.</p> <p>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.</p>	B1S1 WRAF ASIC indicates control module faults	Controller Status fail counts and Measure Valid fail counts are accumulated to determine fault status	<p>Diagnostic is Enabled</p> <p>Engine Run or Auto stop</p> <p>Heater Warm-up delay</p> <p>WRAF circuit diagnostic delay since power up</p>	<p>= True</p> <p>= Complete</p> <p>> 20.0 sec</p>	<p>128 controller status fail counts out of 160 samples</p> <p>OR</p> <p>128 measure valid fail counts out of 160 samples</p> <p>25 ms / sample</p> <p>Continuous</p>	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
5 Volt Reference #2 Circuit	P0651	Detects a continuous or intermittent short on the 5 volt reference circuit #2 by monitoring the reference percent Vref2 and failing the diagnostic when the percent Vref2 is too low or too high or if the delta between the filtered percent Vref2 and non-filtered percent Vref2 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref2 < or ECM percent Vref2 > or the difference between ECM filtered percent Vref2 and percent Vref2 > (100% corresponds to 5.5 Volt)	88.64 % Vref2 93.18% Vref2 0.90 % Vref2	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 >6.41 Volts = 25.00 Seconds = FALSE >8.41 Volts = TRUE	19/39 counts; or 187.5000 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 Illum.
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 Q 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 controlle rs P0686 may also set (Powertr ain Relay Control Short to Ground).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	Short to power: < 0.5 Q impedance between output and controller power	<p>Powertrain relay Low Side driver short to power diagnostic enable = TRUE</p> <p>Run/Crank Voltage</p>	<p>1.00</p> <p>Voltage > 11.00 volts</p>	<p>8 failures out of 10 samples</p> <p>250 ms / sample</p>	Type B, 2 Trips

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

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

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

23OBDG03A Part2 ECM Summary Tables

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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 ≥ 500 milliseconds	6/12 counts or 2,000 milliseconds 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 Illum.
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 Cumulative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow	Yes > 2.0 seconds > 400 RPM and < 8,500 RPM > 100 Revs > 20 mg/cylinder and < 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0400 Updated each engine event	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 Cumulative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow	Yes > 2.0 seconds > 400 RPM and < 8,500 RPM > 100 Revs > 20 mg/cylinder and < 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient Case 1 Weight Coefficient = 0.0400 Updated each engine event Case 2 Weight Coefficient = 0.0400 Updated each engine event	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 controlle rs 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 Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	Short to Ground Circuit < 0.5 Q impedance between output and controller ground	Powertrain Relay Voltage Run/Crank Active Cranking State	<p>> 11.00</p> <p>= True</p> <p>= False</p>	<p>>= 40 errors out of 50 samples.</p> <p>Performed every 100 msec</p>	<p>Type B, 2 Trips</p> <p>Note: In certain controllers P06DA may also set (Engine Oil Pressure Control Circuit Open)</p>

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 Illum.
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 than desired then the intrusive test is retriggered.	<u>Fail from passing state:</u> 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 1.5 seconds] Oil Pressure delta < P06DD_P06DE_OP_StateChangeMin AND Filtered Oil Pressure ≥ (P0521_P06DD_P06DE_OP_HiStatePressure + P0521_P06DD_P06DE_OP_LoStatePressure) 2 (see P06DD details on Supporting Tables Tab P06DD_P06DE_OP_StateChangeMin P0521_P06DD_P06DE_OP_HiStatePressure P0521_P06DD_P06DE_OP_LoStatePressure) <u>Active Criteria:</u> One Sided Performance Test = Disabled	<u>Common Criteria:</u> Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 10,000 RPM for longer than 30.0 seconds) No active DTC's for diagnosis enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control enable: <u>Active Criteria:</u> One Sided Performance Test = Disabled	TRUE > 10.0 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 Disabled	> 12 errors out of 15 samples. Run once per trip or activated 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 Illum.
					Oil Pump in Low State Modelled Oil Temperature within range Filtered Engine Speed within range Delta Filtered Engine Speed within a range Engine Torque within range Filtered Oil Pressure within range	> 1.5 seconds 50.0 deg C < Oil Temp < 110.0 deg C 1,350 RPM < Filtered Engine Speed < 2,500 RPM ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] < 150 RPM 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 Engine Oil Pressure > P06DD_P06DE_MinOilPressureThresh (see P06DD details on Supporting Tables Tab P06DD_P06DE_MinOilPressureThresh)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Expected Oil Pressure Delta within range	100.0 kPa < ABS [P0521_P06DD_P06DE_ 0 P_HiStatePressure - P0521_P06DD_P06DE_ OP_LoStatePressure] < 250.0 kPa		
					<u>Passive Criteria:</u> Active Test Passed Filtered Engine Speed within range Modelled Oil Temperature within range Delta Filtered Engine Speed within a range Oil Pressure Delta within a range	TRUE 1,000 RPM < Filtered Engine Speed < 4,500 RPM 40.0 deg C < Oil Temp < 120.0 degC ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.50 seconds] < 1,000 RPM Oil Pressure Delta < P06DD_P06DE_OP_Stat eChangeMin (see P06DD details on Supporting Tables Tab P06DD_P06DE_OP_Stat eChangeMin)		
			<u>Fast Pass Condition</u> 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 -	<u>Common Criteria:</u> Two Stage Oil Pump is Present Engine Running	TRUE > 10.0 seconds	0 errors out of 5 samples. Run once per trip or activated by the Passive Test	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			above a threshold	<p>filtered oil pressure after 1.5 seconds]</p> <p>Oil Pressure delta <</p> <p>P06DD_P06DE_OP_StateChangeMin</p> <p>AND</p> <p>Filtered Oil Pressure ≥</p> <p>(</p> <p>P0521_P06DD_P06DE_OP_HiStatePressure</p> <p>-</p> <p>P0521_P06DD_P06DE_OP_LoStatePressure</p> <p>) 2</p> <p>(see P06DD details on Supporting Tables Tab</p> <p>P06DD_P06DE_OP_StateChangeMin</p> <p>P0521_P06DD_P06DE_OP_HiStatePressure</p> <p>P0521_P06DD_P06DE_OP_LoStatePressure</p> <p>)</p>	<p>Ambient Air Pressure</p> <p>Oil Aeration (= TRUE if engine speed > 10,000 RPM for longer than 30.0 seconds)</p> <p>No active DTC's for diagnosis enable:</p> <p>Check oil pump TFTKO as a diagnostic enable when Enabled.</p> <p>No active DTC's for control enable:</p> <p><u>Active Criteria:</u> One Sided Performance Test = Disabled</p> <p>Oil Pump in Low State</p> <p>Modelled Oil Temperature within range</p> <p>Filtered Engine Speed within range</p>	<p>>70.0 kPa</p> <p>FALSE</p> <p>Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA OilPmpTFTKO CrankSensor_FA</p> <p>Enabled : OilPmpTFTKO</p> <p>Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA</p> <p>Disabled</p> <p>> 1.5 seconds</p> <p>50.0 deg C < Oil Temp < 110.0 degC</p> <p>1,350 RPM < Filtered Engine Speed < 2,500</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>Engine Torque within range</p> <p>Delta Filtered Engine Speed within a range</p> <p>Filtered Oil Pressure within range</p> <p>Expected Oil Pressure Delta within range</p>	<p>RPM</p> <p>P06DD_P06DE_MinEnableTorque_OP \leq Indicated Requested Engine Torque \leq P06DD_P06DE_MaxEnableTorque_OP (see P06DD details on Supporting Tables Tab P06DD_P06DE_MinEnableTorque_OP P06DD_P06DE_MaxEnableTorque_OP)</p> <p>ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] < 150 RPM</p> <p>Filtered Engine Oil Pressure > P06DD_P06DE_MinOilPressureThresh (see P06DD details on Supporting Tables Tab P06DD_P06DE_MinOilPressureThresh)</p> <p>100.0 kPa < ABS [P0521_P06DD_P06DE_OP_HiStatePressure - P0521_P06DD_P06DE_OP_LoStatePressure] < 250.0 kPa</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Two Stage Oil Pump Control Circuit StuckOn - Two Sided	P06DE	<p>Diagnoses the two stage oil pump is stuck in the low pressure state. This diagnostic includes an intrusive test and a passive test.</p> <p>Intrusive test: The oil pump control is cycled off (high pressure) and on (low pressure) Y 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.</p> <p>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.</p>	<p><u>Fail from a passing state:</u></p> <p>Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is below a threshold</p>	<p>Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change - filtered oil pressure after 1.5 seconds]</p> <p>Oil Pressure delta < P06DD_P06DE_OP_StateChangeMin (see P06DE details on Supporting Tables Tab)</p> <p>Filtered Oil Pressure ≤ P0521_P06DD_P06DE_OP_HiStatePressure (re - P0521_P06DD_P06DE_OP_LoStatePressure) * 2 (see P06DE details on Supporting Tables Tab)</p>	<p><u>Common Criteria:</u></p> <p>Two Stage Oil Pump is Present</p> <p>Engine Running</p> <p>Ambient Air Pressure</p> <p>Oil Aeration (= TRUE if engine speed > 10,000 RPM for longer than 30.0 seconds)</p> <p>No active DTC's for diagnosis enable:</p> <p>Check oil pump TFTKO as a diagnostic enable when Enabled.</p> <p>No active DTC's for control enable:</p> <p><u>Active Criteria:</u> One Sided Performance</p>	<p>TRUE</p> <p>> 10.0 seconds</p> <p>>70.0 kPa</p> <p>FALSE</p> <p>Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA</p> <p>Enabled : OilPmpTFTKO</p> <p>Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA</p> <p>Disabled</p>	<p>> 12 errors out of 15 samples.</p> <p>Run once per trip or activated by the Passive Test</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Test = Disabled Oil Pump in Low State Modelled Oil Temperature within range Filtered Engine Speed within range Engine Torque within range Delta Filtered Engine Speed within a range Filtered Oil Pressure within range Expected Oil Pressure Delta within range	> 1.5 seconds 50.0 deg C < Oil Temp < 110.0 degC 1,350 RPM < Filtered Engine Speed < 2,500 RPM P06DD_P06DE_MinEnableTorque_OP ≤ Indicated Requested Engine Torque ≤ P06DD_P06DE_MaxEnableTorque_OP (see P06DE details on Supporting Tables Tab) ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] < 150 RPM Filtered Engine Oil Pressure > P06DD_P06DE_MinOilPressureThresh (see P06DD details on Supporting Tables Tab) 100.0 kPa < ABS [P0521_P06DD_P06DE_OP_HiStatePressure - P0521_P06DD_P06DE_OP_LoStatePressure] < 250.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<u>Passive Criteria:</u> Active Test Passed Filtered Engine Speed within range Modelled Oil Temperature within range Delta Filtered Engine Speed within a range Oil Pressure Delta < P06DD_P06DE_OP_StateChangeMin (see P06DE details on Supporting Tables Tab)	TRUE 1,000 RPM < Filtered Engine Speed < 4,500 RPM 40.0 deg C < Oil Temp < 120.0 degC ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.50 seconds] < 1,000 RPM TRUE		
			<u>Fast Pass Condition</u> Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is below a threshold	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change - filtered oil pressure after 1.5 seconds] Oil Pressure delta <	<u>Common Criteria:</u> Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed	TRUE > 10.0 seconds >70.0 kPa FALSE	0 errors out of 5 samples. Run once per trip or activated by the Passive Test	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				P06DD_P06DE_OP_StateChangeMin (P06DD Performance Test Details on Supporting Tables Tab) Filtered Oil Pressure ≤ P0521_P06DD_P06DE_OP_HiStatePressure (re - P0521_P06DD_P06DE_OP_LoStatePressure)/2 (P06DD Performance Test Details on Supporting Tables Tab)	> 10,000 RPM for longer than 30.0 seconds) No active DTC's for diagnosis enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control : <u>Active Criteria:</u> One Sided Performance Test = Disabled Oil Pump in Low State Modelled Oil Temperature within range Filtered Engine Speed within range Engine Torque within range	Fault bundles: MAFSensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Disabled > 1.5 seconds 50.0 deg C < Oil Temp < 110.0 degC 1,350 RPM < Filtered Engine Speed < 2,500 RPM P06DD_P06DE_MinEnableTorque_OP ≤		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>Delta Filtered Engine Speed within a range</p> <p>Filtered Oil Pressure within range</p> <p>Expected Oil Pressure Delta within range</p>	<p>Indicated Requested Engine Torque \leq P06DD_P06DE_MaxEnableTorque_OP (P06DD Performance Test Details on Supporting Tables Tab)</p> <p>ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] < 150 RPM</p> <p>Filtered Engine Oil Pressure > P06DD_P06DE_MinOilPressureThresh (see P06DD details on Supporting Tables Tab)</p> <p>100.0 kPa < ABS [P0521_P06DD_P06DE_OP_HiStatePressure - P0521_P06DD_P06DE_OP_LoStatePressure] < 250.0 kPa</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Unable to Engage Neutral	P073D	Detects the inability to achieve or remain in Neutral.	Actual Arbitrated Transmission Range	≠Neutral	Actual Transmission Range Commanded Transmission Range AND CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup	= Good value = Neutral =False =False =True = True =True =Park =False	10,000.00 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 Illum.
Unable to Engage Reverse	P073E	Detects the failure to achieve the expected command to Reverse range.	Actual Arbitrated Transmission Range	#Reverse	Actual Transmission Range Commanded Transmission Range AND CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup	= Good value = Reverse =False =False =True =True =True =Park =False	10,000.00 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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Position Sensor/ Switch A Circuit Low	P07B3	The Park Button Circuit Diagnostic detects a reading LowCorrelation diagnostic 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

23OBDG03A Part2 ECM Summary Tables

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Position Sensor/Switch A Circuit Performance	P07B5	The Park Button Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Park Position Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	DTC not set	P07B3OR P07B4	2000 Failures out of 2500 Samples =10 sec (SIB is 5 msec loop)	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

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

23OBDG03A Part2 ECM Summary Tables

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Position Sensor/Switch B Circuit Performance	P07BB	The Park Button Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Park Position Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	Diagnostic Enable Calibration DTC not set	=TRUE P07BA or P07B9	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 Illum.
Transmission Park Position Switch A/B Correlation	P07BE	Correlation diagnostic 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 Illum.
Unable to Engage Park	P07E4	Detects the inability to achieve or remain in Park.	Actual Arbitrated Transmission Range	#Park	Actual Transmission Range Commanded Transmission Range AND CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup	= Good value = Park =False =False =True = True =True =Park =False	10,000.00 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 Illum.
Unable to Engage Drive	P07E5	Detects the failure to achieve the expected command to Drive range.	Actual Arbitrated Transmission Range	#Drive	Actual Transmission Range Commanded Transmission Range AND CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup	= Good value = Drive =False =False =True = True =True =Park =False	10,000.00 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 Illum.
Traction Control Torque Request Circuit	P0856	Determines if torque request from the EBCM is valid	<p>Serial Communication 2's complement message - (\$1C7/\$1C9 for engine torque, \$1CA/\$1C6 for axle torque)</p> <p>OR</p> <p>Serial Communication message (\$1C7/\$1C9 for engine torque, \$1CA/ \$1C6 for axle torque) rolling count index value</p> <p>OR</p> <p>Too many minimum limit torque request transitions occur from TRUE to FALSE to TRUE within a time period</p> <p>Torque request greater than torque request diagnostic maximum threshold</p>	<p>Message <> 2's complement of message</p> <p>Message rolling count value <> previous message rolling count value plus one</p> <p>Requested torque intervention type toggles from not increasing request to increasing request</p> <p>> 280 Nm for engine torque based traction torque system, OR > 2,000 Nm for axle torque based traction torque system</p>	<p>Active Communication with EBCM</p> <p>Power Mode Engine Running</p> <p>Status of traction in GMLAN message (\$4E9)</p> <p>Run/Crank Active</p> <p>Ignition Voltage</p>	<p>Received serial data</p> <p>= Run = True</p> <p>= Traction Present</p> <p>> 0.50 seconds</p> <p>> 6.41 volts</p>	<p>>= 6 failures out of 10</p> <p>Performed on every received message</p> <p>6 rolling count failures out of 10 samples</p> <p>Performed on every received message</p> <p>>= 3 multi- transitions out of 5 samples.</p> <p>Performed every 200 ms</p> <p>>= 4 out of 10 samples</p> <p>Performed on every received message</p>	Type C, No SVS Emissio ns Neutral Diagnost ic - Type C

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.	
DC/DC Converter Voltage Sensor A Range/ Performance	P0E32	Detects DC/DC Converter Actuator Voltage 1 Performance issues	Bypass Mode: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 1 and ECM Run/Crank	> 2 Volt	Diagnostic enabled	1	320 failed samples out of 400 samples in 12.50 ms loop	Type B, 2 Trips	
					If Global B electrical architecture Then (Run/Crank or Accessory)	0			
					Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active)	TRUE			
					Engine running OR Engine stopped	TRUE			
			Battery Voltage	FALSE	for >160 loops in 12.50 ms loop for >160 loops in 12.50 ms loop				
			Stabilize Mode- Auto- Cranking: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 1 and ECM Run/Crank	> 2 Volt	Diagnostic enabled	1			8 failed samples out of 16 samples in 12.50 ms loop
					If Global B electrical architecture Then (Run/Crank or Accessory)	0			
					Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active)	TRUE			
					Engine auto-cranking	TRUE			
Battery Voltage	FALSE	for>0 loops in 12.50 ms loop							
Stablize Mode-Auto- Cranking Events: Number of failed auto- cranking events exceeds threshold	> 2 failed auto- cranking events	Diagnostic enabled	1	2 failed auto- crank events out of 3 consecutive auto-crank events					
		If Global B electrical architecture Then (Run/Crank or Accessory)	0						
					TRUE				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active) Engine auto-cranking	TRUE FALSE has occurred		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Voltage Sensor A Low	P0E33	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 1 for short to ground faults.	DC/DC Converter Actuator Voltage Raw Value 1	< 1 Volt	Diagnostic enabled If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active) Battery Voltage	1 0 TRUE TRUE FALSE >= 6.60 Volts	320 failed samples out of 400 samples in 12.50 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Voltage Sensor A High	P0E34	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 1 for short to battery faults.	DC/DC Converter Actuator Voltage Raw Value 1	> 28 Volt	Diagnostic enabled If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active) Battery Voltage	1 0 TRUE TRUE FALSE >= 6.60 Volts	320 failed samples out of 400 samples in 12.50 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.	
DC/DC Converter Voltage Sensor B Range/ Performance	P0E37	Detects DC/DC Converter Actuator Voltage 2 Performance issues	Bypass Mode: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 2 and ECM Run/Crank	> 2 Volt	Diagnostic enabled	1	320 failed samples out of 400 samples in 12.50 ms loop	Type B, 2 Trips	
					If Global B electrical architecture Then (Run/Crank or Accessory)	0			
					Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active)	TRUE			
					Engine running OR Engine stopped	TRUE			
			Battery Voltage	FALSE	for >160 loops in 12.50 ms loop for >160 loops in 12.50 ms loop				
			Stabilize Mode- Auto- Cranking: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 2 and ECM Run/Crank	> 2 Volt	Diagnostic enabled	1			8 failed samples out of 16 samples in 12.50 ms loop
					If Global B electrical architecture Then (Run/Crank or Accessory)	0			
					Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active)	TRUE			
					Engine auto-cranking	TRUE			
Battery Voltage	FALSE	for> 0 loops in 12.50 ms loop							
Stablize Mode-Auto- Cranking Events: Number of failed auto- cranking events exceeds threshold	> 2 failed auto- cranking events	Diagnostic enabled	1	2 failed auto- crank events out of 3 consecutive auto-crank events					
		If Global B electrical architecture Then (Run/Crank or Accessory)	0						
					TRUE				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active) Engine auto-cranking	TRUE FALSE has occurred		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Voltage Sensor B Low	P0E38	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 2 for short to ground faults.	DC/DC Converter Actuator Voltage Raw Value 2	< 1 Volt	Diagnostic enabled If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active) Battery Voltage	1 0 TRUE TRUE FALSE >= 6.60 Volts	320 failed samples out of 400 samples in 12.50 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Voltage Sensor B High	P0E39	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 2 for short to battery faults.	DC/DC Converter Actuator Voltage Raw Value 2	> 28 Volt	Diagnostic enabled If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active) Battery Voltage	1 0 TRUE TRUE FALSE >= 6.60 Volts	320 failed samples out of 400 samples in 12.50 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Isolation Valve (FTIV) Circuit Open (wired to ECM)	P0F34	Controller specific output driver circuit diagnoses the Fuel Tank Isolation Valve 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		120 failures out of 150 samples 100 msec / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Isolation Valve (FTIV) Circuit Low (wired to ECM)	P0F35	Controller specific output driver circuit diagnoses the Fuel Tank Isolation Valve 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 impedance between output and controller ground	Diagnostic is Enabled		120 failures out of 150 samples 100 msec / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Isolation Valve (FTIV) Circuit High (wired to ECM)	P0F36	Controller specific output driver circuit diagnoses the Fuel Tank Isolation Valve 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 impedance between output and controller power	Diagnostic is Enabled		120 failures out of 150 samples 100 msec / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Isolation Valve (FTIV) Stuck Open	P0F37	A Stuck Open FTIV is detected in the EVAP system between the fuel tank and carbon canister. The purge system creates a vacuum across the FTIV. The vacuum on the carbon canister side of the FTIV is compared to the vacuum on the fuel tank side of the FTIV (in the form of an integrated difference) to determine if the FTIV is stuck open. The diagnostic has the ability to run while vacuum is being generated or relieved. Additionally, the diagnostic has the ability to run during the existing EVAP diagnostic sequence (during P0446) and each time the FTIV is commanded from Open to Closed as a "confirmed closed" check.	<p>During P0446 Method:</p> <p>. Integrated canister and tank vacuum delta @ 2.00 seconds</p>	<p>Integrated delta must be >10.00</p> <p>See supporting fuel tank level normalization table for Fuel Tank Pressure: P0F37 Fuel Tank Level Normalization for Stuck Open Diagnostic (Fuel Tank Pressure- Vacuum Relief)</p> <p>See supporting fuel tank level normalization table for Canister Pressure: P0F37 Fuel Tank Level Normalization for Stuck Open Diagnostic (Canister Pressure- Vacuum Relief)</p>	<p>Cold start and confirmed closed check diagnostic is Enabled OR confirmed closed check is Enabled</p> <p>During P0446 Method:</p> <p>. Fuel Level</p> <p>System Voltage</p> <p>BARO</p> <p>Purge Flow</p> <p>No active DTCs:</p> <p>No Active DTCs TFTKO</p>	<p>10 % < Percent < 90 %</p> <p>> 10.0 volts</p> <p>> 70 kPa</p> <p>> 1.50 %</p> <p>MAP_SensorFA TPS_FA P24D6 P24D7 P24D8 P0F34 P0F35 P0F36 P0451 P0452 P0453</p> <p>P1001 U18A2 U131D</p> <p>P14CD U18A2 U131D</p> <p>VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnainePowerLimited</p>	12.5 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						FuelLevelDataFault EvapExcessPurgePsbl_FA EvapReducedPurgePsbl_FA ConvPurgeCkt_FA ConvFTPSnsrOOR_FA PurgeValveLeak_FA ConvVenting_FA PurgePumpDiag_FA PurgePumpControl_FA P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0498 P0499 P1001 U18A2 U131D P14CD U18A2 U131D P2418 P2419 P2420 P145D P2450 If ECT > IAT,Startup temperature delta (ECT- IAT): Startup IAT Startup ECT		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>Confirmed closed method:</p> <p>Integrated canister and tank vacuum delta for vacuum generation @ 4.00 displaced fuel tank volume</p>	<p>Integrated delta must be >10.00</p> <p>See supporting fuel tank level normalization table for Fuel Tank Pressure: P0F37 Fuel Tank Level Normalization for Stuck Open Diagnostic (Fuel Tank Pressure- Vacuum Generation)</p> <p>See supporting fuel tank level normalization table for Canister Pressure: P0F37 Fuel Tank Level Normalization for Stuck Open Diagnostic (Canister Pressure- Vacuum Generation)</p>	<p>Confirmed closed method:</p> <p>Fuel Level BARO Purge Flow Ambient Temperature Fuel Tank Vent Flow System Voltage</p> <p>No active DTCs</p> <p>No Active DTC's TFTKO</p>	<p>10 % < Percent < 90 % 72.40 < kPa <120.00 Value >3.95 4.00 < °C <50.00 Value >0.04 >8.00 Volts</p> <p>P24D6 P24D7 P24D8 P0F34 P0F35 P0F36 P0451 P0452 P0453</p> <p>P1001 U18A2 U131D</p> <p>P14CD U18A2 U131D</p> <p>P0F38 P0F37 EvapExcessPurgePsbl_FA EvapReducedPurgePsbl_FA ConvPurgeCkt_FA ConvFTPSnsrOOR_FA PurgeValveLeak_FA ConvVenting_FA PurgePumpDiag_FA PurgePumpControl_FA</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Reset Signal Message Counter Incorrect	P1000	This DTC monitors for an error in communication with the Fuel Pump Driver Control Module Reset Signal.	<p>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:</p> <p>Fuel Tank Zone Module Info 9 ARC</p> <p>Fuel Tank Zone Module Info 9 CSUM</p>	<p>>= 3.00 counts out of >= 10.00 counts</p> <p>>= 3.00 counts out of >= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>Fuel Tank Zone Module Info 9 ARC samples every 250.00 milliseconds.</p> <p>Fuel Tank Zone Module Info 9 CSUM samples every 250.00 milliseconds.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) System Signals Message Counter Incorrect	P1001	This DTC monitors for an error in communication with the Evaporative Emission (EVAP) System Signal.	<p>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:</p> <p>Fuel Tank Zone Module Info 11 ARC</p> <p>Fuel Tank Zone Module Info 11 CSUM</p>	<p>>= 8.00 counts out of >= 18.00 counts</p> <p>>= 8.00 counts out of >= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>Fuel Tank Zone Module Info 11 ARC samples every 10.00 milliseconds.</p> <p>Fuel Tank Zone Module Info 11 CSUM samples every 10.00 milliseconds.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Control System Signals Message Counter Incorrect	P1003	This DTC monitors for an error in communication with the Fuel Control System Signals.	<p>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:</p> <p>Fuel Tank Zone Module Info 12 ARC</p> <p>Fuel Tank Zone Module Info 12 CSUM</p>	<p>>=8.00 counts out of >= 18.00 counts</p> <p>>= 8.00 counts out of >= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>Fuel Tank Zone Module Info 12 ARC samples every 20.00 milliseconds.</p> <p>Fuel Tank Zone Module Info 12 CSUM samples every 20.00 milliseconds.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>If the diagnostic has detected that an unexpected reset has occurred:</p> <p>The time since last module reset event data value received from the FPDCM/FTZM is less than the previous value and also</p> <p>And</p> <p>The rollover occurred value received from the FPDCM/FTZM is false</p> <p>for</p> <p>out of total samples</p>	<p>≤ 0.50 seconds</p> <p>≥ 2.00 counts</p> <p>≥ 400.00 counts</p>	<p>DTC is enabled</p> <p>Sensor bus relay is on</p> <p>Battery voltage</p> <p>No FTZM reconfiguration is requested for</p> <p>A new message that contains the FPDCM/FTZM reset data is received</p> <p>The following DTCs that diagnose the message that contains the FPDCM/FTZM reset data are not active:</p> <p>P1000</p> <p>U18A2</p>	<p>Enabled</p> <p>> 11.00 Volts</p> <p>1.00 second(s)</p>	This diagnostic 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 Illum.
Fuel Pump Driver Control Module Temperature (Fuel Tank Zone Module) Too High Signal Message Counter Incorrect	P1009	This DTC monitors for an error in communication with the Fuel Pump Driver Control Module (FTZM) Temperature Too High Signal Message.	<p>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:</p> <p>Fuel Tank Zone Module Info 7 ARC</p> <p>Fuel Tank Zone Module Info 7 CSUM</p>	<p>>=3.00 counts out of >= 10.00 counts</p> <p>>= 3.00 counts out of >= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>Fuel Tank Zone Module Info 7 ARC samples every 100.00 milliseconds.</p> <p>Fuel Tank Zone Module Info 7 CSUM samples every 100.00 milliseconds.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Temperature Erratic	P100C	This DTC monitors for an erratic Temperature signal via LIN bus from the Battery Monitor Module.	Communication of the Temperature signal from the Battery Monitor Module has become erratic or is incorrect for out of total samples	 ≥ 4 counts ≥ 5 counts	The diagnostic is enabled 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	Enabled ≥ 3,000.00 milliseconds ≥ 11.00 volts ≤ 18.00 volts	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 Illum.
Battery Monitor Internal Temperature Circuit Erratic	P100D	This DTC monitors for an erratic Temperature Circuit signal via LIN bus from the Battery Monitor Module.	Communication of the Temperature Circuit signal from the Battery Monitor Module has become erratic or is incorrect for out of total samples	 >= 4 counts >= 5 counts	The diagnostic is enabled 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	Enabled >= 3,000.00 milliseconds >=11.00 volts <= 18.00 volts	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 Illum.
Fuel Pump Phase U-V- W Circuit Open	P1029	<p>This DTC detects if any of the 3phase fuel pump control circuits is Open [system configuration "Brushless"]</p> <p>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</p>	Phased-pair circuit voltage	3V <= V [back-EMF] <= 6V	<p>a) Sensed fuel pump speed</p> <p>b) Device configuration Chassis Fuel Pres System type</p> <p>c) Diagnostic is ..</p> <p>d) CAN Sensor Bus message \$3EC Available</p> <p>e) Sensor Bus Relay On</p> <p>f) Sensor Bus B Message \$3EC Temp Signal Message Counter Incorrect [Info7]</p>	<p>a) == 0 RPM</p> <p>b) == Brushless motor</p> <p>c) ENABLED</p> <p>d) == TRUE</p> <p>e) == TRUE</p> <p>f) == False</p>	<p>40.00 failures / 80.00 samples</p> <p>1 sample / 12.5 ms</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 Illum.
Fuel Pump Phase U-V- W Circuit Low	P102A	<p>This DTC detects if the fuel pump control circuit is shorted to low [Short to Ground]</p> <p>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].</p> <p>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-</p>	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 Illum.
		<p>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.</p> <p>This open circuit diagnostic follows "smart device" Component Technical Specifications.</p>						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Phase U-V- W Circuit High	P102B	<p>This DTC detects if the fuel pump control circuit is shorted to high voltage [Short to Battery]</p> <p>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].</p> <p>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</p>	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 Illum.
		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 Illum.
02 Sensor Heater Supply Voltage Sense Circuit Range/ Performance	P103B	<p>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.</p> <p>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.</p> <p>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.</p>	The absolute value of Heater Supply Voltage delta from Run Crank voltage	> 2.50 volts	<p>Diagnostic is Enabled</p> <p>Powertrain relay in range (Relay in range is defined as relay voltage</p> <p>Run Crank signal active</p>	<p>= True > 11.00 volts)</p> <p>= True (Please see “Run/Crank Active conditions” in Supporting Tables)</p>	<p>8 failures out of 10 samples</p> <p>250 ms / sample</p> <p>Continuous</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
02 Sensor Heater Supply Voltage Sense Circuit Low	P103C	<p>The P103C diagnostic determines if the heater supply circuit is low by comparing the heater supply voltage to the threshold.</p> <p>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.</p> <p>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.</p>	Heater Supply Voltage	< 6.00 volts	<p>Diagnostic is Enabled</p> <p>Powertrain relay in range (Relay in range is defined as relay voltage</p> <p>Run Crank signal active</p>	<p>= True</p> <p>> 11.00 volts)</p> <p>= True</p> <p>(Please see “Run/Crank Active conditions” in Supporting Tables)</p>	<p>8 failures out of 10 samples</p> <p>250 ms / sample</p> <p>Continuous</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 P10A5P10A7 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

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	> P10A4 P10A6 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 Illum.
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 P10A5P10A7 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 Illum.
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 Illum.
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 P10A5P10A7 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 Illum.
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 Illum.
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 P10A5P10A7 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 Illum.
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 Illum.
Barometric Pressure Sensor A / C Correlation	P10BC	<p>Detects a performance failure in the Barometric Pressure (BARO) sensor, such as when a BARO value is stuck in range.</p> <p>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.</p>	Difference between BARO A Sensor reading and BARO C Sensor reading	> 15.0 kPa	<p>Diagnostic is Enabled</p> <p>LIN communications established with MAF</p>		<p>160 failures out of 200 samples</p> <p>1 sample every 25 msec</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 2 Signal Message Counter Incorrect	P1100	This DTC monitors for an error in communication with the Fuel Pump Control Module (FTZM) Fuel Level Sensor 2 Signal Message Counter.	<p>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:</p> <p>Fuel Tank Zone Module Info 4 ARC</p> <p>Fuel Tank Zone Module Info 4 CSUM</p>	<p>>= 3.00 counts out of >= 10.00 counts</p> <p>>= 3.00 counts out of >= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>Fuel Tank Zone Module Info 4 ARC samples every 250.00 milliseconds.</p> <p>Fuel Tank Zone Module Info 4 CSUM samples every 250.00 milliseconds.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Inlet Airflow System Performance (single turbo)	P1101	<p>Detects a performance failure in the Manifold Pressure (MAP) sensor, Turbocharger Boost Pressure 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.</p> <p>This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from these four sensors.</p> <p>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</p>	<p>See table P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix for combinations of model failures that can set this DTC.</p> <p>MAF model fails when ABS(Measured Flow - Modeled Air Flow) Filtered</p> <p>MAPI model fails when ABS(Measured MAP - MAP Model 1) Filtered</p> <p>MAP2 model fails when ABS(Measured MAP - MAP Model 2) Filtered</p> <p>MAP3 model fails when ABS(Measured MAP - MAP Model 3) Filtered</p> <p>TIAP1 model fails when ABS(Measured TIAP - TIAP Model 1) Filtered</p> <p>TPS model fails when Filtered Throttle Model Error</p> <p>TIAP Correlation model fails when High Engine Air Flow is TRUE AND Measured TIAP -</p>	<p>>20.0 grams/sec</p> <p>> 23.0 kPa</p> <p>> 25.0 kPa</p> <p>> 25.0 kPa</p> <p>> 30.0 kPa</p> <p>> 175 kPa*(g/s)</p>	<p>Engine Speed Engine Speed</p> <p>(Coolant Temp OR OBD Coolant Enable Criteria</p> <p>(Coolant Temp OR OBD Max Coolant Achieved</p> <p>Intake Air Temp Intake Air Temp</p> <p>Powertrain Relay Voltage for a period of time</p> <p>Minimum total weight factor (all factors multiplied together)</p> <p>See Residual Weight Factor tables.</p>	<p>>= 400 RPM <= 6,100 RPM</p> <p>>= -9 Deg C</p> <p>= TRUE)</p> <p><= 130 Deg C</p> <p>= FALSE)</p> <p>> -20 Deg C <= 125 Deg C</p> <p>>=9.1 Volts >= 0.2 Seconds</p> <p>>= 0.50</p> <p>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</p> <p>MAP Model 1 Error multiplied by</p>	<p>Continuous</p> <p>Calculation are performed every 12.5 msec</p>	<p>Type B, 2 Trips</p>

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		the system, but no single failed sensor can uniquely be identified. In this case, the Inlet Airflow System Performance diagnostic will fail.	<p>measured MAP - offset as a function of engine speed See table P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Offset</p> <p>OR</p> <p>Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Offset</p> <p>TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time</p> <p>High Engine Air Flow is TRUE when Mass Air Flow</p>	<p>> 30.0 kPa</p> <p>> 30.0 kPa</p> <p>> 1.0 seconds</p> <p>> 1.0 seconds</p> <p>> a threshold in gm sec as a function of engine speed See table P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow</p>	No Active DTCs:	<p>P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM</p> <p>MAP Model 2 Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM</p> <p>MAP Model 3 Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM</p> <p>TIAP Model 1 Error multiplied by P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM</p> <p>Filtered Throttle Model Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM</p> <p>MAP_SensorCircuitFA EGRValvePerformance_F A MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC BoostPresSnsrCktFA</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>AND Manifold Pressure</p> <p>AND Filtered Mass Air Flow - Mass Air Flow</p> <p>Low Engine Air Flow is TRUE when Mass Air Flow</p> <p>AND Manifold Pressure</p> <p>AND Mass Air Flow - Filtered Mass Air Flow</p>	<p>> a threshold in kPa as a function of engine speed See table P0101, P0106, P0121, P0236, P1101: TIAP- MAP Correlation Min MAP</p> <p>< 1.3 gm/sec</p> <p>< a threshold in gm sec as a function of engine speed See table P0101, P0106, P0121, P0236, P1101: TIAP- Baro Correlation Max Air Flow</p> <p>< a threshold in kPa as a function of engine speed See table P0101, P0106, P0121, P0236, P1101: TIAP- Baro Correlation Max MAP</p> <p>< 2.0 gm/sec</p>	<p>No Pending DTCs:</p> <p>Diagnostic is Enabled</p>	<p>AmbientAirDefault</p> <p>EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENTSID1 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 sensor1 and sensor2)	> 20.00 degC	<p>Fuel Temperature Rationality Diagnostic Enabled</p> <p>No Fault Active on</p> <p>No Fault Pending on</p>	<p>True</p> <p>Enabled when a code clear is not active or not exiting device control</p> <p>Temperature sensors 1 out of range Low or High Fault Active (P0182, P0182)</p> <p>Temperature sensors 2 out of range Low or High (P0187, P0188)</p> <p>SENT Communication Fault Active (U0625, U101B, U0670, U0671)</p> <p>SENT Internal Error Fault Active (P126E, P126F)</p> <p>Fuel Temperature Sensor SENT Message Error Fault Active (P128C, P128D)</p> <p>SENT Communication Fault Pending (U0625, U101B, U0670, U0671)</p> <p>Fuel Temperature Sensor SENT Message Error Fault Pending (P128C, P128D)</p>	<p>100.00 failures out of 125.00 samples</p> <p>100 ms per Sample Continuous</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 FPDCM/FTZM reference circuit data are not active: P165C U0076 U18A2	Enabled >=11.00 Volts Commanded on (if present)	Samples every 6.00 milliseconds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 FPDCM/FTZM reference circuit data are not active: P165C U0076 U18A2	Enabled >=11.00 Volts Commanded on (if present)	Samples every 6.00 milliseconds.	Type B, 2 Trips

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 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 Illum.
Fuel Level Sensor 1 Signal Message Counter Incorrect	P1200	This DTC monitors for an error in communication with the Fuel Pump Control Module (FTZM) Fuel Level Sensor 1 Signal Message Counter.	<p>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:</p> <p>Fuel Tank Zone Module Info 3 ARC</p> <p>Fuel Tank Zone Module Info 3 CSUM</p>	<p>>= 3.00 counts out of >= 10.00 counts</p> <p>>= 3.00 counts out of >= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>Fuel Tank Zone Module Info 3 ARC samples every 250.00 milliseconds.</p> <p>Fuel Tank Zone Module Info 3 CSUM samples every 250.00 milliseconds.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 >= 1 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 Illum.
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 >= 1 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 Illum.
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 >= 1 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 Illum.
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 >= 1 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 Illum.
Fuel Pump Driver Over Temperature	P1255	<p>To detect if an internal fuel pump driver over-temperature condition exists under normal operating conditions.</p> <p>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.</p>	Fuel Pump Driver Temperature	T > 160degC	<p>a) Diagnostic is ..</p> <p>b) Sensor Bus Relay On</p> <p>c) CAN Sensor Bus message \$3EC_Available</p> <p>d) Sensor Bus Message \$3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_A RCChkErr]</p>	<p>a) Enabled</p> <p>b) == TRUE</p> <p>c) == TRUE</p> <p>d) <> TRUE</p>	<p>5.00 failures / 10.00 samples</p> <p>1 sample / 100 millisec</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	$\geq 4,089.00$	No Fault Active on No Fault Pending 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) Fuel Temperature Sensor SENT Message Error Fault Pending (P128C)	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 Illum.
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	$\geq 4,089.00$	No Fault Active on No Fault Pending 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 (P128D) 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 Illum.
SENT Fuel Rail High Pressure Sensor 2 Out of Range	P127C	<p>This DTC diagnose SENT high pressure sensor 2 that is too low out of range.</p> <p>If the sensor digital value (representing the reference 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.</p>	High Pressure Rail Sensor 2 SENT digital read value	=< 94			<p>Time Based: 400 Failuerout of 500 Samples 6.25 ms per Sample Continuous</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	SENT Fuel Rail Pressure Sensor Internal Performance Enable No Fault Pending	Enabled when a code clear is not active or not exiting device control True U0625 P16E5 P128F	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 Illum.
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	SENT Fuel Rail Pressure Sensor Internal Performance Enable No Fault Pending	Enabled when a code clear is not active or not exiting device control True U0625 P16E5 P128F	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 Illum.
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	>= 0.04 ms	SENT signal Serial waveform diagnostics enable SENT power up delay No Fault Active	True >=0.00 seconds U0625 P16E5	114 failures out of 142 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 Illum.
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	>= 0.04 ms	SENT signal Serial waveform diagnostics enable SENT power up delay No Fault Active	True >=0.00 seconds U0625 P16E5	114 failures out of 142 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 Illum.
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 SENTHWIO 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 > 1.94 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 Illum.
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	<p>> Speed Error Low Threshold [Supporting Table] P129F Threshold Low</p> <p>OR</p> <p>< Speed Error High Threshold [Supporting Table] P129F Threshold High</p>	<p>a) Diagnostic is ..</p> <p>b) CAN Sensor Bus message \$0CB_Available</p> <p>c) FABR Fuel Control Enable Fault Active</p> <p>d) Fuel Pmp Speed Command Alive Rolling Count and Checksum Error [CAN Bus B \$0CE] [CFMR_b_FTZM_Cmd1_ARC_ChkErr]</p> <p>e) FABR Fuel Pump Ckt FA</p> <p>f) FABR Driver OverTemp FA</p> <p>g) Run_Crank input Voltage</p> <p>h) Sensor Bus Relay On</p> <p>j) CAN Sensor Bus message \$0CB Data Fault [CFMR_b_FTZM_Info8_ARCChkErr]</p> <p>k) CAN Sensor Bus message \$0CB Comm Fault [CFMR_b_FTZM_Info8_UcodeCmFA]</p> <p>l) Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [CFMR_b_FTZM_Cmd1_UcodeCmFA]</p> <p>m) Timer - FABR Rising Edge Diagnostic Delay</p> <p>n) Timer - FABR Falling Edge Diagn Delay</p>	<p>a) Enabled</p> <p>b) == TRUE</p> <p>c) <> TRUE</p> <p>d) <> TRUE</p> <p>e) <> TRUE</p> <p>f) <> TRUE</p> <p>g) > 9.00 volts</p> <p>h) == TRUE</p> <p>j) <> TRUE</p> <p>k) <> TRUE</p> <p>l) <> TRUE</p> <p>m) > 2.25 seconds</p> <p>n) > 1.00 seconds</p>	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 Illum.
		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 Illum.
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 \$OCC Fuel Pump Command Message Signal Counter Incorrect [CFMR_b_FTZM_Info2_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 Illum.
Fuel Pump Control Module (Fuel Tank Zone Module) Control Signal Message Counter Incorrect	P12A8	This DTC monitors for an error in communication with the Fuel Pump Control Module (FTZM) Control Signal Message.	<p>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:</p> <p>Fuel Tank Zone Module Info 8 ARC</p> <p>Fuel Tank Zone Module Info 8 CSUM</p>	<p>>= 8.00 counts out of >= 18.00 counts</p> <p>>= 8.00 counts out of >= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>Fuel Tank Zone Module Info 8 ARC samples every 10.00 milliseconds.</p> <p>Fuel Tank Zone Module Info 8 CSUM samples every 10.00 milliseconds.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Run/ Start Voltage Signal Message Counter Incorrect	P130F	This DTC monitors for an error in the Ignition Run/Start Voltage Signal Message Counter.	<p>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:</p> <p>Fuel Tank Zone Module Info 5 ARC</p> <p>Fuel Tank Zone Module Info 5 CSUM</p>	<p>>=4.00 counts out of >= 10.00 counts</p> <p>>=4.00 counts out of >= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>Fuel Tank Zone Module Info 5 ARC samples every 50.00 milliseconds.</p> <p>Fuel Tank Zone Module Info 5 CSUM samples every 50.00 milliseconds.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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? Three possible Ignition Coil Power Sources (only 1 used): Ignition Coil Power Source = <u>Case 1: Battery</u> Delay starting at Key-On <u>Case 2: Ignition Run/Crank</u> Ignition Run/Crank Voltage <u>Case 3: PT Relay</u> PT Relay Voltage	Yes PT Relay (Case 3) 5 Engine Revs > 5.0 volts >11.0 volts	50 Failures out of 63 Samples 6.25 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 Status Signals Message Counter Incorrect	P135C	This DTC monitors for an error in communication with the Cooling Fan 1 Status Signals.	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: Coolant Fan 1 ARC	 ≥ 8.00 counts out of ≥ 10.00 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	 ≥ 3,000.00 milliseconds ≥ 11.00 volts ≤ 18.00 volts	Coolant Fan 1 ARC samples every 1,000.00 milliseconds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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_EngineSpeedResidualTable * output of P1400_SparkResidual_Table NOTE: Desired accumulated power would use the desired catalyst light off spark and desired engine speed and the actual accumulated 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) > 11.00 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 > -12.00 degC <= 66.00 degC >= 72.00 KPa >= 900.00 degC >= 20.00 seconds > P1400_CatalystLightOff ExtendedEngineRunTimeExit This Extended Engine run time exit is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details. < 72.00 KPa	Runs once per trip when the cold start emission reduction strategy is active Frequency: 100ms Loop Test completes after 8 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 Illum.
					<p>Other Enable Criteria:</p> <p>OBD Manufacturer Enable Counter</p> <p>Vehicle Speed</p> <p>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</p> <p>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:</p> <p>Pedal Close Delay Timer</p> <p>the diagnostic will continue the calculation.</p> <p>A change in gear will initiate a delay in the calculation of the average Qualifiedresidual value to</p>	<p>0</p> <p><1.86MPH</p> <p>0</p> <p>(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)</p> <p>> 5.00 seconds</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>allow time for the actual engine speed and actual final commanded spark to achieve their desired values. Therefore, when the:</p> <p>Gear Shift Delay Timer</p> <p>the diagnostic will continue the calculation</p> <p>For Manual Transmission vehicles:</p> <p>Clutch Pedal Position</p> <p>Clutch Pedal Position</p> <p>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.</p> <p>The time weighting factor must be :</p>	<p>> 2.00 seconds</p> <p>> 88.00 %</p> <p><12.00%</p> <p>>0 These are scalar values that are a function of engine run time. Refer to</p>		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 Ref V Period]	> 25.00 millise	a) CAN serial data available [\$2D7] b) Calibration - Reference Voltage Command Source c) Timer - Reference Voltage Pulse Width Available Synchronization d) Timer - Reference Voltage Period Available Delay e) Diagnostic System Disabled f) FTZM Serial Data Info4 Rolling Counter Check Error g) Reference Voltage Performance 0 Diagnostic Enabled	a) == True b) == ECM c) > 1.25 sec d) > 0.75 sec e) <> True f) <> True g) == TRUE	250 ms / sample	Type B, 2 Trips
			Reference Voltage 0 Pulse Width Error Maximum [Measured Ref V PW - Commanded Ref V PW]	> 1.50 millise	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 Illum.
					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 Illum.
Mass Air Flow Sensor A Signal Message Counter Incorrect	P14B6	This DTC monitors for an error in communication with the Mass Air Flow Sensor A.	<p>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:</p> <p>Temperature and Humidity ARC</p> <p>Pressure ARC</p>	<p>>= 8.00 counts out of >= 10.00 counts</p> <p>>= 8.00 counts out of >= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>Temperature and Humidity ARC samples every 25.00 milliseconds.</p> <p>Pressure ARC samples every 25.00 milliseconds.</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Configuratio n Command Signal 1 Message	P14CD	This DTC monitors for an error in communication with the Fuel Pump Driver Control Module Configuration Command Signal 1.	The Fuel Tank Zone Module has determined that signal value of the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) of Fuel Pump Driver Control Module Configuration Command Signal 1 Message transmitted by the Engine Control module is incorrect and sends a fail status back to the ECM for	>= 15.00 counts out of >= 16.00 counts	Diagnostic is enabled Message frame from the Fuel Tank Zone Module containing the diagnostic status is received All the following conditions are met for: Battery Voltage Sensor bus relay is on (if present)	Enabled >= 3,000.00 milliseconds >=11.00 Volts	Samples every 10.00 milliseconds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Configuratio n Status Signal Message Counter Incorrect	PUCE	This DTC monitors for an error in communication with the Fuel Pump Driver Control Module Configuration Status Signals.	<p>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:</p> <p>Fuel Tank Zone Module Info 16 ARC</p> <p>Fuel Tank Zone Module Info 16 CSUM</p>	<p>>= 3.00 counts out of >= 10.00 counts</p> <p>>= 3.00 counts out of >= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>Fuel Tank Zone Module Info 16 ARC samples every 250.00 milliseconds.</p> <p>Fuel Tank Zone Module Info 16 CSUM samples every every 250.00 milliseconds.</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Engine Speed Request Circuit	P150C	This DTC monitors for an error in communication with the Transmission Engine Speed Request Signal.	<p>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:</p> <p>Transmission 199 ARC</p> <p>Transmission ARC</p> <p>Transmission Engine Speed Request PV</p>	<p>>= 8.00 counts out of >= 18.00 counts</p> <p>>= 8.00 counts out of >= 18.00 counts</p> <p>>= 8.00 counts out of >= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>Transmission 199 ARC samples every 25.00 milliseconds.</p> <p>Transmission ARC samples every 25.00 milliseconds.</p> <p>Transmission Engine Speed Request PV samples every 25.00 milliseconds.</p>	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Throttle Position Steady State Actuation Fault	P1516	Detect an inability to maintain a steady state throttle position.	The absolute difference between desired and indicated throttle position is >	2.00 %	Run/Crank voltage 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 For a settling time period Ignition voltage failure is false	> 6.41 Volts < 0.25 percent > 4.00 seconds P1682	0.49 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Communication Error with Active Grill Air Shutter Module "A"	P151E	This DTC monitors for an internal error or error in communication with the Active Grill Air Shutter Module A.	<p>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:</p> <p>Aeroshutter Control Module 1 Initialization ARC</p>	<p>>= 8.00 counts out of</p> <p>>= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	Aeroshutter Control Module 1 Initialization ARC samples every 500.00 milliseconds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Adaptive Cruise Control Signal Circuit	P1553	<p>Detects rolling count or protection value errors in Adaptive Cruise Control Axle Torque Command serial data signal</p> <p>"Emissions Neutral Default Action : When the ECM determines that a serial communication fault has occurred with the EOCM or the ACC module in data frame \$2CB, the code is set and the Adaptive Control Cruise will be disabled and disengaged until the diagnostic passes and recovery conditions are satisfied." Only applicable for applications with ACC feature.for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for applications with ACC feature.</p>	If x of y rolling count/ protection value faults occur, disable adaptive cruise control for duration of fault		<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p>	<p>ACCCmndAlvRlg Cnt: 6.00 rolling count failures out of / 15.00 samples</p> <p>ACCxITrqCmd Prot: 6.00 rolling count failures out of / 15.00 samples</p>	<p>Type C, No SVS , "Emissions Neutral Diagnostics - special type C"</p>

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Switch State Undertermin ed Legacy	P155A	<p>Detects when cruise switch state cannot be determined, such as low voltage conditions</p> <p>"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."</p>	cruise switch state is received as "undetermined" for greater than a calibratable time over a sample period.	fail in the indeterminate state for greater than 3.00 seconds over the sample period of 15.00 seconds	Diagnostic is enabled.		indicate failure for 3.00 seconds / 15.00 seconds.	Type C, No SVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage Signal Message Counter Incorrect	P155E	This DTC monitors for an error in communication with the DC/DC Converter Actuator Voltage Signal.	<p>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:</p> <p>DC Converter Actuator Voltage ADC ARC</p> <p>DC Converter Actuator Voltage ADC PV</p>	<p>>= 8.00 counts out of >= 18.00 counts</p> <p>>= 8.00 counts out of >= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>DC Converter Actuator Voltage ADC ARC samples every 10.00 milliseconds.</p> <p>DC Converter Actuator Voltage ADC PV samples every 10.00 milliseconds.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Ignition Switch Run/ Start Position Signal Message Counter Incorrect	P156D	This DTC monitors for an error in communication with the DC/DC Converter Ignition Switch Run/Start Position Signal.	<p>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:</p> <p>DC Converter Run Crank Terminal Status ARC</p> <p>DC Converter Run Crank Terminal Status PV</p>	<p>>= 8.00 counts out of >= 18.00 counts</p> <p>>= 8.00 counts out of >= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>DC Converter Run Crank Terminal Status ARC samples every 10.00 milliseconds.</p> <p>DC Converter Run Crank Terminal Status PV samples every 10.00 milliseconds.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Crank Control Signal Message Counter Incorrect	P156E	This DTC monitors for an error in communication with the DC/DC Converter Crank Control Terminal Signal.	<p>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:</p> <p>DC Converter Crank Control Terminal Status ARC</p> <p>DC Converter Crank Control Terminal Status PV</p>	<p>>= 8.00 counts out of >= 18.00 counts</p> <p>>= 8.00 counts out of >= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>DC Converter Crank Control Terminal Status ARC samples every 10.00 milliseconds.</p> <p>DC Converter Crank Control Terminal Status PV samples every 10.00 milliseconds.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Calibration Incorrect	P158A	Type of cruise in Body Control Module does not match that in the Engine Control Module for 2.5 seconds "Emissions Neutral Default Action : This diagnostic compares the BCM and the ECM configuration calibrations of whether No Cruise, Conventional Cruise Control, or ACC is available on the vehicle. If the calibration for the cruise system type in the ECM does not match the value in \$4E9 signal Vehicle Speed Control System Type, a P158ADTC is set and cruise control is disabled."	Type of cruise system in GMLAN \$4E9 does not match with that in the Engine Control Module for a fix time.	2.5 seconds	Diagnostic is enabled. DID \$40 from BCM says cruise system is present (ECM receives programmable information from Body Control Module) OR ECM will not receive Programmable information for Cruise from Body Control Module	CeACZR_e_AdaptCruise Cntrl	fail continuously for greater than 2.5 seconds.	Type C, No SVS "Emissions Neutral Diagnostics - Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Front Object Detection Control Module Torque Request Signal Message Counter Incorrect	P15F6	<p>Detects rolling count or protection value errors in Collision Preparation System Axle Torque Command serial data signal</p> <p>"Default Action : When the ECM determines that a serial communication fault has occurred with the EOCM in frame \$2CD, the code is set and the Collision Preparation System is disabled until the diagnostic passes and recovery conditions are satisfied." When the code is set, ECM no longer honors max torque request from EOCM. Only applicable for applications with Collision Preparation System feature.</p>	If x of y rolling count/ protection value faults occur, disable collision preparation system for duration of fault		<p>Diagnostic is enabled.</p> <p>Front Object Detection Module Torque Request Serial Data Error Diagnostic Enable</p>	0.00	<p>ColPrSysAxITrq CmdRC : 6.00 rolling count failures out of / 15.00 samples</p> <p>ColPrSysAxITrq CmdProtVal : 6.00 rolling count failures out of / 15.00 samples</p>	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Automatic Braking Engine Torque Request Signal Message Incorrect	P15F8	<p>Detects rolling count or protection value errors Rear Virtual Bumper Axle Torque Command serial data signal</p> <p>"Default Action : When the ECM determines that a serial communication fault has occurred with the EBCM in frame \$2F9, the code is set and the auto braking feature is disabled for the remainder of the key cycle." Only applicable for applications with Collision Preparation System or Rear Virtual Bumper feature.</p>	If x of y rolling count/ protection value faults occur, disable rear virtual bumper or collision preparation system for duration of fault		<p>Diagnostic is enabled.</p> <p>Automatic Braking Engine Torque Request Serial Data Error Diagnostic Enable</p>	0.00	<p>AutoBrkFeatInhb tARC : 4.00 rolling count failures out of/ 10.00 samples</p> <p>AutoBrkFeatInhb tPVal : 4.00 rolling count failures out of/ 10.00 samples</p>	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Sensor Signal Message Counter Incorrect	P15FF	This DTC monitors for an internal error or error in communication with the Battery Monitor Signal.	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.		IBS MVIARC samples every 250.00 milliseconds.	Type B, 2 Trips
			IBS MVIARC	>= 8.00 counts out of >= 10.00 counts	All the following conditions are met for:	>= 3,000.00 milliseconds	IBS Calculated Data ARC samples every 500.00 milliseconds.	
			IBS Calculated Data ARC	>= 8.00 counts out of >= 10.00 counts	Battery voltage	>= 11.00 volts	IBS Measured Temperature ARC samples every 250.00 milliseconds.	
			IBS Measured Temperature ARC	>= 8.00 counts out of >= 10.00 counts	Accessory mode to off mode transition not pending		NAHr Charge ARC samples every 500.00 milliseconds.	
			NAHr Charge ARC	>= 8.00 counts out of >= 10.00 counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts	NAHr Discharge ARC samples every 500.00 milliseconds.	
			NAHr Discharge ARC	>= 8.00 counts out of >= 10.00 counts	Controller type: OBD Controller		Current FOM ARC samples every 2,000.00 milliseconds.	
			Current FOM ARC	>= 8.00 counts out of >= 10.00 counts			Voltage FOM ARC samples every 2,000.00 milliseconds.	
			Voltage FOM ARC	>= 8.00 counts out of >= 10.00 counts			IBS FOM ARC samples every 2,000.00 milliseconds.	
			IBS FOM ARC	>= 8.00 counts out of >= 10.00 counts				
			Vehicle StartuoARC	>= 8.00 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Battery Rational ARC	out of >= 10.00 counts >= 8.00 counts out of >= 10.00 counts			Vehicle Startup ARC samples every 500.00 milliseconds. Battery Rational ARC samples every 1,000.00 milliseconds.	

23OBDG03A Part2 ECM Summary Tables

[illegible]

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 Illum.
Sensor Reference Voltage Status Message Counter Incorrect	P165C	This DTC monitors for an error in communication with the Sensor Reference Voltage Status Signals.	<p>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:</p> <p>Fuel Tank Zone Module Info 1 ARC</p> <p>Fuel Tank Zone Module Info 1 CSUM</p>	<p>>= 8.00 counts out of >= 18.00 counts</p> <p>>= 8.00 counts out of >= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>Fuel Tank Zone Module Info 1 ARC samples every 6.00 milliseconds.</p> <p>Fuel Tank Zone Module Info 1 CSUM samples every 6.00 milliseconds.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Voltage Signal Message Counter Incorrect	P167F	This DTC monitors for an error in the FTZM Battery Voltage Signal Message Counter.	<p>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:</p> <p>Fuel Tank Zone Module Info 2 ARC</p> <p>Fuel Tank Zone Module Info 2 CSUM</p>	<p>>= 8.00 counts out of >= 18.00 counts</p> <p>>= 8.00 counts out of >= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>Fuel Tank Zone Module Info 2 ARC samples every 10.00 milliseconds.</p> <p>Fuel Tank Zone Module Info 2 CSUM samples every 10.00 milliseconds.</p>	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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, No SVS

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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Circuit Low Voltage	P16D4	This DTC monitors for a battery module low voltage circuit fault.	Battery Module signals a low voltage circuit fault via LIN bus Battery voltage	< 3.00 Volts for 200 fail counts out of 250 sample counts	The diagnostic is enabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	Enabled Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Circuit High Voltage	P16D5	This DTC monitors for a battery module high voltage circuit fault	Battery Module signals a high voltage circuit fault via LIN bus Battery voltage	> 26.00 Volts for 200 fail counts out of 250 sample counts	The diagnostic is enabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	Enabled Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Current Low	P16D6	This DTC monitors for a battery module current low fault	Battery Module signals a current low fault via LIN bus Battery current	< -1400 Amps for 200 fail counts out of 250 sample counts	The diagnostic is enabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	Enabled Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	Open Circuit: > 200 K Q ohms impedance between output and controller ground	<p>Sensor Bus relay circuit open diagnostic = TRUE</p> <p>Run/Crank Voltage</p>	<p>1.00</p> <p>Voltage > 11.00 volts</p>	<p>8 failures out of 10 samples</p> <p>250 ms / sample</p>	<p>Type B, 2 Trips</p> <p>Note: In certain controllers P16D8 may also set (Sensor Bus Relay Control Circuit Low).</p>

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	Short to ground: < 0.5 Q impedance between output and controller ground	<p>Sensor Bus relay circuit short to ground diagnostic = TRUE</p> <p>Run/Crank Voltage</p>	<p>1.00</p> <p>Voltage > 11.00 volts</p>	<p>8 failures out of 10 samples</p> <p>250 ms / sample</p>	<p>Type B, 2 Trips</p> <p>Note: In certain controllers P16D7 may also set (Sensor Bus Relay Control Circuit Open).</p>

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	Short to power: < 0.5 Q impedance between output and controller power	<p>Sensor Bus relay circuit short to power diagnostic = TRUE</p> <p>Run/Crank Voltage</p>	<p>1.00</p> <p>Voltage > 11.00 volts</p>	<p>8 failures out of 10 samples</p> <p>250 ms / sample</p>	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Current High	P16DD	This DTC monitors for a battery module current high fault	Battery Module signals a current high fault via LIN bus Battery current	> +1400 Amps for 200 fail counts out of 250 sample counts	The diagnostic is enabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	Enabled Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Internal Temperature Circuit Low	P16DE	This DTC monitors for a battery module internal temperature circuit low fault	Battery Module raw temperature 1 value	> 120.00 Celsius	<p>The historical mode diagnostic is enabled and / or The continuous mode diagnostic is enabled</p> <p>Power Mode</p> <p>12V System Reference Voltage</p> <p>LIN Bus Off or Battery Module Communication Faults Active</p> <p>Outside Air Temperature</p> <p>Outside Air Temperature Validity Bit</p> <p>For Historical Mode IBS Down Counter (over LIN bus) For Continuous Mode IBS Down Counter (over LIN bus)</p> <p>IBS Measure Temperature Data Available over LIN bus</p>	<p>Enabled</p> <p>Enabled</p> <p>Not equal off</p> <p>> 9.00 Volts</p> <p>= False</p> <p>> -20.00 Celsius and < 50.00 Celsius</p> <p>= True</p> <p>Between 1 and 24 or zero</p> <p>= zero</p> <p>= True</p>	<p>4 failed samples within 5 total samples</p> <p>Diagnostic runs in the 250 ms loop</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Internal Temperature Circuit High	P16DF	This DTC monitors for a battery module internal temperature circuit high fault	Battery Module raw temperature 1 value	< -43.00 Celsius	The historical mode diagnostic is enabled and / or The continuous mode diagnostic is enabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit For Historical Mode IBS Down Counter (over LIN bus) For Continuous Mode IBS Down Counter (over LIN bus) IBS Measure Temperature Data Available over LIN bus	Enabled Enabled Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True Between 1 and 24 = zero = True	4 failed samples within 5 total samples Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Random Access Memory (RAM) Error	P16E1	This DTC monitors for a battery module RAM memory fault	Battery Module signals a RAM memory fault via LIN bus VeVITR_e_IBS_IntRAM_ Fault	= CeVITR_e_DiagFailed	The diagnostic is enabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	Enabled Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Read Only Memory (ROM) Error	P16E2	This DTC monitors for a battery module ROM memory fault	Battery Module signals a ROM memory fault via LIN bus VeVITR_e_IBS_IntROM_ Fault	= CeVITR_e_DiagFailed	The diagnostic is enabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	Enabled Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Data Incompatible	P16E3	This DTC monitors for a battery module data incompatible fault	<p>Battery Module data received over LIN bus is incompatible. (Measured by any of the following)</p> <p>Historical Test</p> <p>Absolute value of IBS battery capacity C20 data (IBS Return Nominal C20 - 70.00 Ah)</p> <p>or</p> <p>IBS Returns a battery type that is not equal to</p> <p>or</p> <p>Absolute value of (IBS Return Battery Calibration#! U40@25 C - 12.08V)</p> <p>or</p> <p>Absolute value of (IBS Return Battery Calibration#! U80@25 C - 12.64 V)</p> <p>Continuous Test</p>	<p>Upon IBS wakeup, if any of the below Historical Test conditions are satisfied, the diagnostic fails.</p> <p>> 5.00 Ah</p> <p>CeBSER_e_IBS_Cfg BatAGM</p> <p>>0.50 Volts</p> <p>> 0.50 Volts</p> <p>If any of the below conditions are satisfied for 16.00 fail counts</p>	<p>The historical mode diagnostic is enabled and / or The continuous mode diagnostic is enabled</p> <p>Power Mode</p> <p>12V System Reference Voltage</p> <p>LIN Bus Off or Battery Module Communication Faults Active</p> <p>Outside Air Temperature</p> <p>Outside Air Temperature Validity Bit</p> <p>IBS Configuration Data Available over LIN bus</p> <p>Historical Test Only Host Controller MEC Counter</p>	<p>Enabled</p> <p>Enabled</p> <p>Not equal off</p> <p>> 9.00 Volts</p> <p>= False</p> <p>> -20.00 Celsius and < 50.00 Celsius</p> <p>= True</p> <p>= True</p> <p><= 0</p>	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>Absolute value of IBS battery capacity C20 data (IBS Return Nominal C20 - 70.00 Ah)</p> <p>or</p> <p>IBS Returns a battery type that is not equal to</p> <p>or</p> <p>Absolute value of (IBS Return Battery Calibration#! U40@25 C - 12.08 V)</p> <p>or</p> <p>Absolute value of (IBS Return Battery Calibration#! U80@25 C - 12.64 V)</p>	<p>out of 20.00 sample counts, the diagnostic fails.</p> <p>> 5.00 Ah</p> <p>CeBSER_e_IBS_Cfg BatAGM</p> <p>>0.50 Volts</p> <p>> 0.50 Volts</p>				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Transmission Range Control Performance	P16F4	Determines if the Electronic Transmission Range Select control module software incorrectly processes a range request which would result in an unsafe condition	Driver Requested Arbitrated Range Commanded OR: Transmission range control routine Transmission range control routine Transmission range control routine	is issued unexpectedly OR # expected range Does not issue Park or Neutral command quickly enough in response to driver request Issues a request to Drive, Low or Manual without a matching input by the customer within a calibrated time T1. Issues a request to Reverse without a matching input by the customer within a calibrated time limit T2.	TRCR Global Diagnostic Enable CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup	= True =False =False =True = True =True =Park =False	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 Illum.
Acceleration Sensor Signal Message Counter Incorrect	P175F	<p>The diagnostic monitor detects an alive rolling count error or checksum error in the CAN frame containing the lateral acceleration signal value and longitudinal acceleration sensor signal value.</p> <p>Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.</p>	<p>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:</p> <p>Acceleration Sensor Value ARC</p> <p>Acceleration Sensor CSUM</p>	<p>>= 8.00 counts out of >= 10.00 counts</p> <p>>= 15.00 counts out of >= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	Executes in 12.5ms loop.	Type C, No SVS "Emissions Neutral Diagnostic-Type C"

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Mode Switch Signal Circuit Include for programs that are NOT hybrid start stop conventional	P1762	BCM to ECM Rolling Count check for CAN frame \$1E1. - Only utilize when calibration variable KeINFG_e_HybridType does not equal CeINFR_e_StartStopC onv. (Note: Not Equal To is represented by <>)	Rolling count value received from BCM does not match expected value	= TRUE	Engine Speed Engine Speed Engine speed between min/max for Vehicle Speed for Hybrid type	>200 RPM <7,500 RPM >5.0 seconds < 318.14MPH > 5.0 seconds <>CeINFR_e_StartStopC onv	> 3 error counts for > 10.0 seconds 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 Illum.
Powerflow Engaged Signal Message Incorrect	P1772	This DTC monitors for an error in communication with the Powerflow Engaged Signal.	<p>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:</p> <p>If Non-Hybrid Application: Transmission Engaged Powerflow Information Alive Rolling Count 197 ARC</p> <p>Transmission Engaged Powerflow Information Alive Rolling Count 197 PV</p> <p>If Hybrid Application: Transmission Engaged Powerflow Information Alive Rolling Count 1AB ARC</p> <p>Transmission Engaged Powerflow Information Alive Rolling Count 1AB PV</p>	<p>>= 8.00 counts out of >= 18.00 counts</p> <p>>= 8.00 counts out of >= 18.00 counts</p> <p>>= 8.00 counts out of >= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>Transmission Engaged Powerflow Information Alive Rolling Count 197 ARC samples every 25.00 milliseconds.</p> <p>Transmission Engaged Powerflow Information Alive Rolling Count 197 PV samples every 25.00 milliseconds.</p> <p>Transmission Engaged Powerflow Information Alive Rolling Count 1AB ARC samples every 25.00 milliseconds.</p> <p>Transmission Engaged Powerflow Information Alive Rolling Count 1AB PV samples every 25.00 milliseconds.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IMS State Signal Message Incorrect	P1773	This DTC monitors for an error in communication with the IMS State Signal.	<p>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:</p> <p>If Non-Hybrid Application: Transmission Actual Range Status 197 ARC</p> <p>Transmission Actual Range Status 197 PV</p> <p>If Hybrid Application: Transmission Actual Range Status 1AB ARC</p> <p>Transmission Actual Range Status 1AB PV</p>	<p>>= 8.00 counts out of >= 18.00 counts</p> <p>>= 8.00 counts out of >= 18.00 counts</p> <p>>= 8.00 counts out of >= 18.00 counts</p> <p>>= 8.00 counts out of >= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>Transmission Actual Range Status 197 ARC samples every 25.00 milliseconds.</p> <p>Transmission Actual Range Status 197 PV samples every 25.00 milliseconds.</p> <p>Transmission Actual Range Status 1AB ARC samples every 25.00 milliseconds.</p> <p>Transmission Actual Range Status 1AB PV samples every 25.00 milliseconds.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Availability Signal Message Incorrect	P1778	This DTC monitors for an error in communication with the Transmission Range Availability Signal.	<p>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:</p> <p>Transmission Range Diagnostic Critical Fault ARC</p> <p>Transmission Range Diagnostic Critical Fault PV</p> <p>Transmission Range Diagnostic Limited Fault ARC</p> <p>Transmission Range Diagnostic Limited Fault PV</p>	<p>>= 3.00 counts out of >= 10.00 counts</p> <p>>= 3.00 counts out of >= 10.00 counts</p> <p>>= 3.00 counts out of >= 10.00 counts</p> <p>>= 3.00 counts out of >= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>Transmission Range Diagnostic Critical Fault ARC samples every 250.00 milliseconds.</p> <p>Transmission Range Diagnostic Critical Fault PV samples every 250.00 milliseconds.</p> <p>Transmission Range Diagnostic Limited Fault ARC samples every 250.00 milliseconds.</p> <p>Transmission Range Diagnostic Limited Fault PV samples every 250.00 milliseconds.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Unexpected Range Change Detected	P1787	Detects an unexpected change in transmission range.	Actual Arbitrated Transmission Range The internal system only diagnoses range changes in and out of Park.	# Previous Value and # Commanded Range	Actual Transmission 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 Illum.
Current Transmission 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 Illum.
Transmission Range Selection Signal Message Counter Incorrect	P17D7	ARC & PV reported SIB for \$1E8 signal from the ECM on Powertrain Sensor CAN BusDetects the failure of the ETRS system to identify the current transmission range with sufficient confidence.	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC # Previous ARC +1 Primary Value \pm Protection Value	Ignition	Run or Run/Crank	1 second	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Control Module Memory Checksum Error	P17D8	[1] This DTC will be stored if any software or calibration checksum 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 Illum.
Transmission Range Selector Control Module Read Only Memory (ROM) Error	P17D9	Reports a failure if the BIST (=Built in Self Test) for [1] the ROM checksum or [2] the ROM Error correcting code (ECO) check fails.	[1] Checksum at power-up [2] ROM ECC	\pm 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 Illum.
Transmission Range Selector Control Module Internal Random Access Memory (RAM) Error	P17DA	Indicates that control module is unable to correctly write and read data to and from RAM.	Data read	# Data written	Ignition: OR Accessory	Run or Run/Crank ON	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures This test runs continuously in the background	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Control Module 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 Illum.
Transmission Range Selector Control Module Ignition On/ Start Switch Circuit Low	P17E0	Detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine Controller Run Crank Terminal Status - CAN Message	= 1 indicating RUN/ CRANK	4.5 sec in 5.5 second window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Control Module Ignition On/ Start Switch Circuit High	P17E1	Detects if the Ignition1 Switch circuit is shorted to vehicle supply voltage	Ignition 1 voltage	> 11.7 V	Engine Controller Run Crank Terminal Status - CAN Message	= 0, indicating NOT RUN/CRANK	8 sec in 10 second window	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "A" Circuit High	P17E3	The Transmission Range Selector Switch "A" Diagnostic detects a reading High	Transmission Range Selector Switch "A" 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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "A" Circuit Low	P17E4	Transmission Range Selector Switch "A" Diagnostic detects a reading Low	Transmission Range Selector Switch "A" 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 Illum.
Transmission Range Selector Switch "A" Circuit Performance	P17E5	Transmission Range Selector Switch "A" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "A" Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	DTC not set	P17E3OR P17E4	2000 Failures out of 2500 Samples =10 sec (SIB is 5 msec loop)	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "B" Circuit High	P17E6	The Transmission Range Selector Switch "B" Diagnostic detects a reading High	Transmission Range Selector Switch "B" 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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "B" Circuit Low	P17E7	Transmission Range Selector Switch "B" Diagnostic detects a reading Low	Transmission Range Selector Switch "B" 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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "B" Circuit Performance	P17E8	Transmission Range Selector Switch "B" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "B" Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	DTC not set	P17E6OR P17E7	2000 Failures out of 2500 Samples =10 sec (SIB is 5 msec loop)	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "C" Circuit High	P17E9	The Transmission Range Selector Switch "C" Diagnostic detects a reading High	Transmission Range Selector Switch "C" 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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "C" Circuit Low	P17EA	Transmission Range Selector Switch "C" Diagnostic detects a reading Low	Transmission Range Selector Switch "C" 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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "C" Circuit Performance	P17EB	Transmission Range Selector Switch "C" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "C" Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	DTC not set	P17E9OR P17EA	2000 Failures out of 2500 Samples =10 sec (SIB is 5 msec loop)	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "D" Circuit High	P17EC	The Transmission Range Selector Switch "D" Diagnostic detects a reading High	Transmission Range Selector Switch "D" 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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "D" Circuit Low	P17ED	Transmission Range Selector Switch "D" Diagnostic detects a reading Low	Transmission Range Selector Switch "D" 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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "D" Circuit Performance	P17EE	Transmission Range Selector Switch "D" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "D" Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	DTC not set	P17EC OR P17ED	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 Illum.
Transmission Range Selector Switch "E" Circuit High	P17EF	The Transmission Range Selector Switch "E" Diagnostic detects a reading High	Transmission Range Selector Switch "E" 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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "E" Circuit Low	P17F0	Transmission Range Selector Switch "E" Diagnostic detects a reading Low	Transmission Range Selector Switch "E" 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 Illum.
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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "E" Circuit Performance	P17F8	Transmission Range Selector Switch "E" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "E" Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	DTC not set	P17EFOR P17F0	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 Illum.
Transmission Range Selector Switch "F" Circuit High	P17F9	The Transmission Range Selector Switch "F" Diagnostic detects a reading High	Transmission Range Selector Switch "F" 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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "F" Circuit Low	P17FD	Transmission Range Selector Switch "F" Diagnostic detects a reading Low	Transmission Range Selector Switch "F" 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 Illum.
Transmission Range Selector Switch "F" Circuit Performance	P17FE	Transmission Range Selector Switch "F" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "F" Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	DTC not set	P17F9OR P17FD	2000 Failures out of 2500 Samples =10 sec (SIB is 5 msec loop)	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "G" Circuit High	P1803	The Transmission Range Selector Switch "G" Diagnostic detects a reading High	Transmission Range Selector Switch "G" 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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "G" Circuit Low	P1805	Transmission Range Selector Switch "G" Diagnostic detects a reading Low	Transmission Range Selector Switch "G" 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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "G" Circuit Performance	P1806	Transmission Range Selector Switch "G" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "G" Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	DTC not set	P1803 OR P1805	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 Illum.
Transmission Range Selector Switch "H" Circuit High	P1807	The Transmission Range Selector Switch "H" Diagnostic detects a reading High	Transmission Range Selector Switch "H" 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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "H" Circuit Low	P180C	Transmission Range Selector Switch "H" Diagnostic detects a reading Low	Transmission Range Selector Switch "H" 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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "H" Circuit Performance	P180D	Transmission Range Selector Switch "H" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "H" Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	DTC not set	P1807 OR P180C	2000 Failures out of 2500 Samples =10 sec (SIB is 5 msec loop)	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "J" Circuit High	P180E	The Transmission Range Selector Switch "J" Diagnostic detects a reading High	Transmission Range Selector Switch "J" 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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "J" Circuit Low	P180F	Transmission Range Selector Switch "J" Diagnostic detects a reading Low	Transmission Range Selector Switch "J" 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 Illum.
Transmission Range Selector Switch "J" Circuit Performance	P1812	Transmission Range Selector Switch "J" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "J" Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	DTC not set	P180E OR P180F	2000 Failures out of 2500 Samples =10 sec (SIB is 5 msec loop)	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "L" Circuit High	P186B	The Transmission Range Selector Switch "L" Diagnostic detects a reading High	Transmission Range Selector Switch "L" 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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "L" Circuit Low	P186C	Transmission Range Selector Switch "L" Diagnostic detects a reading Low	Transmission Range Selector Switch "L" 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 Illum.
Transmission Range Selector Switch "L" Circuit Performance	P186D	Transmission Range Selector Switch "L" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "L" Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	DTC not set	P186B OR P186C	100 Failures out of 120 Samples =500 msec (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 Illum.
Transmission Range Selector Switches Primary Signal Message Counter Incorrect	P187F	This DTC monitors for an error in communication with the Transmission Range Selector Switches Primary Signal.	<p>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:</p> <p>Shifter Interface Board Input Sensor State Primary ARC</p> <p>Shifter Interface Board Input Sensor State Primary CSUM</p>	<p>>= 8.00 counts out of >= 18.00 counts</p> <p>>= 8.00 counts out of >= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>Shifter Interface Board Input Sensor State Primary ARC samples every 25.00 milliseconds.</p> <p>Shifter Interface Board Input Sensor State Primary CSUM samples every 25.00 milliseconds.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switches Secondary Signal Message Counter Incorrect	P188A	This DTC monitors for an error in communication with the Transmission Range Selector Switches Secondary Signal.	<p>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:</p> <p>Shifter Interface Board Input Sensor State Secondary ARC</p> <p>Shifter Interface Board Input Sensor State Secondary CSUM</p>	<p>>=4.00 counts out of >= 10.00 counts</p> <p>>=4.00 counts out of >= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>Shifter Interface Board Input Sensor State Secondary ARC samples every 50.00 milliseconds.</p> <p>Shifter Interface Board Input Sensor State Secondary CSUM samples every 50.00 milliseconds.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Signal Message Counter Incorrect	P188B	This DTC monitors for an error in communication with the Transmission Range Signal.	<p>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:</p> <p>Dual Track Pulse Width Crank Permission Status ARC</p> <p>Dual Track Pulse Width Crank Permission Status PV</p>	<p>>= 8.00 counts out of >= 18.00 counts</p> <p>>= 8.00 counts out of >= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>Dual Track Pulse Width Crank Permission Status ARC samples every 25.00 milliseconds.</p> <p>Dual Track Pulse Width Crank Permission Status PV samples every 25.00 milliseconds.</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park 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 $\leq 0.08 * 8.00$ $\geq 0.80 * 8.00$	Not Fault Active Controller is on Park button switch signals: Vehicle Speed Comprehensive correlation diagnostics:	P07B3, P07B4, P07B5, P07B9, P07BA, P07BB ~ 100 ms =valid \leq 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 $\geq 0.80 * 8.00$ $\leq 0.08 * 8.00$	Not Fault Active Controller is on Park button switch signals: Vehicle Speed	P07B3, P07B4, P07B5, P07B9, P07BA, P07BB ~ 100 ms =valid \leq 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 Illum.
					Comprehensive correlation diagnostics:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Park Assistance System Performance	P18CB	Determines if Park assist active bit from EBCM is valid	Speed Error - APA active (\$1C6/\$1C7) above a vehicle speed threshold OR Initialization Error -APA active (\$1C6/\$1C7) without an active torque request OR Exit Error - APA transitions to inactive during active torque request above a vehicle speed threshold	>10.00 APA active boolean transitions from False to True with Torque Intervention = No request APA active boolean transitions from True to False with Torque Intervention <> No request when vehicle speed is > 1.00	Active Communication with EBCM Power Mode Engine Running Status of traction in GMLAN message (\$4E9) Run/Crank Active Ignition Voltage	Received serial data = Run = True = Traction Present > 0.50 seconds > 6.41 volts	>= 6 failures out of 10 Performed every 12.5ms >= 6 failures out of 10 Performed every 12.5ms When transition occurs, no number of samples Performed every 12.5ms	Type C, No SVS Emissions Neutral Diagnostic - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "A" Circuit Correlation	P18CD	Compares Switch "A" with other relevant TRS Switches Switch "A" = Drive Input 1	[1] The number of Drive Button Press AND Switch-1-Closed count	\geq 8.00 \leq 0.08* 8.00	Not Fault Active	P17E3, P17E4, P17E5	This is based on button and switch activation, not time.	Type B, 2 Trips
			AND Switch-2-Closed count	\geq 0.80* 8.00				
			[2] The number of Drive Button Press AND Switch-1-Closed count AND Switch-3-Closed count	\geq 8.00 $\leq 0.08*8.00$ $\geq 0.80*8.00$				
			[3] The number of Drive Button Press AND Switch-1-Closed count AND Sum of Switch-2-Closed count and Switch-3- Closed count	\geq 8.00 \leq 0.08* 8.00 \geq 0.80* 8.00	Not Fault Active	P17E3, P17E4, P17E5	This is based on button and switch activation, not time.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "B" Circuit Correlation	P18CF	Compares Switch "B" with other relevant TRS Switches Switch "B" = Drive Input 2	[1] The number of Drive Button Press AND Switch-1-Closed count	≥ 8.00 $\leq 0.08 \times 8.00$ $\geq 0.80 \times 8.00$	Not Fault Active	P17E6, P17E7, P17E8	This is based on button and switch activation, not time.	Type B, 2 Trips
			AND Switch-2-Closed count					
			[2] The number of Drive Button Press AND Switch-1-Closed count AND Switch-3-Closed count	≥ 8.00 $\leq 0.08 \times 8.00$ $\geq 0.80 \times 8.00$	Not Fault Active	P17E6, P17E7, P17E8	This is based on button and switch activation, not time.	
			[3] The number of Drive Button Press AND Switch-1-Closed count AND Sum of Switch-2-Closed count and Switch-3-Closed count	≥ 8.00 $\leq 0.08 \times 8.00$ \geq	Not Fault Active	P17E6, P17E7, P17E8	This is based on button and switch activation, not time.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				0.80* 8.00				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "C" Circuit Correlation	P18D1	Compares Switch "C" with other relevant TRS Switches Switch "C" = Drive Input 3	[1] The number of Drive Button Press AND Switch-1-Closed count	≥ 8.00 $\leq 0.08 \times 8.00$ $\geq 0.80 \times 8.00$	Not Fault Active	P17E9, P17EA, P17EB	This is based on button and switch activation, not time.	Type B, 2 Trips
			AND Switch-2-Closed count					
			[2] The number of Drive Button Press AND Switch-1-Closed count AND Switch-3-Closed count	≥ 8.00 $\leq 0.08 \times 8.00$ $\geq 0.80 \times 8.00$				
			[3] The number of Drive Button Press AND Switch-1-Closed count AND Sum of Switch-2-Closed count and Switch-3- Closed count	≥ 8.00 $\leq 0.08 \times 8.00$ $\geq 0.80 \times 8.00$	Not Fault Active	P17E9, P17EA, P17EB	This is based on button and switch activation, not time.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "D" Circuit Correlation	P18D3	Compares Switch "D" with other relevant TRS Switches Switch "D" = Neutral Input 1	[1] The number of Neutral Button Press AND Switch-1-Closed count	>= 8.00 <= 0.08* 8.00	Not Fault Active	P17EC, P17ED, P17EE	This is based on button and switch activation, not time.	Type B, 2 Trips
			AND Switch-2-Closed count	>= 0.80* 8.00				
			[2] The number of Neutral Button Press AND Switch-1-Closed count AND Switch-3-Closed count	>= 8.00 <= 0.08* 8.00 >= 0.80* 8.00				
			[3] The number of Neutral Button Press AND Switch-1-Closed count AND Sum of Switch-2-Closed count and Switch-3- Closed count	>= 8.00 <= 0.08* 8.00 >= 0.80* 8.00	Not Fault Active	P17EC, P17ED, P17EE	This is based on button and switch activation, not time.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "E" Circuit Correlation	P18D5	Compares Switch "E" with other relevant TRS Switches Switch "E" = Neutral Input 2	[1] The number of Neutral Button Press	≥ 8.00	Not Fault Active	P17EF, P17F0, P17F8	This is based on the number of button and switch activation, not time. *note: these samples can accumulate over key-cyclesThis is based on button and switch activation, not time.	Type B, 2 Trips
			AND	$\leq 0.08 \times 8.00$	Neutral button Comprehensive Diagnostics	1.00		
			Switch-1-Closed count	$\geq 0.80 \times 8.00$				
			AND					
			Switch-2-Closed count					
			[2] The number of Neutral Button Press	≥ 8.00	Not Fault Active	P17EF, P17F0, P17F8		
			AND	$\leq 0.08 \times 8.00$	Neutral button Comprehensive Diagnostics:	1.00		
			Switch-1-Closed count	$\geq 0.80 \times 8.00$				
			AND					
			Switch-3-Closed count					
			[3] The number of Neutral Button Press	≥ 8.00	Not Fault Active	P17EF, P17F0, P17F8	This is based on the number of button and switch activation, not time.	
			AND	$\leq 0.08 \times 8.00$	Neutral button Comprehensive Diagnostics:	1.00		
			Switch-1-Closed count				*note: these samples can	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AND Sum of Switch-2-Closed count and Switch-3- Closed count	 ≥0.80*8.00			accumulate over key-cyclesThis is based on button and switch activation, not time.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "F" Circuit Correlation	P18D7	Compares Switch "F" with other relevant TRS Switches Switch "F" = Neutral Input 3	[1] The number of Neutral Button Press AND Switch-1-Closed count	>= 8.00 <= 0.08* 8.00	Not Fault Active	P17F9, P17FD, P17FE	This is based on button and switch activation, not time.	Type B, 2 Trips
			AND Switch-2-Closed count	>= 0.80* 8.00				
			[2] The number of Reverse Button Press AND Switch-1-Closed count	>= 8.00 <= 0.08* 8.00				
			AND Switch-3-Closed count	>= 0.80* 8.00				
			[3] The number of Neutral Button Press AND Switch-1-Closed count	>= 8.00 <= 0.08* 8.00	Not Fault Active	P17F9, P17FD, P17FE	This is based on button and switch activation, not time.	
			AND Sum of Switch-2-Closed count and Switch-3-Closed count	>= 0.80* 8.00				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "G" Circuit Correlation	P18D9	Compares Switch "G" with other relevant TRS Switches Switch "G" = Reverse Input 1	[1] The number of Reverse Button Press AND Switch-1-Closed count	≥ 8.00 $\leq 0.08 * 8.00$ $\geq 0.80 * 8.00$	Not Fault Active	P1803, P1805, P1806	This is based on button and switch activation, not time.	Type B, 2 Trips
			AND Switch-2-Closed count					
			[2] The number of Reverse Button Press AND Switch-1-Closed count	≥ 8.00 $\leq 0.08 * 8.00$ $\geq 0.80 * 8.00$				
			AND Switch-3-Closed count					
			[3] The number of Reverse Button Press AND Switch-1-Closed count	≥ 8.00 $\leq 0.08 * 8.00$ $\geq 0.80 * 8.00$	Not Fault Active	P1803, P1805, P1806	This is based on button and switch activation, not time.	
			AND Sum of Switch-2-Closed count and Switch-3-Closed count					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "H" Circuit Correlation	P18DB	Compares Switch "H" with other relevant TRS Switches Switch "H" = Reverse Input 2	[1] The number of Reverse Button Press AND Switch-1-Closed count	≥ 8.00 $\leq 0.08 * 8.00$ $\geq 0.80 * 8.00$	Not Fault Active	P1807, P180C, P180D	This is based on button and switch activation, not time.	Type B, 2 Trips
			AND Switch-2-Closed count					
			[2] The number of Reverse Button Press AND Switch-1-Closed count					
			AND Switch-3-Closed count					
			[3] The number of Reverse Button Press AND Switch-1-Closed count	≥ 8.00 $\leq 0.08 * 8.00$ $\geq 0.80 * 8.00$	Not Fault Active	P1807, P180C, P180D	This is based on button and switch activation, not time.	
			AND Sum of Switch-2-Closed count and Switch-3-Closed count					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "J" Circuit Correlation	P18DD	Compares Switch "J" with other relevant TRS Switches Switch "J" = Reverse Input 3	[1] The number of Reverse Button Press AND Switch-1-Closed count	>= 8.00 <= 0.08*8.00	Not Fault Active	P180E, P180F, P1812	This is based on button and switch activation, not time.	Type B, 2 Trips
			AND Switch-2-Closed count	>= 0.80* 8.00				
			[2] The number of Reverse Button Press AND Switch-1-Closed count	>= 8.00 <= 0.08*8.00				
			AND Switch-3-Closed count	>= 0.80* 8.00			This is based on button and switch activation, not time.	
			[3] The number of Reverse Button Press AND Switch-1-Closed count	>= 8.00 <= 0.08*8.00	Not Fault Active	P180E, P180F, P1812	This is based on button and switch activation, not time.	
			AND Sum of Switch-2-Closed count and Switch-3- Closed count	>= 0.80* 8.00				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "L" Stuck On	P18E1	Detects TRC Switch "L" is stuck on. Switch "L" = Manual/ Low Input	Valid switch status "pressed" for a longer than expected time.		Not Fault Active	P186B, P186C, P186D	4,800 failures out of 6,000 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 Illum.
Transmission Range Selector Switches A- B-C Stuck On	P18E9	Detects when TRS Switches A, B and C are stuck on A, B, C are Drive Button switches	Valid switches "PRESSED" for extended time		Not Fault Active	P17E3, P17E4, P17E5, P17E6, P17E7, P17E8, P17E9, P17EA, P17EB	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 Illum.
Transmission Range Selector Switches D- E-F Stuck On	P18EA	Detects when TRS Switches D, E and F are stuck on D, E, F are Neutral Button switches	Valid switches "PRESSED" for extended time		Not Fault Active	P17EC, P17ED, P17EE, P17EF, P17F0, P17F8, P17F9, P17FD, P17FE	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 Illum.
Transmissio n Range Selector Switches G- H-J Stuck On	P18EB	Detects when TRS Switches G, H and J are stuck on G, H, J are Reverse Button switches	Valid switches "PRESSED" for extended time		Not Fault Active	P1803, P1805, P1806, P1807, P180C, P180D, P186B, P186C, P186D	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 Illum.
Transmission Range Command Correlation	P1911	Detects if Range Command Echo from TCM matched current Range Command	Check Range Command Echo vs Range Command when Range Command Poke is called	Range Command Echo \neq Range Command	Diagnostic Enable Calibration Recent Range Command Transition TCM LIN Node or Bus Fault Active	= TRUE = FALSE =FALSE	80.00 failures out of 100.00 samples 50ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 2 Performance (For use on vehicles with two fuel senders and mechanical transfer pump)	P2066	This DTC will detect a secondary fuel tank level sensor stuck in-range.	1) If Deadband diagnostic subtest Enabled AND 2a) If fuel volume in primary tank is and 2b) if fuel volume in secondary tank is and 2c) and if 2a and 2b indications do not change while fuel volume consumed by engine is	2a) >1,024.0 liters 2b) <2.0 liters 2c) >18.0 liters	1a) Diagnostic is Disabled 1b) Engine Operational Status	1b) == Running	250 ms / sample	Type B, 2 Trips
			1) If Secondary sensor rationality diagnostic subtest enabled AND 2a) Volume in primary tank is 2b) and volume in secondary tank is 2c) and remains in this condition for	2a) < 1,024 liters 2b) > 2 liters 2c) > 1,800 seconds	1a) Diagnostic is Disabled 1b) Engine Operational Status Engine Running	1b) == Running	250 ms / sample	
			a) If indicated fuel volume change is b) while fuel consumed by the engine is	a) < 3.00 liters b) > 19 liters	1a) Diagnostic is Enabled 1b) Engine Operational Status Engine Running 2) Secondary tank volume [Not Empty] is	1b) == Running 2) >2.0 liters	250 ms / sample	

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 Illum.
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 Illum.
Exhaust Camshaft Actuator Solenoid Circuit Low- Bank 1	P2090	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 Illum.
Exhaust Camshaft Actuator Solenoid Circuit High - Bank 1	P2091	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 Ignition switch	> 11.00 Volts On Crank or Run	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 Illum.
Post Catalyst Fuel Trim System Too Lean Bank 1	P2096	<p>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.</p> <p>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.</p> <p>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</p>	<p>The Average Integral Offset % Authority</p> <p>AND</p> <p>The Average Total Offset % Authority</p> <p>(Note: any value greater than or equal to +100% effectively nullifies the Average Total Offset % Authority criteria)</p> <p>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.</p> <p>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.</p>	<p>>=95.0 %</p> <p>>=50.0 %</p> <p>If the P2096 is actively failing then the Average Integral Offset must be < 85.0 % and the Average Total Offset must be < 99.0 % for the diagnostic to report a pass.</p>	<p>The post cat fuel trim diagnostic is enabled</p> <p>The diagnostic is enabled during: Deceleration Idle Cruise Light Acceleration Heavy Acceleration</p> <p>Ambient Air Pressure Engine AirFlow Intake Manifold Pressure Induction Air Temperature Start-up Coolant Temp.</p> <p>PTO Intrusive diag. fuel control Ethanol Estimation in Progress</p> <p>02 Heater Learned Resistance</p> <p>Long Term Secondary Fuel Trim Enabled for (see "Long Term Secondary Fuel Trim Enable Criteria" in Supporting Tables)</p> <p>High Vapor Conditions</p> <p>Green Cat System</p>	<p>No No Yes Yes Yes</p> <p>>= 70 kPa >= 0.0 g/s <= 10,000.0 >= 20 kPa <= 256 >= -20 deg. C <= 200 >= -20 deg. C (or OBD Coolant Enable Criteria = TRUE)</p> <p>Not Active Not Active Not Active</p> <p>= Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")</p> <p>>= 0.1 seconds</p> <p>Not Present</p> <p>= Not Valid,</p>	<p>Frequency: Continuous Monitoring in 100ms loop.</p> <p>The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 30.0 seconds (300 samples) before comparing to their respective failure thresholds.</p>	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		and proportional offset values of "0" (i.e. 0% authority) and a post catalyst O ₂ 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 360,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is above 11 grams/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_F A IAT_SensorFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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):</p> <p>Deceleration Idle Cruise Light Acceleration Heavy Acceleration</p>	CamSensorAnyLocationF A EvapEmissionSystem_FA EvapFlowDuringNonPurg e_FA FuelTankPressureSnsrCkt _FA EvapPurgeSolenoidCircuit _FA EvapSmallLeak_FA EvapVentSolenoidCircuit_ FA FuelInjectorCircuit_FA MAF_SensorFA MAF_SensorTFTKO MAP_SensorFA MAP_EngineVacuumStat us EngineMisfireDetected_F A A/F Imbalance BankI 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 Illum.
					(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 Illum.
Post Catalyst Fuel Trim System Too Rich Bank 1	P2097	<p>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.</p> <p>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.</p> <p>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</p>	<p>The Average Integral Offset % Authority</p> <p>AND</p> <p>The Average Total Offset % Authority</p> <p>(Note: any value less than or equal to -100% effectively nullifies the Average Total Offset % Authority criteria)</p> <p>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 $\geq 18\%$ for ≥ 5.0 seconds.</p> <p>Diagnosis resumes if the purge valve is closed OR the percent vapor is $\leq 14\%$ for ≥ 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.</p>	<p>$\leq -97.0\%$</p> <p>$\leq -50.0\%$</p> <p>If the P2097 is actively failing then the Average Integral Offset must be $> -85.0\%$ and the Average Total Offset must be $> -99.0\%$ for the diagnostic to report a pass.</p>	Same as P2096	Same as P2096	<p>Frequency: Continuous Monitoring in 100ms loop.</p> <p>The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 30.0 seconds (300 samples) before comparing to their respective failure thresholds.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		and proportional offset values of "0" (i.e. 0% authority) and a post catalyst O ₂ sensor that is within its optimal operating range (neither rich nor lean).						

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 >	10.00 % 10.00 %	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)) AND ((Engine shutdown procedure is not complete) OR (Run/Crank signal is	> 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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					active))			
			Throttle Position >	52.71 %	TPS minimum learn active AND Powertrain Relay ContactI 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 Illum.
Accelerator Pedal Position (APP) Sensor 1 Lo	P2122	Detects a continuous or intermittent short low or open in the APP sensor #1 by monitoring the APP1 sensor percent Vref and failing the diagnostic when the APP1 percent Vref is too low. This diagnostic only runs when battery voltage is high enough. Detects a continuous or intermittent short low or open in the APP sensor #1 on the Main processor.	APP1 percent Vref < (100% corresponds to 5.0 Volt)	9.25 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	19/39 counts; or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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) > (100% corresponds to 5.0 Volt)	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 Illum.
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 faultst 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) >	5.000 % Vref	Run/Crank voltage No APP sensor faults No 5V reference errors or faultst 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 Illum.
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 >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 >= 1 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 Illum.
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 >= 1 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 Illum.
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 >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 >= 1 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 Illum.
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 >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 >= 1 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 Illum.
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 minimum 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 > (100% corresponds to 5.0 Volt)	11.48% 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 Illum.
Bank 1 Air- Fuel Ratio Imbalance	P219A	<p>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 O2 voltage is used to generate a variance metric that represents the statistical variation of the O2 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).</p> <p>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.</p> <p>The Ratio metric is calculated by selecting the appropriate threshold calibration from a 17x17 table (see Supporting Table</p>	<p>Standard Mode Filtered Ratio</p> <p>The EWMA calculation uses the weighting coefficient from the following supporting table: P219A EWMA Coefficient</p> <p>For this program, the Optional Mode is NOT used</p> <p>Optional Mode Filtered Ratio</p> <p>The EWMA calculation uses the weighting coefficient from the following supporting table while in Optional Mode:</p>	<p>>0.45</p> <p>If the diagnostic has reported a failure on the prior trip, the EWMA Filtered Ratio must fall below 0.37 in order to report a pass. This feature prevents the diagnostic from toggling between failing and passing.</p> <p>> 0.50</p> <p>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.</p>	<p>The A/F imbalance diagnostic is enabled</p> <p>System Voltage</p> <p>Fuel Level</p> <p>Engine Coolant Temperature</p> <p>Cumulative engine run time</p> <p>Diagnostic enabled at Idle (regardless of other operating conditions)</p> <p>Engine speed range</p> <p>Engine speed delta during a short term sample period</p> <p>Mass Airflow (MAF) range</p> <p>Cumulative delta MAF during a short term sample period</p> <p>Filtered MAF delta between samples Note: first order lag filter coefficient applied to MAF</p>	<p>No lower than 10.0 Volts for more than 0.2 seconds</p> <p>> 10.0% The diagnostic will disregard the fuel level criteria if the fuel sender is faulty.</p> <p>> -20 deg. C (or OBD Coolant Enable Criteria = TRUE)</p> <p>> 0.0 seconds</p> <p>No</p> <p>1,200 to 4,279 RPM</p> <p><250 RPM</p> <p>0 to 1,000 g/s</p> <p><5 g/s</p> <p><0.20 g/s</p>	<p>Minimum of 1 test per trip, up to 5 tests per trip during RSR or FIR.</p> <p>The front O2 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</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>P219A Variance Threshold Bank1 Table) and subtracting it from the measured Variance. The result is then divided by a normalizer calibration from another 17 x 17 table (see Supporting Table P219A Normalizer Bank1 Table). This quotient is then multiplied by a quality factor calibration from a 17 x 17 table (see Supporting Table P219A Quality Factor Bank1 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.</p> <p>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</p>	P219A EWMA Coefficient Opt Table		<p>= 0.050</p> <p>Air Per Cylinder (APC)</p> <p>APC delta during short term sample period</p> <p>Filtered APC delta between samples Note: first order lag filter coefficient applied to APC = 0.250</p> <p>Spark Advance</p> <p>Throttle Area (percent of max)</p> <p>Intake Cam Phaser Angle</p> <p>Exhaust Cam Phaser Angle</p> <hr/> <p>Electronic Waste Gate (eWG) present</p> <p>If eWG = yes then Waste Gate Position</p> <p>Intrusive eWG Feature</p> <p>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.</p> <p>Intrusive Waste Gate Position Min</p>	<p>190 to 715 mg/cylinder</p> <p>< 100 mg/cylinder</p> <p><9.99 percent</p> <p>0 to 100 degrees</p> <p>0 to 200 percent</p> <p>-10 to 100 degrees</p> <p>0 to 100 degrees</p> <hr/> <p>No</p> <p>0.0 to 101.0</p> <p>Disabled</p> <p>0.0</p>	<p>made within 5 minutes of operation.</p> <p>For RSRorFIR, 10 tests must complete before the diagnostic can report.</p>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 suooortinci			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	0.99 to 0.01		
					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 Illum.
		tables: P219A Variance Threshold Bank1 Opt Table P219A Normalizer Bank1 Opt Table , and P219A Quality Factor Bank1 Opt Table			<p>Low Lift Cam Profile will use:</p> <p>Quality Factor (QF) QF calibrations are located in a 17x17 lookup table versus engine speed and load (see Supporting Table P219A Quality Factor Bank1 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.</p> <p>Fuel Control Status Closed Loop and Long Term FT Enabled for:</p> <p>Device Control AIR pump CASE learn EGR EVAP Engine Over Speed Protection Idle speed control PTO Injector base pulse width</p>	<p>Optional Mode Filtered Ratio</p> <p>>=0.99</p> <p>>= 0.0 seconds (Please see "Closed Loop Enable Clarification" and "Long Term FT Enable Criteria" in Supporting Tables)</p> <p>Not active Not on Not active Not intrusive Not intrusive Not Active</p> <p>Normal Not Active Above min pulse limit</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					02 learned htr resistance Rapid Step Response (RSR): RSR will trigger if the Ratio result from the last test is AND it exceeds the last Filtered ratio by Once triggered, the filtered ratio is reset to: Fast Initial Response (FIR): FIR will trigger when an NVM reset or code clear occurs. Once triggered, the filtered ratio is reset to: No Fault Active for:	= Valid (the 02 heater resistance has learned since NVM reset) >= 0.86 >=0.15 0.00 0.00 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 Illum.
						WRAF_Bank_1_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Circuit Low (applications with LIN MAF)	P2228	<p>Detects an erroneously 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.</p> <p>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.</p>	BARO Pressure	< 50.0 kPa	<p>Diagnostic is Enabled</p> <p>LIN communications established with MAF</p>		<p>160 failures out of 200 samples</p> <p>1 sample every 25 msec</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Circuit High (applications with LIN MAF)	P2229	<p>Detects an erroneously 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.</p> <p>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.</p>	BARO Pressure	> 115.0 kPa	<p>Diagnostic is Enabled</p> <p>LIN communications established with MAF</p>		<p>160 failures out of 200 samples</p> <p>1 sample every 25 msec</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Circuit Intermittent (applications with LIN MAF)	P2230	<p>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.</p> <p>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".</p> <p>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.</p>	<p>String Length</p> <p>Where: "String Length" = sum of "Diff" calculated over</p> <p>And where: "Diff" = ABS(current BARO reading - BARO reading from 25 milliseconds previous)</p>	<p>> 100 kPa</p> <p>40 consecutive BARO readings</p>	<p>Diagnostic is Enabled</p> <p>LIN communications established with MAF</p>		<p>4 failures out of 5 samples</p> <p>Each sample takes 1.0 seconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
02 Sensor Pumping Current Circuit/Open Bank 1 Sensor 1 (WRAF & Gen4 ECM	P2237	<p>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).</p> <p>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.</p>	<p>B1S1 WRAF ASIC indicates a Open circuit on the Pump Current circuit signal.</p> <p>Open fail counts are accumulated to determine fault status.</p> <p>Note: This ASIC is referred to as ATIC142 (Continental).</p>	<p>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</p> <p>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.</p>	<p>Diagnostic is Enabled</p> <p>DTC's Not active this key cycle</p> <p>Measure Valid status (ASIC)</p> <p>Controller status (ASIC)</p> <p>Engine Run or Auto stop</p> <p>*****</p> <p>Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete)</p> <p>*****</p>	<p>WRAF_Bank_1_FA P0135, P0030, P0031, P0032</p> <p>= Valid</p> <p>= Ready</p> <p>= True</p> <p>= Complete</p> <p>> 20.0 seconds</p>	<p>20 failures out of 24 samples</p> <p>Continuous in 25 milli - second loop</p>	Type B, 2 Trips
			<p>B1S1 WRAF ASIC indicates a Open circuit on the Pump Current circuit signal.</p> <p>Open fail counts are accumulated to determine fault status.</p> <p>This application uses the following type of WRAF sensor:</p> <p><u>For NGK ZFAS U2</u></p> <p><u>For Bosch LSU 4p9</u></p>	<p>The ASIC provides a fault indication when the pumping current circuit fails the following criteria;</p> <p>Based on the type of WRAF sensor used;</p> <p>CeWRSG_e_Bosch_LSU_4p9</p> <p>element resistance > 400 ohms</p> <p>pump cell reference resistance > Nernst</p>	<p>Diagnostic is Enabled</p> <p>DTC's Not active this key cycle</p> <p>Measure Valid status (ASIC)</p> <p>Controller status (ASIC)</p> <p>Engine Run or Auto stop</p> <p>*****</p> <p>Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete)</p> <p>*****</p>	<p>WRAF_Bank_1_FA P0135, P0030, P0031, P0032</p> <p>= Valid</p> <p>= Ready</p> <p>= True</p> <p>= Complete</p> <p>> 20.0 seconds</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<u>Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch).</u>	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 Illum.
02 Sensor Reference Voltage Circuit/Open Bank 1 Sensor 1 (WRAF& Gen4 ECM	P2243	<p>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).</p> <p>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.</p>	<p>B1S1 WRAF ASIC indicates a Open circuit on the Reference Voltage circuit signal.</p> <p>Open fail counts are accumulated to determine fault status.</p> <p>Note: This ASIC is referred to as ATIC142 (Continental).</p>	<p>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</p> <p>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.</p>	<p>Diagnostic is Enabled</p> <p>DTC's Not active this key cycle</p> <p>Measure Valid status (ASIC)</p> <p>Controller status (ASIC)</p> <p>Engine Run or Auto stop *****</p> <p>Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) *****</p>	<p>WRAF_Bank_1_FA P0135, P0030, P0031, P0032</p> <p>= Valid</p> <p>= Ready</p> <p>= True</p> <p>= Complete</p> <p>> 20.0 seconds</p>	<p>20 failures out of 24 samples</p> <p>Continuous in 25 milli - second loop</p>	Type B, 2 Trips
			<p>B1S1 WRAF ASIC indicates a Open circuit on the Reference Voltage circuit signal.</p> <p>Open fail counts are accumulated to determine fault status.</p> <p>Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch).</p>	<p>The ASIC provides a fault indication when the reference voltage circuit fails the following criteria;</p> <p> Nernst signal - 0.45 > 1.0 volts</p> <p>Note: the faults must exist for more than 10 msec to qualify for a fail flag.</p>	<p>DTC's Not active this key cycle</p> <p>Measure Valid status (ASIC)</p> <p>Controller status (ASIC)</p> <p>Engine Run or Auto stop *****</p> <p>Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) *****</p>	<p>WRAF_Bank_1_FA P0135, P0030, P0031, P0032</p> <p>= Valid</p> <p>= Ready</p> <p>= True</p> <p>= Complete</p> <p>> 20.0 seconds</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
02 Sensor Reference Ground Circuit/Open Bank 1 Sensor 1 (WRAF & Gen4 ECM	P2251	<p>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).</p> <p>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.</p>	<p>B1S1 WRAF ASIC indicates a Open circuit on the Reference Ground circuit signal.</p> <p>Open fail counts are accumulated to determine fault status.</p> <p><u>Note:</u> This ASIC is referred to as ATIC142 (Continental).</p>	<p>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</p> <p>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.</p>	<p>Diagnostic is Enabled</p> <p>DTC's Not active this key cycle</p> <p>Measure Valid status (ASIC)</p> <p>Controller status (ASIC)</p> <p>Engine Run or Auto stop</p> <p>*****</p> <p>Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) *****</p>	<p>WRAF_Bank_1_FA P0135, P0030, P0031, P0032</p> <p>= Valid</p> <p>= Ready</p> <p>= True</p> <p>= Complete</p> <p>> 20.0 seconds</p>	<p>20 failures out of 24 samples</p> <p>Continuous in 25 milli - second loop</p>	Type B, 2 Trips

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>B1S1 WRAFASIC indicates a Open circuit on the Reference Ground circuit signal.</p> <p>Open fail counts are accumulated to determine fault status.</p> <p>Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch).</p>	<p>The ASIC provides a fault indication when the reference ground circuit fails the following criteria;</p> <p>CJ136 H/W detection</p> <p>Note: the faults must exist for more than 10 msec to qualify for a fail flag.</p>	<p>Diagnostic is Enabled</p> <p>DTC's Not active this key cycle</p> <p>Measure Valid status (ASIC)</p> <p>Controller status (ASIC)</p> <p>Engine Run or Auto stop *****</p> <p>Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) *****</p>	<p>WRAF_Bank_1_FA P0135, P0030, P0031, P0032</p> <p>= Valid</p> <p>= Ready</p> <p>= True</p> <p>= Complete</p> <p>> 20.0 seconds</p>	<p>20 failures out of 24 samples</p> <p>Continuous in 25 milli - second loop</p>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Bypass Valve - Mechanical Turbocharge r with wastegate. Not supercharge r with mechanical compressor	P2261	This DTC indicates the compressor recirculation valve being stuck closed. This diagnostic is active at coast down let off conditions, where an airflow pulsation criteria is used as basis of this diagnostic.	When measuring time accumulated air mass flow derivate boost pressure is high pass filtered with filter frequency ***** A failure is detected when Acc. Filtered Air Mass Flow or Acc.Der.Filtered boost pressure	< 0.80 Second, = 10.00 Hz ***** >60.00 g/s > 500.00 kPa/s	Diagnostic enabled ***** Engine speed ***** Bypass valve commanded open duty cycle For at least ***** Pressure ratio over the compressor relative limit Condition keep true for x seconds extra ***** Negative transient -> TRUE Relative boost and Pressure derivate Hysteresis negative transient -> FALSE Relative boost or Pressure derivate ***** No Active DTCs:	True ***** >= 1,200 rpm ***** > 6.00 % >= 0.20 s ***** > refer to P00C4 P2261: Compressor Surge Line in Supporting Tables 1.50 s ***** TRUE >=20.00 kPa <=-250.00 kPa/s <3.00 kPa > 50.00 kPa/s ***** BSTR_b_TurboBypassCkt FA BSTR_b_BoostSnrFA MAF_SensorFA	8 Failed tests out of 10 tests 25ms/ sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
02 Sensor Signal Stuck Lean Bank 1 Sensor 2	P2270	<p>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.</p> <p>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.</p>	<p>Post 02 sensor signal</p> <p>AND</p> <p>The Accumulated mass airflow monitored during the Stuck Lean Voltage Test</p>	<p>< 850mvolts</p> <p>> 70 grams</p>	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>B1S2 DTC's Not active this key cycle</p> <p>System Voltage Learned heater resistance</p> <p>Green 02S Condition</p>	<p>TPS_ThrottleAuthorityDefaulted</p> <p>ECT_Sensor_FA</p> <p>IAT_SensorFA</p> <p>MAF_SensorFA</p> <p>MAP_SensorFA</p> <p>AIR System FA</p> <p>FuelInjectorCircuit_FA</p> <p>FuelTrimSystemBI_TFTK0</p> <p>FuelTrimSystemB2_TFTK0</p> <p>EngineMisfireDetected_FA</p> <p>Ethanol Composition Sensor FA</p> <p>02S_Bank_ 1_TFTK0</p> <p>02S_Bank_ 2_TFTK0</p> <p>P013A, P013B, P013E, P013F, P2270orP2271</p> <p>>10.5 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "H02S Heater Resistance DTC's")</p> <p>= 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:</p>	<p>Frequency: Once per trip</p> <p>Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Low Fuel Condition Only when FuelLevelDataFault Pedal position Engine Airflow Closed loop integral Closed Loop Active Evap Ethanol Estimation in Progress Post fuel cell Crankshaft Torque EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Transmission Temp	B1S2, B2S2 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 11.0 grams/sec. = False = False < 10.0% 2.0 < gps < 10.0 0.74 < C/L Int < 1.08 = 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). = Enabled, refer to Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests for additional info. <100.ONm = not active = not active > 60.0 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Predicted Catalyst temp Fuel State	> -41.0 °C 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)	1,100 < RPM < 3,200		
					Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled)	1,200 < RPM < 3,350 40.4 < MPH < 80.8		
					All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested.	37.3 < MPH < 83.9		
					During Stuck Lean test the following must stay TRUE or the test will abort: Commanded Fuel Crankshaft Torque	0.96 < EQR < 1.08 <110.ONm		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
02 Sensor Signal Stuck Rich Bank 1 Sensor 2	P2271	<p>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.</p> <p>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.</p>	<p>Post 02 sensor signal</p> <p>AND</p> <p>The Accumulated mass airflow monitored during the Stuck Rich Voltage Test</p>	<p>> 100 mvolts</p> <p>> 32.0 grams</p>	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>B1S2 DTC's Not Active this key cycle</p> <p>System Voltage Learned heater resistance</p> <p>Green 02S Condition</p>	<p>TPS_ThrottleAuthorityDefaulted</p> <p>ECT_Sensor_FA</p> <p>IAT_SensorFA</p> <p>MAF_SensorFA</p> <p>MAP_SensorFA</p> <p>AIR System FA</p> <p>FuelInjectorCircuit_FA</p> <p>FuelTrimSystemBI_TFTK0</p> <p>FuelTrimSystemB2_TFTK0</p> <p>EngineMisfireDetected_FA</p> <p>Ethanol Composition Sensor FA</p> <p>02S_Bank_ 1_TFTK0</p> <p>02S_Bank_ 2_TFTK0</p> <p>P013A, P013B, P013E, P013F or P2270</p> <p>>10.5 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")</p> <p>= Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than Multiple DTC Use_Green Sensor Delay Criteria - Limit for the following locations:</p>	<p>Frequency: Once per trip</p> <p>Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_Rap idResponseActiv e = TRUE, multiple tests per trip are allowed.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Low Fuel Condition Only when FuelLevelDataFault Fuel State DTC's Passed ===== After above conditions are met: DFCO mode is continued (w/o driver initiated pedal input).	B1S2, B2S2 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 11.0 grams/sec. = False = False = DFCO possible = P2270 = P013E = P013A =====		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure Sensor C Circuit Low	P227C	<p>Detects an erroneously 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.</p> <p>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.</p>	BARO C Pressure	< 50.0 kPa	<p>Diagnostic is Enabled</p> <p>LIN communications established with MAF</p>		<p>160 failures out of 200 samples</p> <p>1 sample every 25 msec</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure Sensor C Circuit High	P227D	<p>Detects an erroneously 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.</p> <p>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.</p>	BARO C Pressure	> 115.0 kPa	<p>Diagnostic is Enabled</p> <p>LIN communications established with MAF</p>		<p>160 failures out of 200 samples</p> <p>1 sample every 25 msec</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure Sensor C Circuit Intermittent/ Erratic	P227E	<p>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.</p> <p>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".</p> <p>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.</p>	<p>String Length</p> <p>Where: "String Length" = sum of "Diff" calculated over</p> <p>And where: "Diff" = ABS(current BARO C reading - BARO C reading from 25 milliseconds previous)</p>	<p>> 100 kPa</p> <p>40 consecutive BARO C readings</p>	<p>Diagnostic is Enabled</p> <p>LIN communications established with MAF</p>		<p>4 failures out of 5 samples</p> <p>Each sample takes 1.0 seconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 or TFTKO) 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	True ≥11 Volts > 0.300 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

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 Illum.
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 FAand IATJAT2.ECTNot FAand Low side Fuel Pump Relay ckt Not FAand 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 >0.300 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 Illum.
					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 Illum.
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 A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	< 100 Q impedance between signal and controller power	<p>Engine running</p> <p>Ignition Voltage</p>	> 11.0 Volts	<p>50 Failures out of 63 Samples</p> <p>100 msec rate</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #2 CIRCUIT High	P2304	Diagnoses Cylinder #2 Ignition Control (EST) output driver circuit for a Short to Power fault	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	< 100 Q impedance between signal and controller power	<p>Engine running</p> <p>Ignition Voltage</p>	> 11.0 Volts	<p>50 Failures out of 63 Samples</p> <p>100 msec rate</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	< 100 Q impedance between signal and controller ground	<p>Engine running</p> <p>Ignition Voltage</p>	> 11.0 Volts	<p>50 Failures out of 63 Samples</p> <p>100 msec rate</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #3 CIRCUIT High	P2307	Diagnoses Cylinder #3 Ignition Control (EST) output driver circuit for a Short to Power fault	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	< 100 Q impedance between signal and controller power	<p>Engine running</p> <p>Ignition Voltage</p>	> 11.0 Volts	<p>50 Failures out of 63 Samples</p> <p>100 msec rate</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	< 100 Q impedance between signal and controller ground	<p>Engine running</p> <p>Ignition Voltage</p>	> 11.0 Volts	<p>50 Failures out of 63 Samples</p> <p>100 msec rate</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #4 CIRCUIT High	P2310	Diagnoses Cylinder #4 Ignition Control (EST) output driver circuit for a Short to Power fault	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.</p>	< 100 Q impedance between signal and controller power	<p>Engine running</p> <p>Ignition Voltage</p>	> 11.0 Volts	<p>50 Failures out of 63 Samples</p> <p>100 msec rate</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP System Pressure Sensor/ Switch "B" Circuit Range/ Performance (wired to ECM)	P24D6	<p>Canister vapor pressure sensor offset pressure is out of range when sensor re-zero occurs.</p> <p>The DTC will be set if the Canister vapor pressure sensor offset is out of range when it tries to re-zero at the beginning of a cold start drive cycle.</p> <p>The re-zero test determines if the Canister vapor pressure sensor signal falls within a calibratable window about atmospheric pressure.</p> <p>The results of the re-zero test are used to determine if there is a re-zero problem. 1) An individual re-zero test generates a re-zero ratio. The ratio goes from 0.0 to 1.0. 2) A 0.0 means that the re-zero pressure signal achieved exactly the previous learned offset. 3) A ratio of 1.0 means that the re-zero pressure did not get within the window. 4) Re-zero pressure within the window</p>	<p>The Canister vapor pressure sensor signal is compared to a window about barometric pressure (sensor voltage offset (~1.25 volts))</p> <p>Upper pressure threshold (pressure addition above the nominal barometric pressure)</p> <p>The learned delta above the previous learned offset needs to be</p> <p>Lower pressure threshold (pressure subtraction below the nominal barometric pressure)</p> <p>The learned delta below the previous learned offset needs to be</p> <p>The difference between Canister vapor pressure sensor signal and the previous learned offset is then normalized against the appropriate threshold listed above to produce a ratio between 0.0 and 1.0. This normalized re-zero ratio is then filtered with a EWMA (with 0= perfect pass and 1=perfect fail).</p> <p>When EWMA is the DTC light is</p>	<p>1.70 Volt rezero max</p> <p>< 0.40 Volt delta max</p> <p>1.30 Volt rezero min</p> <p>> -0.40 Volt delta min</p> <p>> 0.73 (EWMA Fail Threshold),</p>	<p>Diagnostic is Enabled</p> <p>Soak timer Power up coolant temperature Barometric pressure Engine not cranking Power up IAT Power up IAT</p> <p>LIN IAT data available</p> <p>Power Up Coolant temp - Power Up IAT temp</p> <p>No Active DTC's</p> <p>No Pending DTC's</p>	<p>>3,600 seconds</p> <p><35 °C >70 kPa</p> <p>> 4° C <35 °C</p> <p><8 °C</p> <p>P24D7 - EVAP System Pressure Sensor/Switch "B" Circuit Low</p> <p>P24D8 - EVAP System Pressure Sensor/Switch "B" Circuit High IAT_SensorFA ECT_Sensor_FA EngineModeNotRunTimer_FA AmbientAirDefault</p> <p>P24D7 - EVAP System Pressure Sensor/Switch "B" Circuit Low</p> <p>P24D8 - EVAP System Pressure Sensor/Switch "B" Circuit High</p>	100 ms	<p>Type A, 1 Trips</p> <p>EWMA Average run length: 6</p> <p>Run length is 2 trips after code clear</p>

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>generates values between 0.0 and 1.0.</p> <p>The resulting re-zero ratio is filtered using an exponentially weighted moving average (EWMA). When the EWMA exceeds a fail threshold, the Canister vapor pressure sensor signal re-zero test reports a failure. Once the Canister vapor pressure sensor signal re-zero test fails, the EWMA fall below a lower re-pass threshold before it can pass the Canister vapor pressure sensor signal re-zero test again.</p>	<p>illuminated.</p> <p>The EWMA calculation uses a 0.20 weighting coefficient.</p> <p>The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 3 additional consecutive trips.</p>	< 0.40 (EWMA Re-Pass Threshold)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP System Pressure Sensor/ Switch "B" Circuit Low (wired to ECM)	P24D7	<p>This DTC will detect a Canister Pressure Sensor signal that is too low out of range.</p> <p>The Canister Pressure 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.</p> <p>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. A pass is reported if the low sample counter reaches its threshold.</p>	<p>Canister Pressure Sensor signal</p> <p>The normal operating range of the Canister Pressure Sensor is 0.5 volts (-1245 Pa) to 4.5 volts (~ -3736 Pa).</p>	< 0.15 volts (3.0 % of Vref or --1,687.50 Pa)			<p>640 failures out of 800 samples</p> <p>12.5 ms / sample</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP System Pressure Sensor/ Switch "B" Circuit High (wired to ECM)	P24D8	<p>This DTC will detect a Canister Pressure Sensor signal that is too high out of range.</p> <p>The Canister Pressure Sensor circuit out of range diagnostic compares the raw sensor voltage to a upper voltage threshold. It is an X out of Y diagnostic that runs continuously anytime the controller is awake.</p> <p>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. A pass is reported if the high sample counter reaches its threshold.</p>	<p>Canister Pressure Sensor signal</p> <p>The normal operating range of the Canister Pressure Sensor is 0.5 volts (-1245 Pa) to 4.5 volts (~ -3736 Pa).</p>	>4.85 volts (97.0 % of Vref or -4,187 Pa)			<p>640 failures out of 800 samples</p> <p>12.5 ms / sample</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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)	Message <> two's complement of message	Diagnostic Status	Enabled	>= 16 failures out of 20 samples.	Type B, 2 Trips
			OR Rolling count error - Serial Communication message (\$189/\$199) rolling count index value	Message <> previous message rolling count value + one	Power Mode	= Run	Performed on every received message	
			OR		Ignition Voltage	> 6.41 volts	>= 6 Rolling count errors out of 10 samples.	
			Range Error - Serial Communication message - (\$189/\$199) TCM Requested Torque Increase	> 350 Nm	Engine Running	= True	Performed on every received message	
			OR Multi-transition error - Trans torque intervention type request change	Requested torque intervention type toggles from not increasing request to increasing request	Run/Crank Active	> 0.50 Sec	>=6 range errors out of 10 samples. Performed on every received message	
					No Serial communication loss to TCM (U0101)	No loss of communication	>=5 multi-transitions out of 5 samples. Performed every 200 msec	

23OBDG03A Part2 ECM Summary Tables

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

23OBDG03A Part2 ECM Summary Tables

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

23OBDG03A Part2 ECM Summary Tables

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Coolant Pump Relay Control Circuit	P2600	Controller specific output driver circuit diagnoses the Auxiliary Coolant Pump Relay Control Circuit low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	> 200 K Q impedance between signal and controller ground.	<p>Diagnostic is Enabled</p> <p>Run Crank Ignition in Range</p> <p>Engine not cranking</p> <p>== Above is true and ==</p> <p>Last Open Circuit Test</p>	<p>= True</p> <p>= True</p> <p>=====</p> <p>not Indeterminate</p>	<p>5 seconds out of a 6 seconds window</p> <p>Continuous</p>	Type B, 2 Trips Note: In certian controllers P2602 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Coolant Pump Relay Control Circuit Low Voltage	P2602	Controller specific output driver circuit diagnoses the Auxiliary Coolant Pump Relay Control Circuit 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 signal and controller ground	Diagnostic is Enabled Run Crank Ignition in Range Engine not cranking == Above is true and == Last Open Circuit Test	= True = True ===== not Indeterminate	5 seconds out of a 6 seconds window Continuous	Type B, 2 Trips Note: In certian controlle rs P2600 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Coolant Pump Relay Control Circuit High Voltage	P2603	Controller specific output driver circuit diagnoses the Auxiliary Coolant Pump Relay Control Circuit 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 signal and controller power.	Diagnostic is Enabled Run Crank Ignition in Range Engine not cranking == Above is true and == Last Open Circuit Test	= True = True ===== not Indeterminate	5 seconds out of a 6 seconds window Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
02 Sensor Pumping Current Trim Circuit/Open Bank 1 Sensor 1 (WRAF & E81 ECM) Or (WRAF & Gen4 ECM)	P2626	<p>This DTC determines if the WRAF 02S trim circuit is open. The trim circuit fine tunes the WRAF 02S pump current signal. The diagnostic is an Application-Specific Integrated Circuit (ASIC) intrusive test which runs when the Run/Crank signal changes from False to True.</p> <p>The diagnostic failure counter is incremented if the ASIC test fails and the enable conditions are met. This DTC is set based on the fail and sample counters.</p>	<p>B1S1 Trim circuit Open test.</p> <p>This application uses the following type of WRAF sensor:</p> <p>The ASIC Open trim test detects a fault if the trim circuit resistance is:</p> <p>For NGK_ZFAS_U2</p> <p>For Bosch_LSU_4p9</p> <p>Note: This ASIC is referred to asATIC142 (Continental).</p>	<p>CeWRSG_e_Bosch_LSU_4p9</p> <p>> 4,644 ohms</p> <p>> 379.5 ohms</p>	<p>Diagnostic is Enabled</p> <p>DTC's Not active this key cycle</p> <p>Run/Crank Signal</p> <p>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)</p> <p>Fuel Control State</p> <p>Off Stoich Closed Loop</p> <p>DFCO</p> <p>WRAF Pump current</p>	<p>WRAF_Bank_1_FA P0135, P0030, P0031, P0032</p> <p>changes from false to true</p> <p>> 20.0 seconds</p> <p>= Closed Loop</p> <p>= Not active</p> <p>= Not active</p> <p>< 1.0 ma</p>	<p>1 fail counts out of 1 samples</p> <p>25 ms / sample</p> <p>Continuous</p>	Type B, 2 Trips
			<p>B1S1 Trim circuit Open test.</p> <p>This application uses the following type of WRAF sensor:</p> <p>The ASIC Open trim test detects a fault if the trim circuit resistance is:</p> <p>For NGK_ZFAS_U2</p> <p>For Bosch_LSU_4p9</p>	<p>CeWRSG_e_Bosch_LSU_4p9</p> <p><118 ohms or > 4K ohms</p> <p><30 ohms or >300 ohms</p> <p>AND</p>	<p>Diagnostic is Enabled</p> <p>DTC's Not active this key cycle</p> <p>Run/Crank Signal</p> <p>WRAF circuit diagnostic delay (since heater Warm-up delay is complete)</p> <p>Fuel Control State</p> <p>Off Stoich Closed Loop</p> <p>DFCO</p> <p>WRAF Pump current</p>	<p>WRAF_Bank_1_FA P0135, P0030, P0031, P0032</p> <p>changes from false to true</p> <p>> 20.0 seconds</p> <p>= Closed Loop</p> <p>= Not active</p> <p>= Not active</p>	<p>1 fail counts out of 1 samples</p> <p>25 ms / sample</p> <p>Continuous</p>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch).	Pump current circuit not detected open		< 1.0 ma		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Power Off Timer Performance	P262B	<p>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).</p> <p>Count Up Test (CUT): Verifies that the HWIO timer is counting up with the proper increment.</p> <p>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.</p>	<p>Count Up Test:</p> <p>Time difference between the current read and the previous read of the timer</p> <p>Range Test:</p> <p>The variation of the HWIO timer and mirror timer is</p>	<p>> 1.50 seconds</p> <p>> 0.25%.</p>			<p>Count Up Test: 8 failures out of 40 samples</p> <p>1 sec / sample</p> <p>Continuous while run/crank is not active and until controller shutdown is initiated.</p> <p>Range Test: Once per trip when controller shutdown is initiated or run/crank becomes active.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Starter Relay Drive Pinion Circuit Open (12VSS)	P26E4	Controller specific output driver circuit diagnoses the Tandem Starter Pinion 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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.</p>	>= 200 KOhms impedance between signal and controller ground.	<p>Starter relay pinion diag enable</p> <p>Engine speed</p> <p>Run Crank voltage</p>	<p>Enabled</p> <p>>=0.00 RPM</p> <p>>=11.00 volts</p>	<p>40 failures out of 50 samples</p> <p>50 ms / sample</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Starter Relay Drive Pinion Circuit Low Voltage (12VSS)	P26E5	Controller specific output driver circuit diagnoses the Tandem Starter Pinion 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.	<p>Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure.</p> <p>Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.</p>	<= 0.5 Ohms impedance between signal and controller ground	<p>Starter control diag enable</p> <p>Engine speed</p> <p>Run Crank voltage</p>	<p>Enabled</p> <p>>=0.00 RPM</p> <p>>= 6.41 volts</p>	<p>8 failures out of 10 samples</p> <p>50 ms / sample</p>	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Starter Relay Drive Pinion Circuit High Voltage (12VSS)	P26E6	Controller specific output driver circuit diagnoses the Tandem Starter Pinion 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	Starter control diag enable	Enabled	40 failures out of 50 samples	Type B, 2 Trips
					Engine speed	>=0.00 RPM	50 ms / sample	
					Run Crank voltage	>=11.00 volts		

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Injection Pulse Performance	P2B00	Diagnostic to determine if any of the commanded injection pulses for cylinder 1 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) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 2 Injection Pulse Performance	P2B01	Diagnostic to determine if any of the commanded injection pulses for cylinder 2 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) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Injection Pulse Performance	P2B02	Diagnostic to determine if any of the commanded injection pulses for cylinder 3 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 Mising Pulse Fail Limit (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

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

23OBDG03A Part2 ECM Summary Tables

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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 Illum.
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 Misng 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 Illum.
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.	<p>Injector voltage feedback is not able to detect an opening magnitude on any pulse for any cylinder</p> <p>Or</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude on any pulse for any cylinder</p>	<p>=<</p> <p>P2B96 - Opening Magnitude Missing Pulse Fail Limit</p> <p>(See supporting table)</p>	<p>Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)</p> <p>Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)</p> <p>OBD Manufacturer Enable Counter</p> <p>To enable the diagnostic, the Cold Start Emission Reduction Strategy Must Be Active per the following:</p> <p>Catalyst Temperature AND Engine Coolant AND Engine Coolant AND Barometric Pressure</p> <p>In addition, Multi Pulse Strategy Is Enabled and Active Per the following:</p> <p>Engine Speed</p> <p>Accel Position</p> <p>Engine Run Time</p>	<p>= True</p> <p>= True</p> <p>= 0</p> <p>< 550.00 degC > -12.00 degC ≤ 66.00 degC ≥ 72.00 KPa</p> <p>≥ 450.00 RPM ≤ 2,600.00 RPM</p> <p>≤ 100.00 Pct</p> <p>< 20 seconds</p>	<p>Runs once per trip when the cold start emission reduction strategy is active and Dual Pulse is enabled and active.</p> <p>Frequency: 100ms</p> <p>Test completes after Dual Pulse is no longer active OR The first 500 engine cycles have been reached</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following:</p> <p>Catalyst Temperature AND Engine Run Time</p> <p>OR</p> <p>Engine Run Time</p> <p>OR</p> <p>Barometric Pressure</p> <p>Multi Pulse Strategy will exit per the following:</p> <p>Engine Speed OR Accel Position</p> <p>Engine Run Time</p>	<p>>= 900.00 degC</p> <p>>= 20.00 seconds</p> <p>></p> <p>P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit</p> <p>This Extended Engine run time exit table is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details.</p> <p>< 72.00 KPa</p> <p>> 2,800.00 RPM</p> <p>> 100.00 Pct</p> <p>>= 20 seconds</p>		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						FuelInjectorCircuit_FA MAF_SensorFA MAP_SensorFA AnyCamPhaser_TFTKO ClutchPstnSnsr FA 1AC_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 Illum.
Injection Pulse Performance Global missing pulse diags	P2B96	Diagnostic to determine if any of the commanded injection pulses for any of the cylinders was not delivered due to the injector pintle/armature not moving (total engine based). 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 on any pulse for any cylinder Or Measured Voltage feedback converted to Injector Opening Magnitude on any pulse for any cylinder	=< P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit => P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude 2 Misisng Pulse Fail Limit =< P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude 2 Delta Misisng Pulse Fail Limit (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below) Above Engine Temperature	= True = True >--30.00 0	100.00 Frequency: 100ms Continuous	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	>= 92° <= 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 > 0.300 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 Illum.
					Crank Sensor Not FA and IATJAT2,ECTNot 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			

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 or TFTKO) 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	True ≥11 Volts > 0.300 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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 Illum.
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 IAT,IAT2,ECTNot 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 >0.300 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

23OBDG03A Part2 ECM Summary Tables

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

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Ignition Switch Run/ Start Position Circuit High Voltage	P305B	Diagnoses the DC/DC Converter Ignition Switch Run/Start Position circuit for circuit high faults	DC/DC Converter Ignition Switch Run/Start Position	<> ECM Ignition Switch Run/Start Position	Diagnostic enabled Run/Crank Accessory Battery Voltage	1 FALSE TRUE >= 6.60 Volts	160 failed samples out of 200 samples in 12.50 ms loop	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Ignition Switch Run/ Start Position Circuit Low Voltage	P305C	Diagnoses the DC/DC Converter Ignition Switch Run/Start Position circuit for circuit low faults	DC/DC Converter Ignition Switch Run/Start Position	<> ECM Ignition Switch Run/Start Position	Diagnostic enabled Run/Crank Accessory Battery Voltage	1 TRUE TRUE >= 6.60 Volts	320 failed samples out of 400 samples in 12.50 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Crank Control Circuit High Voltage	P305D	Diagnoses the DC/DC Converter Crank Control Circuit for circuit high faults	DC/DC Converter Crank Control	<> ECM Crank Control	Diagnostic enabled If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active) ECM Crank Control Battery Voltage	1 0 TRUE TRUE FALSE FALSE >= 6.60 Volts	320 failed samples out of 400 samples in 12.50 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Crank Control Circuit Low Voltage	P305E	Diagnoses the DC/DC Converter Crank Control Circuit for circuit low faults	DC/DC Converter Crank Control	<> ECM Crank Control	Diagnostic enabled If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active) ECM Crank Control Battery Voltage	1 0 TRUE TRUE FALSE TRUE >= 6.60 Volts	26 failed samples out of 30 samples in 12.50 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	<p>Injector voltage feedback is not able to detect an opening magnitude</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector Opening Magnitude</p> <p>OR</p> <p>Injector voltage feedback is not able to detect a closing time</p> <p>OR</p> <p>Measured Voltage feedback converted to Injector closing time</p> <p>OR</p> <p>Measured Voltage</p>	<p>=<</p> <p>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude (See supporting table)</p> <p>>=</p> <p>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude (See supporting table)</p> <p>=<</p> <p>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time (See supporting table)</p> <p>>=</p>	<p>Small Pulse General Diagnostic Enable (See Definition in Supporting Material below)</p> <p>Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below)</p> <p>Injection Pulse Width</p>	<p>= True</p> <p>>=</p> <p>P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width</p>	<p>2.50 Second Fail count out of 10.00 seconds Samples</p> <p>Continuous</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 Illum.
Control Module Serial Peripheral Interface Bus 1	P30D6	This DTC detects intermittent 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 Illum.
Control Module Serial Peripheral Interface Bus 2	P30D7	This DTC detects intermittent 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 Illum.
Control Module Serial Peripheral Interface Bus 3	P30D8	This DTC detects intermittent 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 Illum.
Control Module Serial Peripheral Interface Bus 4	P30D9	This DTC detects intermittent 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 Illum.
Control Module Serial Peripheral Interface Bus 5	P30DA	This DTC detects intermittent 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 Illum.
Control Module Serial Peripheral Interface Bus 6	P30DB	This DTC detects intermittent 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 Illum.
Control Module Serial Peripheral Interface Bus 7	P30DC	This DTC detects intermittent 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 Illum.
Control Module Serial Peripheral Interface Bus 8	P30DD	This DTC detects intermittent 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 Illum.
Cooling Fan 1 Out of Range Low [LIN Bus Electric PWM Fans Only - Internal or External controller]	P30EE	This diagnostic is to determine if the fan speed feedback is incorrect. This is determined by measuring if the reported actual fan speed (in RPM) exceeds a lower limit for the fan speed, indicating that there is a failure of the measurement of the fan speed. If the measured fan speed exceeds the lower limit for an extended period of time so that a standard X of Y Figure of Merit matures, then the DTC is set.	Measured LIN Fan1 Speed must exceed a lower limit value to ensure measured feed speed is within an acceptable range	< = -110.00 rpm	a] Diagnostic Enabled b] Diagnostic System Disabled(via service tool) c] Battery Voltage In Range d] LIN Bus based Fan Operation Enabled e] LIN Serial data Lost communication Fault Active [DTC: U063200] f] LIN Serial data Continuous Operation Fault Active [DTCP135C]	a] = 1 [True if 1; False if 0] b] = FALSE c] = TRUE d] = TRUE e] = FALSE f] = FALSE	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 Illum.
Cooling Fan 1 Out of Range High [LIN Bus Electric PWM Fans Only - Internal or External controller]	P30EF	This diagnostic is to determine if the fan speed feedback is incorrect. This is determined by measuring if the reported actual fan speed (in RPM) is below an upper limit for the fan speed, indicating that there is a failure of the measurement of the fan speed. If the measured fan speed exceeds the upper limit for an extended period of time so that a standard X of Y Figure of Merit matures, then the DTC is set.	Measured LIN Fan1 Speed must be below an upper limit value to ensure measured feed speed is within an acceptable range	> = 4,000.00 rpm	a] Diagnostic Enabled b] Diagnostic System Disabled(via service tool) c] Battery Voltage In Range d] LIN Bus based Fan Operation Enabled e] LIN Bus Lost Communication Fault Active [DTC U063200] f] LIN Bus serial data Continuous Operation Fault Active [DTCP135C]	a] = 1 [True if 1; False if 0] b] =FALSE c] =TRUE d] == TRUE e] =FALSE f] =FALSE	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 Illum.
Brake System Vehicle Speed Limit Request Signal Message Counter Incorrect	P314F	This DTC monitors for an error in communication with the Brake System Vehicle Speed Limit Request Signal.	<p>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:</p> <p>Braking System Vehicle Top Speed Limit Request Type ARC</p> <p>Braking System Vehicle Top Speed Limit Request Type PV</p>	<p>>= 3.00 counts out of >= 10.00 counts</p> <p>>= 3.00 counts out of >= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	<p>Braking System Vehicle Top Speed Limit Request Type ARC samples every 100.00 milliseconds.</p> <p>Braking System Vehicle Top Speed Limit Request Type PV samples every 100.00 milliseconds.</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 [DTCP12A6] 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 c10) == 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 Illum.
					Active [DTC P1255] c12) Fuel Pump Speed Fault Active [DTCP129F] 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 mI) Fuel Pmp Speed Command Alive Rollina	c12) == False c13) == False d 4] == False c15) == CeFDBR_e_WiredTo_FT ZM c16) == TRUE d) == False e) == TRUE f) == NORMAL g) >= 9.00 volts h) == False j) == Not Disabled Mode AND == Not ZeroFlow Mode mI) == False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 Illum.
Fuel Pump Performance - Over Pressure	P3188	This DTC detects degradation in the performance of the electronically regulated fuel system by calculating the difference between the sensed, filtered system [line] pressure versus the ECM-commanded pressure [error calculation]. The calculated error is then compared to calibrated fault threshold tables for a fault decision.	Sensed Filtered Fuel System [line] pressure error	<= Threshold [Supporting Table] P3188_Threshold	a) Diagnostic is .. b1) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [Cmd1 DTC U131D] b2) Sensor Configuration b3) Fuel Pres Sensor Serial Comm Ready b4) Fuel Pres Sensor Serial Comm Fault Pending [DTC P14D5] b5) Sensed Fuel Control Enable Serial Comm Ready b6) Sensed Fuel Control Enable Serial Comm Fault Pending c1) Fuel Flow data Valid c2) Ambient Air Pressure Value Defaulted c3) Fuel Pres Sensor Type c4) Fault Bundle FDB_FuelPresSnsrCktFA c5) Reference Voltage	a) Enabled b1) == False b2) == CeFDBR_e_WiredTo_FT ZM b3) == TRUE b4) == False b5) == TRUE b6) == False c1) == TRUE c2) == False c3) == CeFDBR_e_AbsolutePressure c4) == False c5) == False	1 sample / 12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Fault Status [DTC P0641]			
					c6) Fuel Pres Sensor Performance Fault Active [DTC P018B]	c6) == False		
					c7) Use Calculated Flow Performance Fault Thresholds	c7) == False		
					c8) Engine Speed Status Valid	c8] ==TRUE		
					c9) Fault bundle FAB_FuelPmpCktFA	c9] == False		
					c10) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255]	c10) == False		
					c11) Fuel Pump Speed Fault Active [DTCP129F]	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) Diaonostic Data	d2')== TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Integrity OK e) Fuel Control Enable f) Fuel Pump Control State g) Instantaneous Fuel Flow h) Fuel Control Enable Fault Active [DTCP12A6] j) Emissions Fuel Level Low [Message \$3FB] k) High Pres Fuel Pump Mode Management Enabled l) High Pres Fuel Pump Control Mode m) Diagnostic Data OK n) Timer - Diagnostic Enable	e) == TRUE f) == Normal AND == NOT Over Response Active g) >= 2.00 gms / sec h) == False j) == False k) == False l) == NOT Disabled Mode AND NOT Over Response Active Mode m) == TRUE n) > 2.00 seconds		

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures equals or exceeds In a window of	>= 5.00 counts >=100.00 milliseconds	Transition from accessory to off is not pending Battery voltage is Controller is an OBD controller Or Battery voltage There or no low voltage disable modes Or If 12 volt vehicle start mode: Starter motor engaged for Or Run/Crank ignition voltage If low voltage mode (run/crank voltage <6.41 volts): That mode is active for The following are true for greater than: Communication channel state is full communication (Power mode is run Or Power mode is not run/crank	>11.00 Volts ≤ 18.00 volts > 15,000.00 milliseconds > 8.41 volts 100.00 milliseconds 3,000.00 milliseconds	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 Illum.
					And (Off key cycle diagnostics are enabled) Or Controller is an OBD controller) Controller type: OBD Controller Or The CAN bus is the sensor bus)	Enabled		

23OBDG03A Part2 ECM Summary Tables

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					And (Off key cycle diagnostics are enabled) Or Controller is an OBD controller) Controller type: OBD Controller Or The CAN bus is the sensor bus)	Enabled		

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Powertrain Sensor CAN Bus Off	U0076	This DTC monitors for a Powertrain Sensor Bus S off condition	Bus off failures equals or exceeds In a window of	>= 5.00 counts >=100.00 milliseconds	General Enable Criteria: Starter motor engaged for Or Run/Crank ignition voltage All below criteria have been met for CAN channel is requesting full communications Normal CAN transmission on Bus is enabled Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If OBDII: Run/Crank ignition voltage If Secure: Starter motor engaged for	> 15,000.00 milliseconds >8.41 Volts >= 3,000.00 milliseconds >11.00 Volts <=18.00 Volts >=11.00 Volts > 15,000.00 milliseconds >8.41 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

23OBDG03A Part2 ECM Summary Tables

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23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With TCM	U0101	This DTC monitors for a loss of communication with the Transmission Control Module.	<p>Message is not received from controller for</p> <p>Message \$0C7:</p> <p>Message \$0F9:</p> <p>Message \$18A:</p> <p>Message \$197:</p> <p>Message \$19D:</p> <p>Message \$1A6:</p> <p>Message \$1AF:</p> <p>Message \$1F5:</p> <p>Message \$3F5:</p> <p>Message \$4AB:</p> <p>Message \$4C9:</p>	<p>> 500.00 milliseconds</p> <p>>500.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>> 500.00 milliseconds</p> <p>> 500.00 milliseconds</p> <p>> 500.00 milliseconds</p> <p>>500.00 milliseconds</p> <p>>500.00 milliseconds</p> <p>> 175.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p>	<p>General Enable Criteria:</p> <p>All below criteria have been met for</p> <p>If message is on Bus A: U0073 not active</p> <p>If message is on Bus B: U0074 not active</p> <p>If message is on Bus S: U0076 not active</p> <p>CAN channel is requesting full communications</p> <p>Normal CAN transmission on Bus is enabled</p> <p>If bus type is Sensor Bus, sensor bus relay is on</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Controller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p>	<p>>= 3,000.00 milliseconds</p> <p>>11.00 Volts</p> <p><=18.00 Volts</p>	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 > 15,000.00 milliseconds >8.41 Volts >=6.41 Volts Enabled >=11.00 Volts		

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With Cruise Control Module	U0104	This DTC monitors for a loss of communication with the Cruise Control Module.	<p>Message is not received from controller for</p> <p>Message \$2CB</p> <p>Message \$2CD</p>	<p>> 500.00 milliseconds</p> <p>> 500.00 milliseconds</p>	<p>General Enable Criteria:</p> <p>All below criteria have been met for</p> <p>If message is on Bus A: U0073 not active</p> <p>If message is on Bus B: U0074 not active</p> <p>If message is on Bus S: U0076 not active</p> <p>CAN channel is requesting full communications</p> <p>Normal CAN transmission on Bus is enabled</p> <p>If bus type is Sensor Bus, sensor bus relay is on</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Conroller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p>	<p>>= 3,000.00 milliseconds</p> <p>>11.00 Volts</p> <p><= 18.00 Volts</p>	Diagnostic runs in 12.5 ms loop	Type C, No SVS "Emissio ns Neutral Diagnost ics - Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 > 15,000.00 milliseconds >8.41 Volts >=6.41 Volts Enabled >=11.00 Volts		

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With Brake System Control Module	U0129	This DTC monitors for a loss of communication with the Brake System Control Module.	<p>Message is not received from controller for</p> <p>Message \$0C1</p> <p>Message \$0C5</p> <p>Message \$0D1</p> <p>Message \$17D</p> <p>Message \$1C7</p> <p>Message \$1E9</p> <p>Message \$1FC</p> <p>Message \$214</p> <p>Message \$22A</p> <p>Message \$2F9</p> <p>Message \$4F9</p>	<p>> 500.00 milliseconds</p> <p>> 500.00 milliseconds</p> <p>> 500.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>> 500.00 milliseconds</p> <p>> 500.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>> 1,000.00 milliseconds</p> <p>> 1,000.00 milliseconds</p> <p>> 500.00 milliseconds</p> <p>>10,000.00 milliseconds</p>	<p>General Enable Criteria:</p> <p>All below criteria have been met for</p> <p>If message is on Bus A: U0073 not active</p> <p>If message is on Bus B: U0074 not active</p> <p>If message is on Bus S: U0076 not active</p> <p>CAN channel is requesting full communications</p> <p>Normal CAN transmission on Bus is enabled</p> <p>If bus type is Sensor Bus, sensor bus relay is on</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Controller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p>	<p>>= 3,000.00 milliseconds</p> <p>>11.00 Volts</p> <p><=18.00 Volts</p>	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 Illum.
					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 >8.41 Volts >= 6.41 Volts Enabled >=11.00 Volts		

23OBDG03A Part2 ECM Summary Tables

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 >8.41 Volts >= 6.41 Volts Enabled >=11.00 Volts		

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on 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		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type C, No SVS "Emissio ns Neutral Diagnost ics - Type C"
			Message \$0F1	> 500.00 milliseconds	All below criteria have been met for	>= 3,000.00 milliseconds		
			Message \$1E1	>500.00 milliseconds	If message is on Bus A: U0073 not active			
			Message \$1F1	>500.00 milliseconds	If message is on Bus B: U0074 not active			
			Message \$451	>500.00 milliseconds	If message is on Bus S: U0076 not active			
			Message \$120	>10,000.00 milliseconds	CAN channel is requesting full communications			
			Message \$12A	> 1,000.00 milliseconds	Normal CAN transmission on Bus is enabled			
			Message \$135	>10,000.00 milliseconds	If bus type is Sensor Bus, sensor bus relay is on			
			Message \$139	> 1,000.00 milliseconds	Accessory mode to off mode not pending	>11.00 Volts		
			Message \$140	>10,000.00 milliseconds	Battery voltage			
			Message \$142	>10,000.00 milliseconds	Controller is an OBD controller Or Battery Voltage	<=18.00 Volts		
			Message \$160	> 1,000.00 milliseconds	Controller type: OBD Controller			
			Message \$1F3	>10,000.00	If power mode = Run/ Crank: Power Mode is run			

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Message \$3C9	milliseconds >10,000.00 milliseconds	IfOBDII: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage	>=11.00 Volts > 15,000.00 milliseconds >8.41 Volts >= 6.41 Volts		
			Message \$3F1	>10,000.00 milliseconds	If Hybrid Secure: Run/Crank ignition voltage	Enabled		
			Message \$4C5	>10,000.00 milliseconds	If power mode = Accessory:			
			Message \$4E1	>10,000.00 milliseconds	Off key cycle diagnostics are enabled Or Controller is an OBD controller			
			Message \$4E9	>10,000.00 milliseconds	Controller shutdown is not impending			
			Message \$4FD	>10,000.00 milliseconds	Power Mode is not run/ crank Battery voltage	>=11.00 Volts		

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With Gateway A	U0146	This DTC monitors for a loss of communication with Gateway A.	<p>Message is not received from controller for</p> <p>Message \$3CF</p> <p>Message \$4D4</p>	<p>>10,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p>	<p>General Enable Criteria:</p> <p>All below criteria have been met for</p> <p>If message is on Bus A: U0073 not active</p> <p>If message is on Bus B: U0074 not active</p> <p>If message is on Bus S: U0076 not active</p> <p>CAN channel is requesting full communications</p> <p>Normal CAN transmission on Bus is enabled</p> <p>If bus type is Sensor Bus, sensor bus relay is on</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Conroller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p>	<p>>= 3,000.00 milliseconds</p> <p>>11.00 Volts</p> <p><= 18.00 Volts</p>	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 Illum.
					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 >8.41 Volts >= 6.41 Volts Enabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With Battery Monitor Module	U01B0	This DTC monitors for a loss of communication with the Battery Monitor Module on the LIN bus.	<p>Message is not received from device for</p> <p>IBSAmpHourChg_18_C02</p> <p>IBSAmpHourDisChrg_19_C02</p> <p>IBSCalcData_16_C02</p> <p>IBSCfgDataRtn_1E_C02</p> <p>IBSCurrentFOMData_1A_C02</p> <p>IBSFOMData_1C_C02</p> <p>IBSMasuredTemp_17_C02</p> <p>IBSMVIData_15_C02</p> <p>IBSVehStartData_1D_C02</p> <p>IBSVoltageFOMData_1B_C02</p>	<p>>=1,250.00 milliseconds</p> <p>>=1,250.00 milliseconds</p> <p>>=1,250.00 milliseconds</p> <p>>=2,500.00 milliseconds</p> <p>>=5,000.00 milliseconds</p> <p>>=5,000.00 milliseconds</p> <p>>= 625.00 milliseconds</p> <p>>= 625.00 milliseconds</p> <p>>=1,250.00 milliseconds</p> <p>>=5,000.00 milliseconds</p>	<p>General Enable Criteria:</p> <p>Diagnostic is enabled</p> <p>LIN channel is enabled</p> <p>LIN module is initialized</p> <p>Slave is calibrated as present</p> <p>All below criteria have been met for</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Conroller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p> <p>IfOBDII: Run/Crank ignition voltage</p> <p>If Secure: Starter motor engaged for Or Run/Crank ignition voltage</p>	<p>Enabled</p> <p>Enabled</p> <p>>= 3,000.00 milliseconds</p> <p>>11.00 Volts</p> <p><=18.00 Volts</p> <p>>=11.00 Volts</p> <p>> 15,000.00 milliseconds</p> <p>>8.41 Volts</p>	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 Illum.
					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	>=6.41 Volts Enabled >=11.00 Volts		

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Active Grill Air Shutter Module A	U0284	This DTC monitors for a loss of communication on the LIN bus with Shutter Module A.	Message is not received from device for ACM1Rsp_31_C02	>=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 IfOBDII: Run/Crank ignition	Enabled Enabled Disabled >= 3,000.00 milliseconds <=18.00 Volts >=11.00 Volts	LIN bus communication executes in 500ms loop.	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 Enabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on with Throttle Position Sensor 1	U0606	<p>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.</p> <p>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.</p> <p>This diagnostic only runs when battery voltage is high enough.</p>	<p>Voltage for wave pulse is below state threshold as defined by SAE J2716 SENT Protocol</p> <p>OR</p> <p>Voltage for wave pulse is above state threshold as defined by SAE J2716 SENT Protocol</p> <p>OR</p> <p>Message Pulse < Message Pulse ></p> <p>OR</p> <p>Message Age Limit >=</p> <p>OR</p> <p>Signal CRC fails</p>	<p>0.5 V</p> <p>OR</p> <p>4.1 V</p> <p>OR</p> <p>0.125977 ms 0.209991 ms</p> <p>OR</p> <p>3.125 ms</p>	Run/Crank voltage	> 6.41 Volts	<p>79/159 counts;</p> <p>57 counts continuous;</p> <p>3.125 ms /count in the ECM main processor</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on with Throttle Position Sensor 2	U0607	<p>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.</p> <p>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.</p> <p>This diagnostic only runs when battery voltage is high enough.</p>	<p>Voltage for wave pulse is below state threshold as defined by SAE J2716 SENT Protocol</p> <p>OR</p> <p>Voltage for wave pulse is above state threshold as defined by SAE J2716 SENT Protocol</p> <p>OR</p> <p>Message Pulse < Message Pulse ></p> <p>OR</p> <p>Message Age Limit >=</p> <p>OR</p> <p>Signal CRC fails</p>	<p>0.5 V</p> <p>OR</p> <p>4.1 V</p> <p>OR</p> <p>0.125977 ms 0.209991 ms</p> <p>OR</p> <p>3.125 ms</p>	Run/Crank voltage	>6.41 Volts	<p>79/159 counts;</p> <p>57 counts continuous;</p> <p>3.125 ms /count in the ECM main processor</p>	Type A, 1 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With Mass or Volume Air Flow Sensor A	U060F	This DTC monitors for a loss of communication on the LIN bus with Mass or Volume Air Flow Sensor A.	<p>Message is not received from device for</p> <p>MAF_Rsp_Press_2B_C0 3</p> <p>MAF_Rsp_TmpHum_2 A_ C03</p>	<p>≥ 62.50 milliseconds</p> <p>≥ 250.00 milliseconds</p>	<p>General Enable Criteria:</p> <p>Diagnostic is enabled</p> <p>LIN channel is enabled</p> <p>LIN module is initialized</p> <p>Slave is calibrated as present</p> <p>All below criteria have been met for</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Conroller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p> <p>If OBDII: Run/Crank ignition voltage</p> <p>If Secure: Starter motor engaged for Or Run/Crank ignition voltage</p>	<p>Enabled</p> <p>Enabled</p> <p>$\geq 3,000.00$ milliseconds</p> <p>> 11.00 Volts</p> <p>≤ 18.00 Volts</p> <p>≥ 11.00 Volts</p> <p>$> 15,000.00$ milliseconds</p> <p>> 8.41 Volts</p>	LIN bus communication executes in 500ms loop.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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	>=6.41 Volts Enabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 Illum.
Cooling Fan 1 LIN Communication Failure	U0632	This DTC monitors for a loss of communication on the LIN bus with Cooling Fan 1.	Message is not received from device for CFM1_Rsp_2D_C02	 ≥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 Controller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If OBDII:	Enabled Enabled ≥ 1.00 seconds ≥ 3,000.00 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 Illum.
					Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts > 15,000.00 milliseconds >8.41 Volts >=6.41 Volts Enabled >=11.00 Volts		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With Fuel Rail Pressure Sensor Bank1 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 Illum.
Engine Control Module LIN Bus 1	U1345	This DTC monitors for a LIN bus off condition on LIN Bus 1.	<p>Loss of Communication Method:</p> <p>The total number of diagnostic enabled slave nodes on LIN Bus 1</p> <p>Or</p> <p>LIN channel Wakeup Method:</p> <p>LIN channel wakeup repetition counter</p>	<p>= Total number of slave nodes on LIN Bus 1 that have reported lost communications DTCs</p> <p>>= 10.00 counts</p>	<p>Loss of Communication Method:</p> <p>Diagnostic is enabled</p> <p>LIN channel is enabled</p> <p>LIN module is initialized</p> <p>The following criteria have been enabled for:</p> <p>LIN channel is requesting full communications</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Conroller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p> <p>If OBDII: Run/Crank ignition voltage</p> <p>If Secure: Starter motor engaged for Or Run/Crank ignition</p>	<p>Enabled</p> <p>Enabled</p> <p>>= 3,000.00 milliseconds</p> <p>>11.00 Volts</p> <p><=18.00 Volts</p> <p>>=11.00 Volts</p> <p>> 15,000.00 milliseconds</p> <p>>8.41 Volts</p>	Dependent on bus loading.	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					voltage	>= 6.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage			
					If power mode = Accessory	Enabled		
					Off key cycle diagnostics are enabled Or Controller is an OBD controller			
					Controller shutdown not impending			
					Power Mode is not run/ crank	>=11.00 Volts		
					Battery voltage			
					LIN channel Wakeup Method:	Enabled		
					Diagnostic is enabled	Enabled		
					LIN channel is enabled			
					LIN channel is requesting full communications			
					LIN module is initialized	>= 3,000.00 milliseconds		
					The following criteria have been enabled for:			
					Accessory mode to off mode not pending	>11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Battery voltage Controller is an OBD controller Or Battery Voltage	<=18.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Control Module LIN Bus 2	U1346	This DTC monitors for a LIN bus off condition on LIN Bus 2.	<p>Loss of Communication Method:</p> <p>The total number of diagnostic enabled slave nodes on LIN Bus 2</p> <p>Or</p> <p>LIN channel Wakeup Method:</p> <p>LIN channel wakeup repetition counter</p>	<p>= Total number of slave nodes on LIN Bus 2 that have reported lost communications DTCs</p> <p>>= 10.00 counts</p>	<p>Loss of Communication Method:</p> <p>Diagnostic is enabled</p> <p>LIN channel is enabled</p> <p>LIN module is initialized</p> <p>The following criteria have been enabled for:</p> <p>LIN channel is requesting full communications</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Controller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p> <p>If OBDII: Run/Crank ignition voltage</p> <p>If Secure: Starter motor engaged for Or Run/Crank ignition</p>	<p>Enabled</p> <p>Enabled</p> <p>>= 3,000.00 milliseconds</p> <p>>11.00 Volts</p> <p><=18.00 Volts</p> <p>>=11.00 Volts</p> <p>> 15,000.00 milliseconds</p> <p>>8.41 Volts</p>	Dependent on bus loading.	Type A, 1 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 not impending Power Mode is not run/ crank Battery voltage LIN channel Wakeup Method: Diagnostic is enabled LIN channel is enabled LIN channel is requesting full communications LIN module is initialized The following criteria have been enabled for: Accessory mode to off mode not pending Battery voltage	>= 6.41 Volts Enabled >=11.00 Volts Enabled Enabled >= 3,000.00 milliseconds >11.00 Volts		

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on with Transmissio n Control Module on Engine Control Module LIN Bus 1	U135E	This DTC monitors for a loss of communication on the LIN bus with Transmission Control Module.	Message is not received from device for Global A: TCM_Rsp_01_C02	>= 125.00 milliseconds	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Slave is calibrated as present Power mode is run/crank or accessory Or Module is not shutting down And TRCM master is not timed out And If monitor timeout is enabled Monitor has not timed out 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	Enabled Enabled Enabled >=600.00 seconds >= 3,000.00 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 Illum.
					If power mode = Run/ Crank: Power Mode is run 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 > 8.41 Volts >=6.41 Volts Enabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With Fuel Pump Driver Control Module	U18A2	This DTC monitors for a loss of communication with the Fuel Pump Driver Control Module.	<p>Message is not received from controller for</p> <p>Message \$0C3</p> <p>Message \$0C4</p> <p>Message \$0CB</p> <p>Message \$0CC</p> <p>Message \$1E6</p> <p>Message \$2C1</p> <p>Message \$2D7</p> <p>Message \$2D9</p> <p>Message \$3EC</p> <p>Message \$3EE</p> <p>Message \$4C6</p>	<p>>10,000.00 milliseconds</p> <p>> 4,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>> 1,125.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p>	<p>General Enable Criteria:</p> <p>All below criteria have been met for</p> <p>If message is on Bus A: U0073 not active</p> <p>If message is on Bus B: U0074 not active</p> <p>If message is on Bus S: U0076 not active</p> <p>CAN channel is requesting full communications</p> <p>Normal CAN transmission on Bus is enabled</p> <p>If bus type is Sensor Bus, sensor bus relay is on</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Controller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p>	<p>>= 3,000.00 milliseconds</p> <p>>11.00 Volts</p> <p><=18.00 Volts</p>	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 Illum.
					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 >8.41 Volts >= 6.41 Volts Enabled >=11.00 Volts		

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With DC/ DC Converter Control Module on Bus B	U18A7	This DTC monitors for a loss of communication with the DC/DC Converter Control Module on Bus B.	<p>Message is not received from controller for</p> <p>Message \$0A0:</p> <p>Message \$1D2:</p>	<p>>10,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p>	<p>General Enable Criteria:</p> <p>All below criteria have been met for</p> <p>If message is on Bus A: U0073 not active</p> <p>If message is on Bus B: U0074 not active</p> <p>If message is on Bus S: U0076 not active</p> <p>CAN channel is requesting full communications</p> <p>Normal CAN transmission on Bus is enabled</p> <p>If bus type is Sensor Bus, sensor bus relay is on</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Conroller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p>	<p>>= 3,000.00 milliseconds</p> <p>>11.00 Volts</p> <p><= 18.00 Volts</p>	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 Illum.
					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 >8.41 Volts >= 6.41 Volts Enabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Control Module Lost Communi- cation 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 < RCVolt < 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 Illum.
Lost Communicati on with Transmissio n 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.	<p>Message is not received from controller for</p> <p>Message \$1E4</p> <p>Message \$1EC</p> <p>Message \$2F3</p> <p>Message \$4C4</p>	<p>> 1,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>> 1,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p>	<p>General Enable Criteria:</p> <p>All below criteria have been met for</p> <p>If message is on Bus A: U0073 not active</p> <p>If message is on Bus B: U0074 not active</p> <p>If message is on Bus S: U0076 not active</p> <p>CAN channel is requesting full communications</p> <p>Normal CAN transmission on Bus is enabled</p> <p>If bus type is Sensor Bus, sensor bus relay is on</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Controller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p>	<p>>= 3,000.00 milliseconds</p> <p>>11.00 Volts</p> <p><=18.00 Volts</p>	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 Illum.
					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 >8.41 Volts >= 6.41 Volts Enabled >=11.00 Volts		

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Transmission Range Selector Control Module on Powertrain Expansion CAN Bus	U18D3	This DTC monitors for a loss of communication with the Transmission Range Selector Control Module on Powertrain Expansion CAN Bus.	<p>Message is not received from controller for</p> <p>Message \$2C2</p> <p>Message \$2EC</p>	<p>> 1,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p>	<p>General Enable Criteria:</p> <p>All below criteria have been met for</p> <p>If message is on Bus A: U0073 not active</p> <p>If message is on Bus B: U0074 not active</p> <p>If message is on Bus S: U0076 not active</p> <p>CAN channel is requesting full communications</p> <p>Normal CAN transmission on Bus is enabled</p> <p>If bus type is Sensor Bus, sensor bus relay is on</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Conroller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p>	<p>>= 3,000.00 milliseconds</p> <p>>11.00 Volts</p> <p><=18.00 Volts</p>	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 Illum.
					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 >8.41 Volts >= 6.41 Volts Enabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
CGM Lost Communication with ECM	U18D5	This DTC monitors for a CGM Lost Communication with ECM error as determined by the CGM	<p>A corresponding index within the CGM Diagnostic Status Message Signal indicates that the CGM Lost Communication with ECM DTC has set in the CGM.</p> <p>See CGM summary pages for more information.</p>		<p>General Enable Criteria:</p> <p>The corresponding index within the CGM Diagnostic Status Message Signal</p> <p>Central Gateway Module</p> <p>ECM</p>	<p>is being received</p> <p>is present on the bus</p> <p>is present on the bus</p>	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 Illum.
CGM Lost Communication with TCM	U18D7	This DTC monitors for a CGM Lost Communication with TCM error as determined by the CGM	<p>A corresponding index within the CGM Diagnostic Status Message Signal indicates that the CGM Lost Communication with TCM DTC has set in the CGM.</p> <p>See CGM summary pages for more information.</p>		<p>General Enable Criteria:</p> <p>The corresponding index within the CGM Diagnostic Status Message Signal</p> <p>Central Gateway Module</p> <p>TCM</p>	<p>is being received</p> <p>is present on the bus</p> <p>is present on the bus</p>	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 Illum.
CGM Lost Communication with BSCM1	U18DC	This DTC monitors for a CGM Lost Communication with BSCM1 error as determined by the CGM	<p>A corresponding index within the CGM Diagnostic Status Message Signal indicates that the CGM Lost Communication with BSCM1 DTC has set in the CGM.</p> <p>See CGM summary pages for more information.</p>		<p>General Enable Criteria:</p> <p>The corresponding index within the CGM Diagnostic Status Message Signal</p> <p>Central Gateway Module</p> <p>BSCM1</p>	<p>is being received</p> <p>is present on the bus</p> <p>is present on the bus</p>	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

23OBDG03A Part2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Control Module Powertrain Sensor CAN Bus Off	U240E	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Powertrain Sensor Bus Status	=off	Ignition=	Run or Run/Crank	1 second	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	<p>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.</p> <p>See CGM summary pages for more information.</p>		<p>General Enable Criteria:</p> <p>The corresponding index within the CGM Diagnostic Status Message Signal</p> <p>Central Gateway Module</p>	<p>is being received</p> <p>is present on the bus</p>	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

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	18.24	18.24	22.87	33.52	66.89	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	54.10	54.10	51.10	55.77	74.61	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	9.19	32.50	68.09	97.59	119.19	134.31	139.09	140.28	137.56

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	511.99	511.99	511.99	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	0.600	0.600	0.640	0.642	0.650	0.660	0.700	0.710	0.720	0.730	0.740	0.750	0.800	0.800	0.800	0.800	0.800

Initial Supporting table - P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)

Description: The Run/Crank voltages required to pull in the PT relay as a function of induction air temperature.

Value Units: Run/Crank Voltages required to pull in PT Relay (V)

X Unit: Induction Air Temperature (deg C)

y/x	23.0	85.0	95.0	105.0	125.0
1	7.000	8.700	9.000	9.200	10.000

Initial Supporting table - P16A7_PT Relay Pull-in Run/Crank Voltage f(IAT)**Description:** The Run/Crank voltages required to pull in the PT relay as a function of induction air temperature.**Value Units:** Run/Crank Voltages required to pull in PT Relay (V)**X Unit:** Induction Air Temperature (deg C)

y/x	23.0	85.0	95.0	105.0	125.0
1	7.000	8.700	9.000	9.200	10.000

Initial Supporting table - 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.

Value Units: sec

X Unit: g/s

Y Units: degC

y/x	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00
500.00	1.23	1.02	0.90	0.84	0.74	0.61	0.59	0.56	0.54	0.53	0.51	0.50	0.48	0.47	0.43	0.38	0.32
550.00	1.37	1.16	1.03	0.95	0.84	0.71	0.67	0.63	0.60	0.57	0.55	0.53	0.51	0.49	0.46	0.41	0.36
600.00	1.51	1.29	1.16	1.07	0.94	0.80	0.76	0.71	0.67	0.62	0.59	0.56	0.54	0.52	0.49	0.44	0.40
650.00	1.65	1.43	1.29	1.19	1.05	0.89	0.84	0.78	0.73	0.67	0.63	0.59	0.57	0.55	0.52	0.48	0.43
700.00	1.79	1.57	1.42	1.30	1.15	0.99	0.93	0.86	0.79	0.72	0.67	0.62	0.60	0.57	0.55	0.52	0.47
750.00	1.93	1.71	1.54	1.42	1.25	1.08	1.01	0.94	0.85	0.77	0.71	0.65	0.63	0.60	0.57	0.55	0.51
800.00	2.06	1.85	1.67	1.53	1.36	1.18	1.09	1.02	0.92	0.82	0.75	0.68	0.66	0.62	0.60	0.58	0.55
850.00	2.20	1.97	1.80	1.64	1.46	1.27	1.17	1.09	0.98	0.87	0.79	0.71	0.69	0.65	0.63	0.62	0.58
900.00	2.33	2.11	1.92	1.76	1.56	1.37	1.25	1.16	1.04	0.91	0.83	0.74	0.72	0.67	0.66	0.65	0.62

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.

Value Units: sec

X Unit: g/s

Y Units: degC

y/x	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00
500.00	2.71	2.05	1.63	1.27	1.19	1.08	0.93	0.89	0.86	0.72	0.71	0.64	0.62	0.60	0.58	0.56	0.55
550.00	2.81	2.12	1.69	1.36	1.26	1.14	0.99	0.94	0.90	0.77	0.75	0.67	0.65	0.62	0.61	0.59	0.57
600.00	2.89	2.20	1.77	1.44	1.33	1.20	1.05	0.99	0.93	0.81	0.78	0.70	0.68	0.65	0.64	0.62	0.60
650.00	2.99	2.28	1.83	1.54	1.40	1.25	1.11	1.04	0.97	0.86	0.82	0.73	0.71	0.68	0.67	0.65	0.63
700.00	3.09	2.35	1.90	1.62	1.47	1.31	1.17	1.09	1.01	0.91	0.85	0.76	0.73	0.71	0.70	0.67	0.66
750.00	3.18	2.42	1.97	1.70	1.54	1.36	1.23	1.15	1.04	0.96	0.88	0.79	0.76	0.74	0.73	0.70	0.69
800.00	3.27	2.50	2.03	1.79	1.61	1.42	1.29	1.20	1.08	1.00	0.92	0.82	0.79	0.77	0.75	0.73	0.72
850.00	3.37	2.58	2.11	1.87	1.68	1.48	1.34	1.25	1.12	1.05	0.96	0.84	0.82	0.79	0.78	0.76	0.74
900.00	3.47	2.65	2.17	1.96	1.76	1.54	1.40	1.30	1.16	1.10	0.99	0.88	0.84	0.82	0.81	0.79	0.77

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	750	2,300	2,988	2,989	2,990	2,991	2,992	2,993	2,994	2,995	2,996	2,997	2,998	3,998	3,999	4,000
1	0	500	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050

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_10msFlow	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_100msFlow
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_10msFlow	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_100msFlow
1	5	5	3	3

P0606 PFM Sequence Sample f(Loop Time) - Part 4

y/x	CePISR_e_250msFlow			
1	3			

Initial Supporting table - P0606 PFM Enable f(Loop Time)

Description: PFM Enable

Value Units: PFM enable flag (boolean)

X Unit: Operating Loop Time Sequence (enum)

P0606 PFM_Enable f(Loop Time) - Part 1

y/x	CePISR_e_2p5msFlow	CePISR_e_3p125msFlow	CePISR_e_5msFlow	CePISR_e_6p25msFlow
1	0	1	0	1

P0606 PFM_Enable f(Loop Time) - Part 2

y/x	CePISR_e_10msFlow	CePISR_e_12p5msFlow	CePISR_e_20msFlow	CePISR_e_25msFlow
1	0	1	0	1

P0606 PFM_Enable f(Loop Time) - Part 3

y/x	CePISR_e_40msFlow	CePISR_e_50msFlow	CePISR_e_80msFlow	CePISR_e_100msFlow
1	0	0	0	0

P0606 PFM_Enable f(Loop Time) - Part 4

y/x	CePISR_e_250msFlow			
1	0			

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	51.10	51.10	51.10	51.10	51.10	51.10

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
350.00	147.85	134.52	127.85	123.52	93.10	64.85
450.00	147.85	134.52	127.85	123.52	93.10	64.85
550.00	147.85	134.52	127.85	123.52	93.10	61.89
650.00	144.85	131.68	125.35	121.52	89.10	49.98
750.00	147.85	134.52	127.85	123.52	93.10	50.16
815.00	151.16	135.53	130.35	124.73	96.89	51.29
950.00	154.98	134.98	140.37	132.64	103.20	52.48
1,050.00	156.36	133.94	139.70	132.89	103.17	55.71
1,150.00	155.85	133.93	139.37	132.27	101.89	60.48
1,400.00	169.47	146.14	140.48	141.14	93.77	67.48
1,650.00	94.97	74.29	64.59	62.89	33.35	29.66
1,900.00	61.01	43.33	34.72	32.61	8.27	5.50
2,150.00	30.05	14.97	7.30	4.84	-14.99	-16.96
3,150.00	-60.52	-60.52	-60.52	-60.52	-60.52	-60.52
4,150.00	-66.58	-66.58	-66.58	-66.58	-66.58	-66.58
6,150.00	-72.63	-72.63	-72.63	-72.63	-72.63	-72.63
6,400.00	-78.68	-78.68	-78.68	-78.68	-78.68	-78.68

Initial Supporting table - Shutter 1 AC OFF - Open 1Close 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	0	0	100	100	100	100	100	100	100
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 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	4	7	9	10	13	15	50	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	95	110	120	140	150	180	200

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	0	0	100	100	100	100	100	100	100
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 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	4	7	9	10	13	15	50	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	95	110	120	140	150	180	200

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	4	7	9	10	13	15	50	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	4	7	9	10	13	15	50	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 - 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	70	73	76	79	82	85	89	95	100	110	150	170	200	230	350
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	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,600
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 - 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	75.0
1.0	8,722.0	8,086.0	7,253.0	6,274.0	5,540.0	4,805.0	4,070.0

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	75.0
1.0	6,793.0	6,200.0	5,423.0	4,510.0	3,825.0	3,140.0	2,455.0

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	75.0
1.0	6,793.0	6,200.0	5,423.0	4,510.0	3,825.0	3,140.0	2,455.0

Initial Supporting table - PO1F0 - Heat To Coolant Min 2D

Description: KtETHD_P_CDD_HeatToCoolantMin

Value Units: Indicated Power (kW)

X Unit: Firing Fraction

Y Units: Ambient temperature (°C)

y/x	0.00	0.25	0.50	0.75	1.00
-9.0	10.0	10.0	10.0	10.0	10.0
0.0	10.0	10.0	10.0	10.0	10.0
10.0	10.0	10.0	10.0	10.0	10.0
20.0	10.0	10.0	10.0	10.0	10.0
50.0	10.0	10.0	10.0	10.0	10.0

Initial Supporting table - P0234 P0299: Boostdeviation in open Loop or ratelimit diagnose enable limit**Description:** Boostdeviation in open Loop or ratelimit diagnose enable limit**Value Units:** [rpm] Engine speed threshold**X Unit:** [kPa] KnBSTD_p_PresCntrDevAmbBP - Ambient Air Pressure

y/x	60	80	100
1	2,000.00	2,000.00	2,000.00

P0234 P0299: Engine speed low limit over Ambient pressure to enable the boost pressure control deviation diagnosis.**Description:** Engine speed low limit over Ambient pressure to enable the boost pressure control deviation diagnosis.**Value Units:** [rpm] Engine speed threshold**X Unit:** [kPa] KnBSTD_p_PresCntrDevAmbBP - Ambient Air Pressure

y/x	60	80	100
1	3,000.00	2,750.00	2,500.00

Initial Supportin 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	0.15	0.15	0.15	0.15	0.15

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 BankI Table

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

Value Units: Unitless Scalar

X Unit: Engine Speed (RPM)

Y Units: Air Per Cylinder (APC) (mg/cylinder)

y/x	1,000	1,220	1,440	1,655	1,875	2,095	2,315	2,530	2,750	2,970	3,190	3,400	3,625	3,845	4,060	4,280	4,500
40	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
80	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
120	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
240	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
280	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
320	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
360	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
400	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	0.00	0.00	0.00
440	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
480	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
520	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
560	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
640	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
720	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
800	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 - CalculatedPerfMaxEd

Description: Maximum desired camshaft position for Exhaust CAM - BankI

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	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
2	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
3	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
4	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
5	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
6	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
7	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
8	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
9	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
10	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
11	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
12	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
13	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
14	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
15	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
16	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
17	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5

Initial Supporting table - CalculatedPerfMaxIcl

Description: Maximum desired camshaft position for Intake CAM - BankI

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	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
2	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
3	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
4	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
5	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
6	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
7	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
8	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
9	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
10	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
11	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
12	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
13	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
14	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
15	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
16	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
17	24.5	24.5	24.5	24.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5

Initial Supporting table - P0234: Overboost pressure limit below basic pressure as a function of engine speed and ambient pressure**Description:** Overboost under basic pressure (open loop pressure control) diagnose failure limit.**Value Units:** [kPa] Overboost under basic pressure fail limit.**X Unit:** [kPa] KnBSTD_p_CntrlDevDiagAmbCorrBP - Ambient Air Pressure**Y Units:** [rpm] KnBSTD_n_CntrlDevDiagAmbCorrBP - Engine Speed

y/x	60.00	70.00	80.00	90.00	100.00	110.00
1,000.00	80.000	65.000	55.000	50.000	45.000	45.000
2,000.00	45.000	40.000	30.000	25.000	25.000	25.000
3,000.00	30.000	20.000	10.000	10.000	10.000	10.000
4,000.00	20.000	10.000	10.000	10.000	10.000	10.000
5,000.00	20.000	10.000	10.000	10.000	10.000	10.000
6,000.00	20.000	10.000	10.000	10.000	10.000	10.000

Initial Supporting table - P0299: Underboost high rate limit as a function of engine speed

Description: Allowed positive rate limit on desired boost pressure. In allowed kPa per 100 ms.

Value Units: [kPa] Allowed positive rate limit

X Unit: [rpm] KnBSTD_n_CntrlDevDiagEngSpdBP - Engine Speed

y/x	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	6,000
1	2.000	2.500	2.700	2.900	3.000	3.000	3.100	3.200	3.500	4.000

Initial Supporting table - P0299: Underboost low rate limit as a function of engine speed

Description: Allowed negative rate limit on desired boost pressure. In allowed kPa per 100 ms.

Value Units: [kPa] Allowed negative rate limit.

X Unit: [rpm] KnBSTD_n_CntrlDevDiagEngSpdBP - Engine Speed

y/x	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	6,000
1	-200.00	-200.00	-200.00	-200.00	-200.00	-200.00	-200.00	-200.00	-200.00	-200.00

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	0.0	20.0	40.0	60.0	80.0	90.0	100.0	110.0	120.0
1,000.0	440.0	418.9	403.2	377.0	329.9	287.2	265.0	238.3	229.4
1,250.0	451.2	427.5	415.9	394.3	370.8	353.0	303.1	296.2	269.2
1,500.0	463.2	432.3	424.2	407.7	388.6	377.1	364.1	333.8	301.3
2,000.0	480.9	444.1	440.1	429.1	413.9	403.0	389.2	378.0	316.6
2,500.0	491.8	462.4	457.6	444.8	428.4	416.2	399.1	384.7	334.0
3,000.0	488.0	449.1	456.5	452.4	434.4	421.7	406.7	394.1	356.5
3,500.0	493.7	434.3	449.0	451.7	437.4	426.8	411.7	399.3	373.8
4,000.0	469.7	434.9	442.1	450.4	441.1	430.6	415.9	402.7	384.9
4,500.0	445.1	443.8	438.1	442.7	433.4	429.4	418.2	402.8	394.2

Initial Supporting table - P0521_PQ6DD_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	0	20	40	60	80	90	100	110	120
1,000	250	237	228	219	209	203	198	193	192
1,250	255	239	233	225	217	213	207	204	200
1,500	261	242	236	230	222	217	212	208	200
2,000	268	245	240	235	228	224	219	216	208
2,500	272	247	241	236	231	228	225	221	211
3,000	275	245	240	238	234	231	228	224	218
3,500	279	247	238	237	234	232	229	224	219
4,000	269	249	236	236	233	230	226	224	222
4,500	267	251	238	236	232	230	228	226	224

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	0.0	100.0	150.0	150.0	150.0	150.0	150.0	100.0	0.0

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	20.0	20.0	20.0	20.0	20.0	0.0	0.0

Initial Supporting table - P06DE_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	0	20	40	60	80	90	100	110	120
1,000	165	165	165	165	165	165	165	165	1,005
1,250	165	165	165	165	165	165	165	165	1,005
1,500	165	165	165	165	165	165	165	165	1,005
2,000	165	165	165	165	165	165	165	165	1,005
2,500	165	165	165	165	165	165	165	165	1,005
3,000	165	165	165	165	165	165	165	165	1,005
3,500	165	165	165	165	165	165	165	165	1,005
4,000	165	165	165	165	165	165	165	165	1,005
4,500	165	165	165	165	165	165	165	165	1,005

Initial Supporting table - P06DE_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	0.0	20.0	40.0	60.0	80.0	90.0	100.0	110.0	120.0
1,000.0	76.0	72.9	69.9	63.1	48.4	33.5	26.8	17.9	15.1
1,250.0	78.6	75.4	73.4	67.6	61.5	56.2	38.3	36.9	27.8
1,500.0	81.0	76.0	75.3	71.3	66.7	63.9	60.7	50.3	40.8
2,000.0	85.3	79.5	80.1	77.8	74.4	71.6	68.0	65.0	43.5
2,500.0	88.1	86.3	86.5	83.6	78.8	75.2	69.6	65.7	49.3
3,000.0	85.1	81.6	86.6	85.7	80.1	76.2	71.6	68.0	55.5
3,500.0	86.0	74.9	84.4	85.8	81.2	77.7	73.0	70.0	62.0
4,000.0	80.1	74.2	82.2	85.9	83.4	80.3	75.8	71.4	65.4
4,500.0	71.4	77.3	80.0	82.8	80.6	79.9	76.1	70.8	68.0

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	1.730	1.730	1.717	1.715	1.719	1.715	1.717	1.711	1.719	1.676	1.551	1.432	1.301	1.301	1.301	1.301	1.301

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	2,700	2,900	3,000	3,250	3,500	3,750	4,000	4,250	4,500	4,750	5,000	5,500	6,000	6,500	7,000	7,500	8,500
1	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500

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	0.750	0.750	0.936	0.936	0.939	0.930	0.939	0.932	0.934	0.900	0.838	0.771	0.695	0.695	0.695	0.695	0.695

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	2,700	2,900	3,000	3,250	3,500	3,750	4,000	4,250	4,500	4,750	5,000	5,500	6,000	6,500	7,000	7,500	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_Abnormal_o2

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_PerfAbnFiltLimitLo (VaKNKD_k_PerfCylAbnFiltLimitLo 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	0.640	0.640	0.640	0.642	0.650	0.660	0.700	0.710	0.720	0.730	0.740	0.750	0.800	0.800	0.800	0.800	0.800

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_PerfAbnFiltLimitLo (VaKNKD_k_PerfCylAbnFiltLimitLo 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	0.600	0.600	0.640	0.642	0.650	0.660	0.700	0.710	0.720	0.730	0.740	0.750	0.800	0.800	0.800	0.800	0.800

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	0.117	0.117	0.119	0.127	0.141	0.150	0.166	0.174	0.182	0.184	0.211	0.225	0.229	0.229	0.229	0.229	0.229

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	0.021	0.021	0.029	0.037	0.049	0.059	0.059	0.053	0.070	0.117	0.139	0.139	0.139	0.139	0.139

Initial Supporting table-P129F Threshold High

Description: P129F Filtered Fuel Pump Speed Error High Threshold [over-performing motor]
Instantaneously calculated filtered pump speed error measured is higher than commanded

Value Units: revs / min

X Unit: revs / min [commanded pump speed]

Y Units: kiloPascals [requested fuel pressure]

y/x	200.0	300.0	400.0	500.0	600.0
1,000.0	-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_Cell00_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 UseGreen Sensor Delay Criteria - Limit

Description: This Calibration is the accumulated 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: Accumulated 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 - \dot{P}_0 (T11 CamPosErrorLimId

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	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
800	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
1,200	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
1,600	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,000	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,400	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,800	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
3,200	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
3,600	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,000	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,400	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,800	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
5,200	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
5,600	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,000	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,400	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,800	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0

Initial Supporting table - P0011_P0021_P05CC_P05CD_EngOilPressEnblIc

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	0	0	0	0	0	0	0	0	0	0

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	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000

Initial Supporting table - P0011_P0021_P05CC_P05CD_HiEngSpdLoEnbllc

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	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoPresHiEnblIc**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	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166

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	161	161	161	161	161	161	161	161	161	161	161	161	161	161	161	161	161

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoRpnHiEnbllc

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	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoRpmLoDsblc

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	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450

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	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2

Initial Supporting table - P0011I_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
400	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
800	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
1,200	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
1,600	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
2,000	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
2,400	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
2,800	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
3,200	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
3,600	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
4,000	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
4,400	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
4,800	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
5,200	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
5,600	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
6,000	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
6,400	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
6,800	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0

Initial Supporting table - P0014_CamPosErrorLimEc1

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

Value Units: Maximum Exhaust 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	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
800	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
1,200	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
1,600	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,000	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,400	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,800	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
3,200	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
3,600	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,000	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,400	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,800	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
5,200	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
5,600	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,000	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,400	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,800	8.0	8.0	8.0	8.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0

Initial Supporting table - P0014_P0024_P05CE_P05CF_EngOilPressEnbIEc

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	0	0	0	0	0	0	0	0	0	0

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	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000

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	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800

Initial Supporting table - P0014_P0024_P05CE_P05CF_LoPresHiEnbIEc**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	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166

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	161	161	161	161	161	161	161	161	161	161	161	161	161	161	161	161	161

Initial Supporting table - P0014_P0024_P05CE_P05CF_LoRpmHiEnbIEc**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	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500

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	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450

Initial Supporting table - P0014_P05CE_StablePositionTimeEc1

Description: Minimum time for Exhaust 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
400	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
800	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
1,200	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
1,600	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
2,000	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
2,400	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
2,800	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
3,200	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
3,600	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
4,000	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
4,400	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
4,800	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
5,200	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
5,600	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
6,000	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
6,400	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
6,800	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0

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	35.0	10.0	7.0	5.0	3.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0

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	50.0	24.0	14.0	10.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	4.0	4.0

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	5.0	10.0	15.0	20.0	25.0	30.0	50.0	80.0
1.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0

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

Description: OAT Performance Diagnostic counter increment for determining OAT-IAT 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	5.0	10.0	15.0	20.0	25.0	30.0	50.0	80.0
1.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0
5.0	-5.0	-2.0	-1.0	0.0	1.0	2.0	3.0	4.0	5.0
10.0	-4.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0
20.0	-2.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0
30.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0
40.0	0.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0
50.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0
60.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0
70.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0

Initial Supporting table - P00C4 P2261: Compressor Surge Line**Description:** Turbo compressor recirculation valve diagnosis surge area limit.**Value Units:** [ratio] CRV diagnosis surge area limit.**X Unit:** [g/sec[] KnBSTD_dm_AirFlowBP - Air FLOW

y/x	15.62	27.88	31.56	38.83	73.23	128.43
1	1.042	1.675	1.787	2.103	2.830	3.651

Initial Supporting table - P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

Description: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix - This table describes combinations of individual model failures that will set P0101, P0106, P010B, P0121, P0236 and P1101 on turbocharged 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	8	9
1	MAF Model	MAPI Model	MAP2 Model	MAP3 Model	TIAP1 Model	TPS Model	TIAP Correlation	TIAP Correlation	DTC Set
2	Failed	Failed	Failed	Failed	Failed	Failed	Failed	Valid	
3	F	F	F	F	F	F	F	F	No DTC
4	F	F	F	F	F	F	F	T	No DTC
5	F	F	F	F	F	F	T	F	No DTC
6	F	F	F	F	F	F	T	T	No DTC
7	F	F	F	F	F	T	F	F	No DTC
8	F	F	F	F	F	T	F	T	No DTC
9	F	F	F	F	F	T	T	F	No DTC
10	F	F	F	F	F	T	T	T	No DTC
11	F	F	F	F	T	F	F	F	No DTC
12	F	F	F	F	T	F	F	T	No DTC
13	F	F	F	F	T	F	T	F	No DTC
14	F	F	F	F	T	F	T	T	No DTC
15	F	F	F	F	T	T	F	F	P1101
16	F	F	F	F	T	T	F	T	P0121
17	F	F	F	F	T	T	T	F	P1101
18	F	F	F	F	T	T	T	T	P0236
19	F	F	F	T	F	F	F	F	No DTC
20	F	F	F	T	F	F	F	T	No DTC
21	F	F	F	T	F	F	T	F	P1101
22	F	F	F	T	F	F	T	T	P1101
23	F	F	F	T	F	T	F	F	P1101
24	F	F	F	T	F	T	F	T	P1101
25	F	F	F	T	F	T	T	F	P1101
26	F	F	F	T	F	T	T	T	P1101
27	F	F	F	T	T	F	F	F	P1101
28	F	F	F	T	T	F	F	T	P1101
29	F	F	F	T	T	F	T	F	P1101
30	F	F	F	T	T	F	T	T	P1101
31	F	F	F	T	T	T	F	F	P1101

Supporting table - P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

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

Supporting table - P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

70	F	T	F	F	F	F	T	T	P0236
71	F	T	F	F	F	T	F	F	P1101
72	F	T	F	F	F	T	F	T	P0121
73	F	T	F	F	F	T	T	F	P1101
74	F	T	F	F	F	T	T	T	P0236
75	F	T	F	F	T	F	F	F	P1101
76	F	T	F	F	T	F	F	T	P1101
77	F	T	F	F	T	F	T	F	P1101
78	F	T	F	F	T	F	T	T	P0236
79	F	T	F	F	T	T	F	F	P1101
80	F	T	F	F	T	T	F	T	P0121
81	F	T	F	F	T	T	T	F	P1101
82	F	T	F	F	T	T	T	T	P0236
83	F	T	F	T	F	F	F	F	P1101
84	F	T	F	T	F	F	F	T	P1101
85	F	T	F	T	F	F	T	F	P1101
86	F	T	F	T	F	F	T	T	P1101
87	F	T	F	T	F	T	F	F	P1101
88	F	T	F	T	F	T	F	T	P1101
89	F	T	F	T	F	T	T	F	P1101
90	F	T	F	T	F	T	T	T	P1101
91	F	T	F	T	T	F	F	F	P1101
92	F	T	F	T	T	F	F	T	P1101
93	F	T	F	T	T	F	T	F	P1101
94	F	T	F	T	T	F	T	T	P1101
95	F	T	F	T	T	T	F	F	P1101
96	F	T	F	T	T	T	F	T	P1101
97	F	T	F	T	T	T	T	F	P1101
98	F	T	F	T	T	T	T	T	P1101
99	F	T	T	F	F	F	F	F	P1101
100	F	T	T	F	F	F	F	T	P1101
101	F	T	T	F	F	F	T	F	P1101
102	F	T	T	F	F	F	T	T	P1101
103	F	T	T	F	F	T	F	F	P1101
104	F	T	T	F	F	T	F	T	P1101
105	F	T	T	F	F	T	T	F	P1101
106	F	T	T	F	F	T	T	T	P1101
107	F	T	T	F	T	F	F	F	P1101

Initial Supporting table - P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

108	F	T	T	F	T	F	F	T	P1101
109	F	T	T	F	T	F	T	F	P1101
110	F	T	T	F	T	F	T	T	P1101
111	F	T	T	F	T	T	F	F	P1101
112	F	T	T	F	T	T	F	T	P1101
113	F	T	T	F	T	T	T	F	P1101
114	F	T	T	F	T	T	T	T	P1101
115	F	T	T	T	F	F	F	F	P0106
116	F	T	T	T	F	F	F	T	P0106
117	F	T	T	T	F	F	T	F	P0106
118	F	T	T	T	F	F	T	T	P0106
119	F	T	T	T	F	T	F	F	P1101
120	F	T	T	T	F	T	F	T	P1101
121	F	T	T	T	F	T	T	F	P1101
122	F	T	T	T	F	T	T	T	P1101
123	F	T	T	T	T	F	F	F	P1101
124	F	T	T	T	T	F	F	T	P1101
125	F	T	T	T	T	F	T	F	P1101
126	F	T	T	T	T	F	T	T	P1101
127	F	T	T	T	T	T	F	F	P1101
128	F	T	T	T	T	T	F	T	P1101
129	F	T	T	T	T	T	T	F	P1101
130	F	T	T	T	T	T	T	T	P1101
131	T	F	F	F	F	F	F	F	No DTC
132	T	F	F	F	F	F	F	T	No DTC
133	T	F	F	F	F	F	T	F	P1101
134	T	F	F	F	F	F	T	T	P0236
135	T	F	F	F	F	T	F	F	P1101
136	T	F	F	F	F	T	F	T	P0121
137	T	F	F	F	F	T	T	F	P1101
138	T	F	F	F	F	T	T	T	P0236
139	T	F	F	F	T	F	F	F	P1101
140	T	F	F	F	T	F	F	T	P1101
141	T	F	F	F	T	F	T	F	P1101
142	T	F	F	F	T	F	T	T	P0236
143	T	F	F	F	T	T	F	F	P1101
144	T	F	F	F	T	T	F	T	P0121
145	T	F	F	F	T	T	T	F	P1101

Initial Supporting table - P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

146	T	F	F	F	T	T	T	T	P0236
147	T	F	F	T	F	F	F	F	P1101
148	T	F	F	T	F	F	F	T	P1101
149	T	F	F	T	F	F	T	F	P1101
150	T	F	F	T	F	F	T	T	P1101
151	T	F	F	T	F	T	F	F	P1101
152	T	F	F	T	F	T	F	T	P1101
153	T	F	F	T	F	T	T	F	P1101
154	T	F	F	T	F	T	T	T	P1101
155	T	F	F	T	T	F	F	F	P1101
156	T	F	F	T	T	F	F	T	P1101
157	T	F	F	T	T	F	T	F	P1101
158	T	F	F	T	T	F	T	T	P1101
159	T	F	F	T	T	T	F	F	P1101
160	T	F	F	T	T	T	F	T	P1101
161	T	F	F	T	T	T	T	F	P1101
162	T	F	F	T	T	T	T	T	P1101
163	T	F	T	F	F	F	F	F	P1101
164	T	F	T	F	F	F	F	T	P1101
165	T	F	T	F	F	F	T	F	P1101
166	T	F	T	F	F	F	T	T	P1101
167	T	F	T	F	F	T	F	F	P1101
168	T	F	T	F	F	T	F	T	P1101
169	T	F	T	F	F	T	T	F	P1101
170	T	F	T	F	F	T	T	T	P1101
171	T	F	T	F	T	F	F	F	P1101
172	T	F	T	F	T	F	F	T	P1101
173	T	F	T	F	T	F	T	F	P1101
174	T	F	T	F	T	F	T	T	P1101
175	T	F	T	F	T	T	F	F	P1101
176	T	F	T	F	T	T	F	T	P1101
177	T	F	T	F	T	T	T	F	P1101
178	T	F	T	F	T	T	T	T	P1101
179	T	F	T	T	F	F	F	F	P1101
180	T	F	T	T	F	F	F	T	P1101
181	T	F	T	T	F	F	T	F	P1101
182	T	F	T	T	F	F	T	T	P1101
183	T	F	T	T	F	T	F	F	P1101

Initial Supporting table - P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

184	T	F	T	T	F	T	F	T	P1101
185	T	F	T	T	F	T	T	F	P1101
186	T	F	T	T	F	T	T	T	P1101
187	T	F	T	T	T	F	F	F	P0101 or P010B
188	T	F	T	T	T	F	F	T	P0101 or P010B
189	T	F	T	T	T	F	T	F	P0101 or P010B
190	T	F	T	T	T	F	T	T	P0101 or P010B
191	T	F	T	T	T	T	F	F	P1101
192	T	F	T	T	T	T	F	T	P1101
193	T	F	T	T	T	T	T	F	P1101
194	T	F	T	T	T	T	T	T	P1101
195	T	T	F	F	F	F	F	F	P1101
196	T	T	F	F	F	F	F	T	P1101
197	T	T	F	F	F	F	T	F	P1101
198	T	T	F	F	F	F	T	T	P0236
199	T	T	F	F	F	T	F	F	P1101
200	T	T	F	F	F	T	F	T	P0121
201	T	T	F	F	F	T	T	F	P1101
202	T	T	F	F	F	T	T	T	P0236
203	T	T	F	F	T	F	F	F	P1101
204	T	T	F	F	T	F	F	T	P1101
205	T	T	F	F	T	F	T	F	P1101
206	T	T	F	F	T	F	T	T	P0236
207	T	T	F	F	T	T	F	F	P1101
208	T	T	F	F	T	T	F	T	P0121
209	T	T	F	F	T	T	T	F	P1101
210	T	T	F	F	T	T	T	T	P0236
211	T	T	F	T	F	F	F	F	P1101
212	T	T	F	T	F	F	F	T	P1101
213	T	T	F	T	F	F	T	F	P1101
214	T	T	F	T	F	F	T	T	P1101
215	T	T	F	T	F	T	F	F	P1101
216	T	T	F	T	F	T	F	T	P1101
217	T	T	F	T	F	T	T	F	P1101
218	T	T	F	T	F	T	T	T	P1101
219	T	T	F	T	T	F	F	F	P1101
220	T	T	F	T	T	F	F	T	P1101
221	T	T	F	T	T	F	T	F	P1101

Initial Supporting table - P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

222	T	T	F	T	T	F	T	T	P1101
223	T	T	F	T	T	T	F	F	P1101
224	T	T	F	T	T	T	F	T	P1101
225	T	T	F	T	T	T	T	F	P1101
226	T	T	F	T	T	T	T	T	P1101
227	T	T	T	F	F	F	F	F	P1101
228	T	T	T	F	F	F	F	T	P1101
229	T	T	T	F	F	F	T	F	P1101
230	T	T	T	F	F	F	T	T	P1101
231	T	T	T	F	F	T	F	F	P1101
232	T	T	T	F	F	T	F	T	P1101
233	T	T	T	F	F	T	T	F	P1101
234	T	T	T	F	F	T	T	T	P1101
235	T	T	T	F	T	F	F	F	P1101
236	T	T	T	F	T	F	F	T	P1101
237	T	T	T	F	T	F	T	F	P1101
238	T	T	T	F	T	F	T	T	P1101
239	T	T	T	F	T	T	F	F	P1101
240	T	T	T	F	T	T	F	T	P1101
241	T	T	T	F	T	T	T	F	P1101
242	T	T	T	F	T	T	T	T	P1101
243	T	T	T	T	F	F	F	F	P1101
244	T	T	T	T	F	F	F	T	P1101
245	T	T	T	T	F	F	T	F	P1101
246	T	T	T	T	F	F	T	T	P1101
247	T	T	T	T	F	T	F	F	P1101
248	T	T	T	T	F	T	F	T	P1101
249	T	T	T	T	F	T	T	F	P1101
250	T	T	T	T	F	T	T	T	P1101
251	T	T	T	T	T	F	F	F	P1101
252	T	T	T	T	T	F	F	T	P1101
253	T	T	T	T	T	F	T	F	P1101
254	T	T	T	T	T	F	T	T	P1101
255	T	T	T	T	T	T	F	F	P1101
256	T	T	T	T	T	T	F	T	P1101
257	T	T	T	T	T	T	T	F	P1101
258	T	T	T	T	T	T	T	T	P1101

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	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,600
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, 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	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,600
1	0.500	0.500	0.500	0.500	0.500	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: 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	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,600
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, 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	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,600
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, 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	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,600
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.982	0.920	0.837	0.865	0.819	0.819

Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max Air Flow**Description:** P0101_P0106_P0121_P0236_P1101 TIAP-Baro Correlation Max Air Flow**Value Units:** Engine Air Flow (Grams/Second)**X Unit:** Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	10.0	14.0	23.0	26.0	27.0	20.0	20.0	20.0	20.0

Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max MAP**Description:** P0101_P0106_P0121_P0236_P1101 TIAP-Baro Correlation Max MAP**Value Units:** Manifold Pressure (kPa)**X Unit:** Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	95.0	80.0	60.0	50.0	50.0	40.0	30.0	30.0	30.0

Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Offset**Description:** P0101_P0106_P0121_P0236_P1101 TIAP-Baro Correlation Offset**Value Units:** Pressure Difference (kPa)**X Unit:** Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	3.5	7.0	7.0	10.0	10.0	10.0	10.0	10.0	10.0

Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow**Description:** P0101_P0106_P0121_P0236_P1101 TIAP-MAP Correlation Min Air Flow**Value Units:** Engine Air Flow (Grams/Second)**X Unit:** Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	13.0	36.0	70.0	82.0	104.0	115.0	120.0	120.0	120.0

Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min MAP**Description:** P0101_P0106_P0121_P0236_P1101 TIAP-MAP Correlation Min MAP**Value Units:** Manifold Pressure (kPa)**X Unit:** Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	115.0	150.0	180.0	180.0	180.0	180.0	180.0	165.0	165.0

Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Offset**Description:** P0101_P0106_P0121_P0236_P1101 TIAP-MAP Correlation Offset**Value Units:** Pressure Difference (kPa)**X Unit:** Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	1.5	1.5	2.5	3.5	3.8	5.0	6.0	6.0	6.0

Supporting table - P0234 P0299: Ambient pressure correction(Overboost) as a function of engine speed and ambient pressure**Description:** Additive offset on boost pressure control Negative deviation fail limit.**Value Units:** [kPa] Negative Control Deviation - Ambient correction.**X Unit:** [kPa] KnBSTD_p_CntrlDevDiagAmbCorrBP - Ambient Air Pressure**Y Units:** [rpm] KnBSTD_n_CntrlDevDiagAmbCorrBP - Engine Speed

y/x	60	70	80	90	100	110
1,000	-20.00	-15.00	-10.00	-5.00	0.00	0.00
2,000	-15.00	-10.00	-5.00	0.00	0.00	0.00
3,000	-10.00	-5.00	0.00	0.00	0.00	0.00
4,000	-10.00	-5.00	0.00	0.00	0.00	0.00
5,000	-15.00	-10.00	-5.00	0.00	0.00	0.00
6,000	-20.00	-15.00	-10.00	-5.00	0.00	0.00

Supporting table - P0234 P0299: Ambient pressure correction(Underboost) as a function of engine speed and ambient pressure**Description:** Additive offset on boost pressure control Positive deviation fail limit.**Value Units:** [kPa] Positive Control Deviation - Ambient correction.**X Unit:** [kPa] KnBSTD_p_CntrlDevDiagAmbCorrBP - Ambient Air Pressure**Y Units:** [rpm] KnBSTD_n_CntrlDevDiagAmbCorrBP - Engine Speed

y/x	60	70	80	90	100	110
1,000	20.00	15.00	10.00	5.00	0.00	0.00
2,000	15.00	10.00	5.00	0.00	0.00	0.00
3,000	10.00	5.00	0.00	0.00	0.00	0.00
4,000	10.00	5.00	0.00	0.00	0.00	0.00
5,000	15.00	10.00	5.00	0.00	0.00	0.00
6,000	20.00	15.00	10.00	5.00	0.00	0.00

Supporting table - P0234 P0299: Boost deviation diagnostic enable delay as a function of engine speed and ambient pressure**Description:** Timer to stabilize enable conditions for over and underboost diagnosis.**Value Units:** [sec] Pressure control deviation diagnosis enable delay.**X Unit:** [kPa] KnBSTD_p_PresCntrDevAmbBP - Ambient Pressure**Y Units:** [rpm] KnBSTD_n_CntrlDevDiagEngSpdBP - Engine Speed

y/x	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	6,000
60	4.7500	4.3750	3.7500	3.3750	2.7500	2.3750	2.0000	1.7500	1.7500	1.3750
80	3.1250	2.8750	2.5000	2.2500	1.7500	1.6250	1.3750	1.1250	1.1250	0.8750
100	1.7500	1.5000	1.3750	1.1250	1.0000	0.8750	0.7500	0.6250	0.5000	0.5000

Initial Supporting table - P0234: Overboost pressure deviation limit as a function of engine speed and desired boost pressure**Description:** Negative boost pressure control deviation fail limit.**Value Units:** [kPa] Negative boost pressure deviation limit.**X Unit:** [kPa] KnBSTD_p_CntrlDevDiagDsrdBP - Boost pressure**Y Units:** [rpm] KnBSTD_n_CntrlDevDiagEngSpdBP - Engine speed

y/x	100.00	120.00	140.00	160.00	170.00	180.00	190.00	200.00	210.00	220.00
1,000	-20.00	-20.00	-20.00	-20.00	-20.00	-20.00	-20.00	-20.00	-20.00	-20.00
1,500	-20.00	-20.00	-20.00	-20.00	-20.00	-20.00	-20.00	-20.00	-20.00	-20.00
2,000	-20.00	-20.00	-20.00	-20.00	-20.00	-20.00	-20.00	-20.00	-20.00	-20.00
2,500	-30.00	-30.00	-30.00	-30.00	-30.00	-30.00	-30.00	-30.00	-30.00	-30.00
3,000	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00
3,500	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00
4,000	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00
4,500	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00
5,000	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00
6,000	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00	-35.00

Initial Supporting table - P0299: Underboost pressure deviation limit as a function of engine speed and desired boost pressure**Description:** Positive boost pressure control deviation fail limit.**Value Units:** [kPa] Positive boost pressure deviation limit.**X Unit:** [kPa] KnBSTD_p_CntrlDevDiagDsrdBP - Boost pressure**Y Units:** [rpm] KnBSTD_n_CntrlDevDiagEngSpdBP - Engine speed

y/x	100.00	120.00	140.00	160.00	170.00	180.00	190.00	200.00	210.00	220.00
1,000	35.00	32.00	30.00	30.00	32.00	37.00	43.00	50.00	50.00	55.00
1,500	35.00	32.00	30.00	30.00	32.00	37.00	43.00	50.00	50.00	55.00
2,000	35.00	32.00	30.00	30.00	32.00	37.00	43.00	50.00	50.00	55.00
2,500	35.00	32.00	30.00	30.00	32.00	37.00	43.00	50.00	50.00	55.00
3,000	35.00	32.00	30.00	30.00	32.00	34.00	43.00	50.00	50.00	55.00
3,500	35.00	32.00	30.00	30.00	32.00	34.00	43.00	50.00	50.00	55.00
4,000	35.00	32.00	30.00	30.00	32.00	34.00	43.00	50.00	50.00	50.00
4,500	35.00	32.00	30.00	30.00	32.00	34.00	43.00	50.00	50.00	50.00
5,000	35.00	32.00	30.00	30.00	32.00	37.00	43.00	50.00	50.00	50.00
6,000	35.00	32.00	30.00	30.00	32.00	37.00	43.00	50.00	50.00	50.00

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	195	195	195	195	195
0.125	195	195	195	195	195
0.250	195	195	195	195	195
0.375	195	195	195	195	195
0.500	20	20	20	20	20
0.625	20	20	20	20	20
0.750	20	20	20	20	20
0.875	20	20	20	20	20
1.000	20	20	20	20	20

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	195	195	195	195	195
0.125	195	195	195	195	195
0.250	195	195	195	195	195
0.375	195	195	195	195	195
0.500	20	20	20	20	20
0.625	20	20	20	20	20
0.750	20	20	20	20	20
0.875	20	20	20	20	20
1.000	20	20	20	20	20

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	0	300	500	700	815	850	900	950	1,000	1,050	1,100	1,200	1,300	1,400	1,600	1,900	2,200
1	0	2	3	11	11	11	15	15	15	15	22	26	30	30	30	30	30

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. ExhEngyPerIInitMass 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	-30	-20	-10	0	10	20	30	40	50
1	1.25	1.25	1.25	1.13	0.81	0.81	0.81	0.69	0.63

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
CiFCLPDecel	2,048	2,048
CiFCLPJdle	2,048	2,048
CiFCLP_Cruise	2,048	2,048
CiFCLPLightAccel	2,048	2,048
CiFCLP_HeavyAccel	2,048	2,048

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 02 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	255

Initial Supporting table - Closed Loop Enable Clarification - KeFCLP_T_IntegrationCatalystMax	
Description: Maximum allowed estimated catalytic converter temperature for post 02 integral terms to be updated.	
Value Units: Celcius	
y/x	1
1	900

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

Description: Minimum allowed estimated catalytic converter temperature to begin using post 02 integration correction terms. Converter temperature must remain above this threshold to ramp-in the post 02 integration adjustments. Once the ramp-in has started, a converter temperature below this threshold will freeze the ramp-in multiplier. Post 02 integration will not be allowed below this converter temperature

Value Units: Celcius

y/x

1

1

530

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	650

Initial Supporting table - Closed Loop Enable Clarification - KeWRSC_T_HtrCntrlCL

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

Value Units: Degrees Celcius

y/x	1
1	675

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	40

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	1,225

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	17.3	17.9	18.6	19.2	19.9	20.6	21.2	21.9	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	263.0	263.0	263.0	241.0	145.0	73.0	60.0	60.0	58.0	54.0	50.0	46.0	46.0	46.0	46.0	46.0	46.0

Initial Supporting table - Closed Loop Enable Clarification - KtFCLP_t_PostIntglRampInTime

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	45.0	30.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

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	320.0	320.0	280.0	200.0	28.0	28.0	28.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
25	320.0	320.0	280.0	200.0	28.0	28.0	28.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
50	320.0	320.0	280.0	200.0	28.0	28.0	28.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
75	320.0	320.0	280.0	200.0	28.0	28.0	28.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
100	320.0	320.0	280.0	200.0	28.0	28.0	28.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6

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	320.0	320.0	280.0	200.0	28.0	28.0	28.0	28.0	16.0	16.0	10.0	10.0	10.0	10.0	18.0	18.0	18.0
25	320.0	320.0	280.0	200.0	28.0	28.0	28.0	28.0	16.0	16.0	10.0	10.0	10.0	10.0	18.0	18.0	18.0
50	320.0	320.0	280.0	200.0	28.0	28.0	28.0	28.0	16.0	16.0	10.0	10.0	10.0	10.0	18.0	18.0	18.0
75	320.0	320.0	280.0	200.0	28.0	28.0	28.0	28.0	16.0	16.0	10.0	10.0	10.0	10.0	18.0	18.0	18.0
100	320.0	320.0	280.0	200.0	28.0	28.0	28.0	28.0	16.0	16.0	10.0	10.0	10.0	10.0	18.0	18.0	18.0

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	30	30	45	60	80	120	220	300	400	400	400	400	400	400	400	400	400

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 EOIMV 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	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
2	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
3	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
4	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
5	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
6	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
7	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
8	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
9	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
10	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
11	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
12	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
13	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
14	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
15	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
16	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
17	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2

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	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

Initial Supporting table - 1st_FireAftMisfr_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	600	800	1,000	1,200	1,400	1,800	2,200	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	0.27	0.86	0.69	0.93	0.42	0.50	0.79	0.49	0.72	0.55	0.60	0.61	0.71	0.67	0.38	0.15	0.42
8	0.19	0.74	0.45	0.40	0.24	0.27	0.54	0.48	0.57	0.38	0.59	0.61	0.63	0.67	0.38	0.23	0.42
12	0.13	0.34	0.31	-0.02	0.02	0.02	0.13	0.32	0.20	0.16	0.29	0.52	0.42	0.60	0.31	0.23	0.33
16	0.10	0.23	0.20	-0.09	-0.07	-0.08	-0.02	-0.07	-0.06	0.01	0.06	0.19	0.29	0.43	0.28	0.21	0.23
20	0.07	0.13	0.27	-0.13	-0.14	-0.08	-0.07	0.01	-0.01	-0.05	0.04	0.04	0.18	0.24	0.14	0.13	0.21
24	0.03	0.01	0.24	-0.01	-0.11	-0.03	-0.13	0.00	0.00	-0.04	0.01	0.09	0.32	0.13	0.13	0.12	0.20
30	-0.04	-0.08	0.14	-0.10	-0.17	0.07	-0.03	0.03	0.04	-0.01	-0.05	0.15	0.33	0.15	0.23	0.24	0.29
40	-0.04	-0.06	0.12	-0.06	-0.09	0.06	0.04	0.04	0.05	0.20	0.47	0.18	0.31	0.28	0.31	0.25	0.43
60	-0.03	-0.04	0.09	-0.04	-0.06	0.05	0.03	-0.13	0.00	0.18	0.48	0.16	0.30	0.28	0.31	0.25	0.41

Initial Supporting table - 1st_FireAfrMisfr_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	600	800	1,000	1,200	1,400	1,800	2,200	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	-0.65	-0.57	-1.00	-1.11	-1.14	-0.96	-0.88	-0.78	-0.89	-0.74	-0.70	-0.51	-0.45	-0.39	-0.39	-0.31	-0.43
8	-1.04	-0.80	-0.99	-1.17	-1.28	-0.92	-0.94	-1.17	-1.07	-1.04	-0.81	-0.67	-0.61	-0.65	-0.72	-0.69	-0.79
12	-0.78	-1.06	-1.41	-1.31	-1.20	-1.23	-1.18	-1.23	-1.22	-1.13	-1.03	-0.82	-0.73	-0.83	-0.85	-0.88	-0.93
16	-0.74	-0.93	-1.21	-1.22	-1.02	-0.95	-1.36	-1.17	-1.15	-1.03	-0.96	-1.00	-1.06	-0.93	-0.96	-0.89	-0.94
20	-0.59	-0.82	-1.08	-1.10	-0.95	-0.96	-1.42	-1.21	-1.17	-0.97	-0.99	-1.06	-1.16	-1.03	-1.04	-1.05	-1.06
24	-0.58	-0.71	-0.97	-1.22	-0.86	-0.88	-1.70	-1.40	-1.17	-1.02	-1.05	-1.09	-1.17	-1.10	-1.06	-1.13	-1.00
30	-0.50	-0.65	-0.91	-1.10	-0.74	-0.87	-1.69	-1.67	-1.26	-1.09	-1.12	-1.11	-1.16	-1.16	-1.08	-1.14	-1.00
40	-0.56	-0.66	-0.85	-0.92	-0.64	-0.85	-1.31	-1.59	-1.28	-1.05	-1.14	-1.09	-1.08	-1.09	-0.98	-1.08	-0.94
60	-0.58	-0.68	-0.82	-0.78	-0.58	-0.88	-1.05	-1.25	-1.16	-0.97	-1.10	-1.01	-1.03	-0.94	-0.95	-0.95	-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
2	-1	-1	-1	-1	-1	-1	-1	-1	-1
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

Initial Supporting table - IstFireAfrMisAcelAFM

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
2	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0

Initial Supporting table - Abnormal Cyl Mode

Description: Used for P0300-P0308. Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (Cylinder Mode Equation)

Value Units: Number of consecutive number of decelerating cylinders (integer)

X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	3	3	3	3	3	3	3	3	3

Initial Supporting table - Abnormal Rev Mode

Description: Used for P0300-P0308. Abnormal Rev Mode Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (Rev Mode Equation)

Value Units: Number of consecutive number of decelerating cylinders (integer)

X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

Initial Supporting table - Abnormal SCD Mode

Description: Used for P0300-P0308. Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (SCD Mode Equation)

Value Units: Number of consecutive number of decelerating cylinders (integer)

X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	3	3	3	3	2	2	2	2	2

Initial Supporting table- Bank_SCD_Decel

Description: Used for P0300 - P0308, Multplier 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	600	700	800	900	1,000	1,100	1,200	1,400	1,600
2	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
8	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
12	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
16	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
20	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
24	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
30	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
40	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60

Initial Supporting table - Bank_SCD_Jerk

Description: Used for P0300 - P0308, Multplier 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	600	700	800	900	1,000	1,100	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

Initial Supporting table - BankCylModeDecel

Description: Used for P0300 - P0308, Multplier 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	600	800	1,000	1,200	1,400	1,800	2,200	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
8	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
12	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
16	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
20	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
24	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
30	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
40	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
60	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00

Initial Supporting tablej - BankCylModeJerk

Description: Used for P0300 - P0308, Multitplier 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	600	800	1,000	1,200	1,400	1,800	2,200	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
8	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
12	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
16	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
20	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
24	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
30	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
40	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
60	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00

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	44.9	40.0	35.0	30.0	20.6	16.6	12.4	7.0
10	39.0	36.0	30.0	26.0	19.0	14.1	12.0	5.0
20	30.0	27.0	21.0	20.0	16.5	11.1	7.0	4.6
30	27.0	21.0	15.5	12.0	11.0	9.0	4.6	4.6
40	20.6	15.5	12.0	8.5	8.0	5.0	4.6	4.6
50	15.5	12.0	8.5	5.0	4.6	4.6	4.6	4.6
60	11.1	8.5	4.6	4.6	4.6	4.6	4.6	4.6
70	7.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
80	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
90	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
100	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6

Initial Supporting table - ClyAfterAFM_Decel

Description: Used for P0300 - P0308, Multplier 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
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

Initial Supporting table - ClyBeforeAFM Jerk

Description: Used for P0300 - P0308, Multplier 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
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

Initial Supporting table - CombustModelIdleTbl

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)

CombustModelIdleTbl - 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

CombustModelIdleTbl - 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

CombustModelIdleTbl - 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 - ConsecCylModDecel

Description: Used for P0300 - P0308, Multplier 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	600	800	1,000	1,200	1,400	1,800	2,200	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	0.95	1.46	1.65	2.79	3.54	2.40	1.70	1.39	1.20	1.13	1.13	1.06	1.00	1.00	1.00	1.15	1.17
8	0.48	1.18	1.33	2.39	3.28	2.00	1.30	1.09	1.03	0.83	0.90	0.94	0.92	0.95	0.94	1.08	1.08
12	0.55	0.85	1.06	1.77	2.14	1.39	0.92	0.91	0.71	0.73	0.71	0.91	0.81	0.95	1.00	1.00	1.00
16	0.71	0.65	0.84	1.16	1.29	1.03	0.72	0.78	0.67	0.67	0.73	0.89	0.79	0.78	0.83	0.93	0.92
20	0.98	0.62	0.77	0.78	0.98	0.82	0.66	0.63	0.61	0.63	0.77	0.87	0.85	0.80	0.71	0.87	0.93
24	1.02	0.70	0.78	0.62	0.78	0.66	0.72	0.55	0.60	0.68	0.78	0.89	0.89	0.80	0.74	0.82	0.93
30	1.20	0.83	0.80	0.61	0.67	0.58	0.78	0.58	0.62	0.67	0.78	0.89	0.86	0.77	0.70	0.81	0.94
40	1.42	0.99	0.83	0.67	0.64	0.65	0.85	0.59	0.63	0.65	0.75	0.91	0.87	0.74	0.64	0.79	1.00
60	1.23	1.13	0.85	0.73	0.63	0.76	0.89	0.65	0.67	0.66	0.92	0.94	0.88	0.73	0.58	0.73	1.07

Initial Supporting table - ConsecCylModeJerk

Description: Used for P0300 - P0308, Multplier 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	600	800	1,000	1,200	1,400	1,800	2,200	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	-2	-1	-1	-1	-2	-2	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1	-1
8	-2	-2	-1	-2	-2	-2	-2	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
12	-1	-1	-1	-1	-1	-2	-2	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
16	-1	-1	-1	-1	-1	-1	-2	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
20	-1	-1	-1	-1	-1	-1	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1	-1
24	-1	-1	-1	-1	-1	-1	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1	-1
30	-1	-1	-1	-1	-1	-1	-1	-2	-1	-1	-1	-1	-1	-1	-1	-1	-1
40	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
60	-1	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1

Initial Supporting table - ConsecSCD_Decel

Description: Used for P0300 - P0308, Multiplier 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	600	700	800	900	1,000	1,100	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

Initial Supporting table - ConsecSCD_Jerk

Description: Used for P0300 - P0308, Multiplier 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	600	700	800	900	1,000	1,100	1,200	1,400	1,600
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Initial Supporting table - CylAfterAFM_Jerk

Description: Used for P0300 - P0308, Multiplier to Lores Jerk to account for different pattern of misfire after a deactivated cylinder. 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
2	1	1	1	1	1	1	1	1	1
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

Initial Supporting table - CylBeforeAFM Decel

Description: Used for P0300 - P0308, Multiplier to Lores decel to account for different pattern of misfire before a deactivated cylinder, but after an active cylinder that follows an inactive 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
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

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 (usec)

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	4,939	3,398	2,472	1,569	986	730	561	336	264	165	137	125	91
6	6,445	4,763	3,168	1,654	1,034	825	592	344	286	168	139	136	91
8	7,196	4,977	3,333	1,806	1,104	937	661	352	308	173	151	150	96
10	8,781	5,853	3,404	2,081	1,270	1,061	703	382	342	209	167	167	104
12	10,196	6,948	4,606	2,437	1,494	1,211	789	474	416	257	197	181	120
14	11,463	7,649	5,113	2,646	1,736	1,511	888	588	517	295	228	197	140
16	14,731	9,267	5,286	2,995	2,054	1,814	1,017	695	607	346	266	217	161
18	16,782	10,939	6,756	3,344	2,346	2,099	1,155	809	693	412	306	243	178
20	18,793	11,202	7,234	3,623	2,619	2,351	1,303	931	799	473	352	274	197
22	20,889	12,777	7,723	3,925	2,853	2,521	1,452	1,030	899	550	400	314	222
24	23,744	13,583	8,225	4,251	3,165	2,695	1,587	1,129	1,005	613	440	356	246
26	25,065	14,399	8,734	4,600	3,399	2,873	1,728	1,244	1,111	689	482	387	272
30	27,999	15,705	9,535	5,274	3,848	3,142	1,995	1,434	1,310	809	565	448	317
40	28,000	19,364	11,798	6,879	4,979	3,918	2,665	1,953	1,728	1,099	762	587	443
50	28,000	23,020	14,060	8,460	6,090	4,693	3,388	2,456	2,153	1,374	965	731	554
60	28,000	26,676	16,322	10,042	7,299	5,468	4,100	2,975	2,515	1,644	1,179	858	668
97	28,000	28,000	24,693	16,346	11,432	8,338	6,286	4,868	3,854	2,606	1,823	1,329	1,047

CylModeDecel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
3	60	50	37	35	28	20	17	12	11	8	7	6	6
6	60	50	37	35	28	20	17	12	11	8	7	6	6
8	64	53	40	38	32	21	17	12	11	8	7	6	6
10	71	66	42	42	36	23	17	12	10	8	7	6	6
12	83	77	48	51	39	26	17	13	10	8	7	6	6
14	95	89	57	57	46	29	18	13	11	9	7	7	6
16	106	96	67	62	49	31	19	14	12	9	7	7	7
18	123	109	86	70	55	34	21	16	12	10	8	7	7
20	134	123	104	82	63	37	23	17	13	11	8	7	8
22	148	135	130	91	70	40	25	18	14	11	8	8	9
24	159	150	146	105	75	44	28	19	15	12	9	8	9

Initial Supporting table - CylModeDecel													
26	170	163	156	114	84	48	31	21	17	12	9	8	10
30	197	188	179	131	103	55	36	25	20	15	11	9	11
40	259	240	238	185	140	74	47	34	27	21	14	11	13
50	337	299	281	230	179	89	58	42	33	27	18	13	16
60	407	360	323	266	217	103	71	50	41	34	22	15	19
97	722	564	528	434	350	170	113	83	68	56	38	25	29

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 (usec)

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	6,377	3,253	1,877	1,350	876	758	458	342	237	160	126	105	88
6	6,377	3,253	1,934	1,525	906	774	565	409	309	194	147	132	106
8	7,091	3,939	2,560	1,783	1,078	932	653	472	339	235	176	155	108
10	8,647	5,235	3,123	2,313	1,509	1,060	794	547	400	280	225	176	126
12	11,018	6,230	4,115	3,015	2,034	1,280	986	686	485	377	288	189	156
14	15,153	8,725	5,552	3,567	2,733	1,604	1,230	830	604	479	348	238	185
16	17,849	10,611	6,660	4,581	3,368	2,071	1,474	1,002	751	602	408	283	215
18	19,650	13,559	8,688	6,006	3,951	2,599	1,713	1,148	872	721	481	325	243
20	23,026	16,116	10,134	7,155	4,642	3,104	1,925	1,312	999	823	556	374	275
22	27,513	19,112	12,327	8,786	5,471	3,489	2,147	1,440	1,087	926	616	415	304
24	30,000	22,034	13,323	9,087	6,266	3,987	2,311	1,573	1,162	1,014	678	460	334
26	30,000	24,663	14,818	9,952	6,887	4,499	2,494	1,692	1,254	1,098	737	497	370
30	30,000	29,112	18,076	11,851	8,100	5,509	2,950	1,993	1,454	1,293	856	585	433
40	30,000	30,000	23,556	15,181	10,374	7,415	4,190	2,784	2,103	1,768	1,158	809	576
50	30,000	30,000	30,000	18,664	12,888	9,206	5,430	3,541	2,728	2,208	1,471	1,023	727
60	30,000	30,000	30,000	21,385	15,138	10,821	6,615	4,298	3,377	2,718	1,772	1,240	877
97	30,000	30,000	30,000	30,000	23,447	16,831	11,283	7,201	5,771	4,609	2,883	2,038	1,438

CylModeJerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
3	51	52	39	33	31	24	20	16	12	9	8	7	7
6	67	60	42	38	33	24	20	16	12	9	8	7	7
8	78	66	45	41	36	24	20	16	12	9	8	7	7
10	92	77	50	45	40	28	21	16	12	9	9	7	7
12	106	87	61	52	47	30	22	17	12	10	9	7	7
14	113	96	72	60	55	35	25	18	13	11	9	8	8
16	124	108	81	69	62	40	27	18	15	12	10	8	8
18	142	121	89	77	71	45	30	20	16	13	10	9	9
20	155	129	102	86	80	49	33	23	18	14	11	9	9
22	164	138	111	96	88	53	37	24	19	15	11	10	10
24	174	146	119	102	95	57	41	27	21	16	12	11	11

Initial Supporting table - CylModeJerk

26	180	157	127	113	103	62	44	29	22	17	13	11	11
30	200	168	137	133	121	70	49	34	26	20	15	13	13
40	298	184	184	183	167	93	67	47	34	27	20	17	17
50	403	248	240	236	210	114	84	59	43	34	26	21	21
60	521	318	300	286	247	137	102	72	53	41	32	25	25
97	995	579	530	474	406	218	168	120	92	68	54	40	40

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 (usec)

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
2	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0

Initial Supporting table - DeacCylInversionJerk

Description: Used for P0300 - P0308, Negative Torque can cause crank readings to invert (active cylinders appear weak & deactivated cylinders appear "strong" If deactivated cylinders don't jerk at least this amount then the crank signal is inverting. Function of speed and load.

Value Units: Change in Delta time per cylinder from last cylinder (usec)

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
2	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0

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	6,500	6,500	6,500	6,500	6,500	6,500	6,500

EngineOverSpeedLimit - Part 2

y/x	CeTGRR_e_TransGr10	CeTGRR_e_TransGrNeutral	CeTGRR_e_TransGrReverse	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	6,500	4,000	4,000	4,000	6,500	6,500	

Initial Supporting table - InfrequentRegen

Description: Used for P0300-P0308. Only used on Diesel engines. Initiates a misfire delay when the current combustion mode matches a selection in the table. A value of CeCMBR_i_CombModesMax means not selected.

Value Units: Enumerated value of different combustion modes (enumeration)

X Unit: Current Combustion Mode (enumeration)

InfrequentRegen - Part 1

y/x	0	1	2	3	4	5
1	CeCMBR_i_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	4	4	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	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	12.0	12.0	11.5	9.0	9.0	7.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0

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	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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 Present (%)

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
0	20.0	20.0	20.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0
13	20.0	20.0	20.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0
25	20.0	20.0	20.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0
38	20.0	20.0	20.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0
50	20.0	20.0	20.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0
63	20.0	20.0	20.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0
75	20.0	20.0	20.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0
88	20.0	20.0	20.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0
100	20.0	20.0	20.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12.0

Initial Supporting table - Pair_SCD_Decel

Description: Used for P0300 - P0308, Multplier 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	600	700	800	900	1,000	1,100	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

Initial Supporting table - Pair_SCD_Jerk

Description: Used for P0300 - P0308, Multplier 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	600	700	800	900	1,000	1,100	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

Initial Supporting table - PairCylModeDecel

Description: Used for P0300 - P0308, Multitplier 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: multiplier

X Unit: RPM

Y Units: percent load of max indicated torque (%)

y/x	600	800	1,000	1,200	1,400	1,800	2,200	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	0.81	1.10	0.99	1.20	1.20	0.95	0.98	1.05	0.87	1.05	0.90	0.97	1.21	1.19	1.19	1.15	1.17
8	0.50	1.05	0.71	1.19	1.20	0.71	0.86	0.82	0.65	0.79	0.78	0.79	1.04	1.05	1.19	1.15	1.08
12	0.56	0.85	0.62	0.89	0.87	0.60	0.69	0.71	0.49	0.64	0.57	0.73	0.85	1.00	1.06	1.15	1.00
16	1.06	0.59	0.64	0.70	0.77	0.61	0.61	0.58	0.48	0.55	0.52	0.68	0.71	0.83	0.89	1.14	0.92
20	1.02	0.69	0.66	0.59	0.72	0.61	0.58	0.47	0.41	0.49	0.50	0.59	0.67	0.76	0.71	0.87	0.79
24	1.15	0.75	0.69	0.55	0.67	0.57	0.59	0.40	0.40	0.48	0.48	0.55	0.63	0.67	0.65	0.71	0.73
30	1.28	0.87	0.70	0.53	0.63	0.56	0.61	0.40	0.42	0.41	0.48	0.52	0.61	0.62	0.63	0.67	0.71
40	1.38	1.02	0.73	0.55	0.62	0.59	0.63	0.42	0.40	0.39	0.49	0.53	0.58	0.56	0.60	0.57	0.71
60	1.23	1.17	0.73	0.58	0.62	0.60	0.62	0.47	0.42	0.36	0.53	0.49	0.57	0.54	0.54	0.61	0.76

Initial Supporting table - PairCylModeJerk

Description: Used for P0300 - P0308, Multplier 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	600	800	1,000	1,200	1,400	1,800	2,200	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	1.70	1.48	1.49	1.48	1.50	1.48	1.49	1.49	1.48	1.49	1.40	1.31	1.39	1.48	1.50	1.44	1.43
8	1.49	1.38	1.40	1.48	1.49	1.23	1.40	1.49	1.23	1.38	1.38	1.36	1.39	1.48	1.50	1.44	1.43
12	1.30	0.96	0.74	1.37	1.28	1.16	1.17	1.30	1.02	1.15	1.13	1.20	1.39	1.50	1.35	1.41	1.36
16	1.02	0.83	0.67	1.09	0.97	0.90	1.15	1.07	0.85	0.95	0.90	1.02	1.28	1.24	1.22	1.26	1.13
20	0.87	0.80	0.75	1.01	0.88	0.89	1.05	0.98	0.83	0.80	0.79	0.86	1.07	1.06	1.04	1.14	1.00
24	0.84	0.80	0.78	1.04	0.89	0.87	1.05	0.92	0.84	0.73	0.76	0.74	0.94	0.93	0.91	1.04	0.86
30	0.91	0.87	0.85	1.04	0.88	0.90	1.18	1.01	0.74	0.69	0.74	0.69	0.79	0.80	0.79	0.90	0.80
40	1.06	0.97	0.88	0.98	0.90	0.89	1.06	1.00	0.76	0.66	0.74	0.65	0.69	0.75	0.70	0.75	0.79
60	1.00	1.06	0.90	0.93	0.92	0.91	0.91	0.94	0.77	0.63	0.77	0.62	0.66	0.66	0.73	0.70	0.80

Initial Supporting tablej - Random_SCD_Decel

Description: Used for P0300 - P0308, Multplier to SCD_Decel to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier

X Unit: RPM

Y Units: percent load of max indicated torque (%)

y/x	600	700	800	900	1,000	1,100	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

Initial Supporting table - Random_SCD_Jerk

Description: Used for P0300 - P0308, Multplier 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	600	700	800	900	1,000	1,100	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

Initial Supporting table - RandomAFM Decel

Description: Used for P0300 - P0308, Multiplier to Cylinder_Decel while in Cylinder 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
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

Initial Supporting table - RandomAFM_Jerk

Description: Used for P0300 - P0308, Multiplier to Cylinder_Jerk while in Cylinder 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
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

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	600	800	1,000	1,200	1,400	1,800	2,200	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	1.00	1.21	1.17	1.28	1.31	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.26	1.33	1.40	1.39	1.00	1.00	1.15	1.00	1.00	1.05	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.14	1.39	1.40	1.40	1.00	1.27	1.16	1.00	1.00	1.16	1.18	1.12	1.15	1.00	1.00	1.00
16	1.00	1.02	1.38	1.39	1.39	1.15	1.34	1.36	1.00	1.00	1.10	1.35	1.32	1.22	1.11	1.14	1.08
20	1.00	1.00	1.20	1.18	1.40	1.22	1.38	1.17	1.17	1.00	1.09	1.35	1.39	1.40	1.14	1.20	1.14
24	1.00	1.00	1.09	1.06	1.39	1.27	1.38	1.00	1.16	1.10	1.11	1.34	1.37	1.33	1.26	1.24	1.20
30	1.00	1.00	1.00	1.00	1.22	1.20	1.40	1.00	1.11	1.12	1.14	1.32	1.39	1.28	1.20	1.24	1.24
40	1.00	1.00	1.00	1.00	1.08	1.12	1.39	1.00	1.00	1.08	1.14	1.25	1.24	1.15	1.19	1.29	1.24
60	1.00	1.00	1.00	1.00	1.00	1.04	1.21	1.00	1.00	1.00	1.11	1.12	1.18	1.11	1.04	1.25	1.28

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	600	800	1,000	1,200	1,400	1,800	2,200	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	1.00	1.23	1.23	1.28	1.29	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.25	1.29	1.39	1.19	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	1.11	1.11	1.32	1.17	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	1.02	1.13	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.08	1.17	1.13	1.05	1.06
20	1.00	1.00	1.00	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.11	1.15	1.14	1.22
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	1.08	1.15	1.16	1.17	1.19
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.06	1.07	1.14	1.10	1.21	1.24
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.03	1.06	1.13	1.07	1.15	1.15
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.07	1.10	1.10	1.08	1.14

Initial Supporting table - RandomRevModDecel

Description: Used for P0300 - P0308, Multitplier 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	3,000	3,500	4,000	4,500	5,000	5,500	6,000	7,000	8,000
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

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	1,000	1,400	1,800	2,200	2,600	3,000	4,000	5,000	6,000
1	1.00	1.00	1.00	1.00	1.00	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 (usec)

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	3,500	4,000	4,500	5,000	5,500	6,000	6,500	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	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	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	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	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	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	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	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	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	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	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	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	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	32,767	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	32,767	32,767	32,767	32,767	32,767	32,767
50	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	32,767	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	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	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - Ring Filter									
Description: Used for P0300-P0308. Driveline Ring Filter After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.									
Value Units: Number of Engine cycles after isolated misfire (Engine cycles) X Unit: thousands of RPM (rpm/1000)									
y/x	0	1	2	3	4	5	6	7	8
1	4	4	4	4	4	4	4	4	4

Initial Supporting table - SCD_Decel

Description: Used for P0300-P0308 Crankshaft decel threshold. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usec)

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	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
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
50	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - 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 (usec)

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	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
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
50	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - 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	1,000	1,400	1,800	2,200	2,600	3,000	4,000	5,000	6,000
1	5.00	5.60	5.60	4.10	3.70	3.70	2.50	2.00	1.76
1	4.00	5.12	5.12	4.00	3.50	3.50	2.00	1.80	1.70
1	3.44	3.73	3.73	3.73	3.44	3.30	1.80	1.70	1.64
1	3.00	3.00	3.00	3.00	2.58	2.50	1.70	1.60	1.59
2	2.50	1.93	1.93	2.50	2.30	2.20	1.65	1.40	1.52
2	2.00	1.60	1.60	2.20	2.10	2.00	1.50	1.33	1.40
3	1.50	1.30	1.30	2.00	2.00	1.90	1.40	1.40	1.38
3	1.50	1.22	1.22	1.90	1.90	1.80	1.30	1.45	1.36
5	1.43	1.20	1.20	1.79	1.86	1.72	1.20	1.50	1.20

Initial Supporting table - TOSSRoughRoadThres

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	0.30005	0.44995	0.59998	0.65002	0.69995	0.75000	0.80005	0.84998	0.90002	0.91003	0.92004	0.93005	0.93994	0.94995	0.95996	0.96997	0.97998

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	-3.00	-3.00	-3.00	-2.50	-2.50	-3.00	-3.00	-2.50	-2.00	-1.00	-1.00	-1.00	-0.50
75	-2.75	-2.75	-2.75	-2.25	-2.25	-2.75	-2.75	-2.25	-1.75	-0.75	-0.75	-0.75	-0.25
85	-2.50	-2.50	-2.50	-2.00	-2.00	-2.50	-2.50	-2.00	-1.50	-0.50	-0.50	-0.50	0.00
95	-2.25	-2.25	-2.25	-1.75	-1.75	-2.25	-2.25	-1.75	-1.25	-0.25	-0.25	-0.25	0.25
105	-2.00	-2.00	-2.00	-1.50	-1.50	-2.00	-2.00	-1.50	-1.00	0.00	0.00	0.00	0.50

ZeroTorqueAFM - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
65	-0.50	-1.00	-1.50	-2.00	-2.00	-1.00	0.00	1.00	2.00	3.00	4.00	5.00	6.00
75	-0.25	-0.75	-1.25	-1.75	-1.75	-0.75	0.25	1.25	2.25	3.25	4.25	5.25	6.25
85	0.00	-0.50	-1.00	-1.50	-1.50	-0.50	0.50	1.50	2.50	3.50	4.50	5.50	6.50
95	0.25	-0.25	-0.75	-1.25	-1.25	-0.25	0.75	1.75	2.75	3.75	4.75	5.75	6.75
105	0.50	0.00	-0.50	-1.00	-1.00	0.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00

Initial Supporting table - ZeroTorqueEngLoad

Description: Used for P0300-P0308. %of Max Brake Torque that represents Zero Brake torque along the Neutral rev line, as a function of RPM and Baro

Value Units: Percent of Maximum Brake torque (%)

X Unit: RPM

Y Units: Barometric Pressure (kPa)

ZeroTorqueEngLoad - Part 1

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
65	-3.00	-3.00	-3.00	-2.50	-2.50	-3.00	-3.00	-2.50	-2.00	-1.00	-1.00	-1.00	-0.50
75	-2.75	-2.75	-2.75	-2.25	-2.25	-2.75	-2.75	-2.25	-1.75	-0.75	-0.75	-0.75	-0.25
85	-2.50	-2.50	-2.50	-2.00	-2.00	-2.50	-2.50	-2.00	-1.50	-0.50	-0.50	-0.50	0.00
95	-2.25	-2.25	-2.25	-1.75	-1.75	-2.25	-2.25	-1.75	-1.25	-0.25	-0.25	-0.25	0.25
105	-2.00	-2.00	-2.00	-1.50	-1.50	-2.00	-2.00	-1.50	-1.00	0.00	0.00	0.00	0.50

ZeroTorqueEngLoad - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
65	-0.50	-1.00	-1.50	-2.00	-2.00	-1.00	0.00	1.00	2.00	3.00	4.00	5.00	6.00
75	-0.25	-0.75	-1.25	-1.75	-1.75	-0.75	0.25	1.25	2.25	3.25	4.25	5.25	6.25
85	0.00	-0.50	-1.00	-1.50	-1.50	-0.50	0.50	1.50	2.50	3.50	4.50	5.50	6.50
95	0.25	-0.25	-0.75	-1.25	-1.25	-0.25	0.75	1.75	2.75	3.75	4.75	5.75	6.75
105	0.50	0.00	-0.50	-1.00	-1.00	0.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00

Initial Supporting table - P057B KtBRKI_K_CmpltTestPointWeight									
Description:									
y/x	0.000	0.001	0.011	0.025	0.039	0.049	0.078	0.116	1.000
1	0	0	0	0	1	1	1	1	1

Initial Supporting table - P057B KtBRKI_K_FastTestPointWeight									
Description:									
y/x	0.000	0.001	0.011	0.025	0.039	0.049	0.078	0.200	1.000
1	0	0	0	0	1	1	1	1	1

Initial Supporting table - DFCO_CoolEnbIHi_Temp			
Description:			
y/x	-40	0	25
1	10.0	10.0	10.0

Initial Supporting table - DFCO_DsblLo_Vehicle_Speed

Description:		
y/x	CeTCOR_e_NonEcoMode	CeTCOR_e_EcoMode
CeTGRR_e_TransGr1	10	10
CeTGRR_e_TransGr2	10	10
CeTGRR_e_TransGr3	10	10
CeTGRR_e_TransGr4	15	15
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	20.0	20.0
CeTGRR_e_TransGr2	20.0	20.0
CeTGRR_e_TransGr3	20.0	20.0
CeTGRR_e_TransGr4	20.0	20.0
CeTGRR_e_TransGr5	20.0	20.0
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	0.0	0.0
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	-1,750	-1,500	-1,250	-1,000	-700	-500	-300	-100	0
1	500	500	500	50	0	0	0	0	0

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 LD. (no units) (Only PurgeOff cells are used)

Minimum Non-Purge Samples for Purge Vapor Fuel - Part 1

y/x	CeFADR_e_Cell00_PurgOnAirMode 5	CeFADR_e_Cell01_PurgOnAirMode 4	CeFADR_e_Cell02_PurgOnAirMode 3	CeFADR_e_Cell03_PurgOnAirMode 2
1	500	500	500	500

Minimum Non-Purge Samples for Purge Vapor Fuel - Part 2

y/x	CeFADR_e_Cell04_PurgOnAirMode 1	CeFADR_e_Cell05_PurgOnAirMode 0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel
1	500	500	500	500

Minimum Non-Purge Samples for Purge Vapor Fuel - 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	0	0	0	0

Minimum Non-Purge Samples for Purge Vapor Fuel - Part 4

y/x	CeFADR_e_Cell12_PurgOffAirMode 1	CeFADR_e_Cell13_PurgOffAirMode 0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
1	0	0	0	0

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_Cell00_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_NonSelectedCell

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_NonSelectedCell

Initial Supporting table - Startup Engine Coolant adjustment 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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0F37 Fuel Tank Level Normalization for Stuck Open Diagnostic (Canister Pressure- Vacuum Generation)																	
Description: Fuel Tank Level Normalization for Stuck Open Diagnostic (Canister Pressure- Vacuum Generation)																	
Value Units: Stuck open diagnostic test statistic gain value (multiplier)																	
X Unit: Fuel Level (Percent)																	
y/x	0.0	10.0	15.0	20.0	25.0	30.0	40.0	50.0	55.0	60.0	70.0	75.0	80.0	85.0	90.0	95.0	100.0
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 - P0F37 Fuel Tank Level Normalization for Stuck Open Diagnostic (Canister Pressure- Vacuum Relief)																	
Description: Fuel Tank Level Normalization for Stuck Open Diagnostic (Canister Pressure- Vacuum Relief)																	
Value Units: Stuck open diagnostic test statistic gain value (multiplier) X Unit: Fuel Level (Percent)																	
y/x	0.0	10.0	15.0	20.0	25.0	30.0	40.0	50.0	55.0	60.0	70.0	75.0	80.0	85.0	90.0	95.0	100.0
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 - P0F37 Fuel Tank Level Normalization for Stuck Open Diagnostic (Fuel Tank Pressure- Vacuum Generation)																	
Description: Fuel Tank Level Normalization for Stuck Open Diagnostic (Fuel Tank Pressure- Vacuum Generation)																	
Value Units: Stuck open diagnostic test statistic gain value (multiplier) X Unit: Fuel Level (Percent)																	
y/x	0.0	10.0	15.0	20.0	25.0	30.0	40.0	50.0	55.0	60.0	70.0	75.0	80.0	85.0	90.0	95.0	100.0
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 - P0F37 Fuel Tank Level Normalization for Stuck Open Diagnostic (Fuel Tank Pressure- Vacuum Relief)																	
Description: Fuel Tank Level Normalization for Stuck Open Diagnostic (Fuel Tank Pressure- Vacuum Relief)																	
Value Units: Stuck open diagnostic test statistic gain value (multiplier) X Unit: Fuel Level (Percent)																	
y/x	0.0	10.0	15.0	20.0	25.0	30.0	40.0	50.0	55.0	60.0	70.0	75.0	80.0	85.0	90.0	95.0	100.0
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 - 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 (usec)

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	4,939	3,398	2,472	1,569	986	730	561	336	264	165	137	125	91
6	6,445	4,763	3,168	1,654	1,034	825	592	344	286	168	139	136	91
8	7,196	4,977	3,333	1,806	1,104	937	661	352	308	173	151	150	96
10	8,781	5,853	3,404	2,081	1,270	1,061	703	382	342	209	167	167	104
12	10,196	6,948	4,606	2,437	1,494	1,211	789	474	416	257	197	181	120
14	11,463	7,649	5,113	2,646	1,736	1,511	888	588	517	295	228	197	140
16	14,731	9,267	5,286	2,995	2,054	1,814	1,017	695	607	346	266	217	161
18	16,782	10,939	6,756	3,344	2,346	2,099	1,155	809	693	412	306	243	178
20	18,793	11,202	7,234	3,623	2,619	2,351	1,303	931	799	473	352	274	197
22	20,889	12,777	7,723	3,925	2,853	2,521	1,452	1,030	899	550	400	314	222
24	23,744	13,583	8,225	4,251	3,165	2,695	1,587	1,129	1,005	613	440	356	246
26	25,065	14,399	8,734	4,600	3,399	2,873	1,728	1,244	1,111	689	482	387	272
30	27,999	15,705	9,535	5,274	3,848	3,142	1,995	1,434	1,310	809	565	448	317
40	28,000	19,364	11,798	6,879	4,979	3,918	2,665	1,953	1,728	1,099	762	587	443
50	28,000	23,020	14,060	8,460	6,090	4,693	3,388	2,456	2,153	1,374	965	731	554
60	28,000	26,676	16,322	10,042	7,299	5,468	4,100	2,975	2,515	1,644	1,179	858	668
97	28,000	28,000	24,693	16,346	11,432	8,338	6,286	4,868	3,854	2,606	1,823	1,329	1,047

RufCyl_Decel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
3	60	50	37	35	28	20	17	12	11	8	7	6	6
6	60	50	37	35	28	20	17	12	11	8	7	6	6
8	64	53	40	38	32	21	17	12	11	8	7	6	6
10	71	66	42	42	36	23	17	12	10	8	7	6	6
12	83	77	48	51	39	26	17	13	10	8	7	6	6
14	95	89	57	57	46	29	18	13	11	9	7	7	6
16	106	96	67	62	49	31	19	14	12	9	7	7	7
18	123	109	86	70	55	34	21	16	12	10	8	7	7
20	134	123	104	82	63	37	23	17	13	11	8	7	8
22	148	135	130	91	70	40	25	18	14	11	8	8	9
24	159	150	146	105	75	44	28	19	15	12	9	8	9

Initial Supporting table - RufCyl Decel

26	170	163	156	114	84	48	31	21	17	12	9	8	10
30	197	188	179	131	103	55	36	25	20	15	11	9	11
40	259	240	238	185	140	74	47	34	27	21	14	11	13
50	337	299	281	230	179	89	58	42	33	27	18	13	16
60	407	360	323	266	217	103	71	50	41	34	22	15	19
97	722	564	528	434	350	170	113	83	68	56	38	25	29

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 (usec)

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	6,377	3,253	1,877	1,350	876	758	458	342	237	160	126	105	88
6	6,377	3,253	1,934	1,525	906	774	565	409	309	194	147	132	106
8	7,091	3,939	2,560	1,783	1,078	932	653	472	339	235	176	155	108
10	8,647	5,235	3,123	2,313	1,509	1,060	794	547	400	280	225	176	126
12	11,018	6,230	4,115	3,015	2,034	1,280	986	686	485	377	288	189	156
14	15,153	8,725	5,552	3,567	2,733	1,604	1,230	830	604	479	348	238	185
16	17,849	10,611	6,660	4,581	3,368	2,071	1,474	1,002	751	602	408	283	215
18	19,650	13,559	8,688	6,006	3,951	2,599	1,713	1,148	872	721	481	325	243
20	23,026	16,116	10,134	7,155	4,642	3,104	1,925	1,312	999	823	556	374	275
22	27,513	19,112	12,327	8,786	5,471	3,489	2,147	1,440	1,087	926	616	415	304
24	30,000	22,034	13,323	9,087	6,266	3,987	2,311	1,573	1,162	1,014	678	460	334
26	30,000	24,663	14,818	9,952	6,887	4,499	2,494	1,692	1,254	1,098	737	497	370
30	30,000	29,112	18,076	11,851	8,100	5,509	2,950	1,993	1,454	1,293	856	585	433
40	30,000	30,000	23,556	15,181	10,374	7,415	4,190	2,784	2,103	1,768	1,158	809	576
50	30,000	30,000	30,000	18,664	12,888	9,206	5,430	3,541	2,728	2,208	1,471	1,023	727
60	30,000	30,000	30,000	21,385	15,138	10,821	6,615	4,298	3,377	2,718	1,772	1,240	877
97	30,000	30,000	30,000	30,000	23,447	16,831	11,283	7,201	5,771	4,609	2,883	2,038	1,438

RufCyl_Jerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
3	51	52	39	33	31	24	20	16	12	9	8	7	7
6	67	60	42	38	33	24	20	16	12	9	8	7	7
8	78	66	45	41	36	24	20	16	12	9	8	7	7
10	92	77	50	45	40	28	21	16	12	9	9	7	7
12	106	87	61	52	47	30	22	17	12	10	9	7	7
14	113	96	72	60	55	35	25	18	13	11	9	8	8
16	124	108	81	69	62	40	27	18	15	12	10	8	8
18	142	121	89	77	71	45	30	20	16	13	10	9	9
20	155	129	102	86	80	49	33	23	18	14	11	9	9
22	164	138	111	96	88	53	37	24	19	15	11	10	10
24	174	146	119	102	95	57	41	27	21	16	12	11	11

Initial Supporting table - RufCyl Jerk

26	180	157	127	113	103	62	44	29	22	17	13	11	11
30	200	168	137	133	121	70	49	34	26	20	15	13	13
40	298	184	184	183	167	93	67	47	34	27	20	17	17
50	403	248	240	236	210	114	84	59	43	34	26	21	21
60	521	318	300	286	247	137	102	72	53	41	32	25	25
97	995	579	530	474	406	218	168	120	92	68	54	40	40

Initial Supporting table - RufSCD_Decel

Description: Used for P0300-P0308. Crankshaft decel threshold while in SCD mode during 1die 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 altitude shifts, (especially decel and jerk thresholds since they track actual air trapped in cylinder)

Value Units: Delta time per cylinder (usec)

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	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
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
50	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

RufSCD_Decel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	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
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
50	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCD Jerk

Description: Used for P0300-P0308. Crankshaft jerk threshold while in SCD mode during Idle or GPF regen. SCD mode uses smaller windows nearTDC. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usec)

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	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
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
50	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

RufSCD_Jerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	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
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
50	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - Misfire IMEP BinID Load Axis

Description: Cylinder LOAD for defining Y AXIS in Misfire_IMEP_BinID_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	47	113	150	188	225	263	300	338	375	413	450	488	563	750	1,125	1,453	1,828

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	700	1,000	1,300	1,600	1,900	2,200	2,500	2,800	3,000

Initial Supportin table - Misfire_IMEP_BinID_vs_RPM_Load

Description: Misfire calibrations used with Crankshaft Based IMEP (Indicated Mean Effective Pressure) estimation do not interpolate versus speed and load. Instead they use unique calibrations within each small speed load "bin". Each Bin has its own "bin ID". This Bin ID keeps all the Crank Based IMEP estimate calculations and various Misfire calibrations synchronized while minimizing 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) estimation do not interpolate versus speed and load. Instead they use unique calibrations within each small speed load region or "bin". Each Bin has its own "BinID". This BinID keeps all the Crank Based IMEP estimate calculations and various Misfire calibrations synchronized while minimizing 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 MisfireJMEP 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
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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 - 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	0.75	0.75	0.75	0.75	0.79	0.82	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:** Measured Fuel Rail Pressure (MPa)

y/x	0.40	5.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00	25.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	191	172	163	158	154	148	143	137	132	127	119	112	108	104	99	97	95

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:** Measured Fuel Rail Pressure (MPa)

y/x	0.40	5.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00	25.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	605	608	616	620	686	686	686	685	682	677	678	669	671	677	681	683	687

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:** Measured Fuel Rail Pressure (MPa)

y/x	0.40	5.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00	25.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	191	172	163	158	154	148	143	137	132	127	119	112	108	104	99	97	95

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:** Measured Fuel Rail Pressure (MPa)

y/x	0.40	5.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00	25.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	5	8	16	20	86	86	86	85	82	77	78	69	71	77	81	83	87

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	5.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00	25.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

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:** Measured Fuel Rail Pressure (MPa)**Y Units:** Injection Pulse Width (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
5.00	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
8.00	-0.13	-0.13	-0.14	-0.14	-0.14	-0.15	-0.15	-0.16	-0.16	-0.16	-0.17
10.00	-0.07	-0.07	-0.08	-0.08	-0.08	-0.09	-0.09	-0.10	-0.10	-0.10	-0.11
12.00	-0.03	-0.03	-0.03	-0.04	-0.04	-0.05	-0.05	-0.05	-0.06	-0.06	-0.07
14.00	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06	-0.06
16.00	-0.02	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.05	-0.05	-0.05	-0.06
18.00	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06
20.00	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06
22.00	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06
25.00	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06
28.00	-0.02	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.05	-0.05	-0.05	-0.06
30.00	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06	-0.06
32.00	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.05	-0.05	-0.05	-0.06	-0.06
34.00	-0.03	-0.03	-0.03	-0.04	-0.04	-0.05	-0.05	-0.05	-0.06	-0.06	-0.07
35.00	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06	-0.06	-0.06	-0.07
36.00	-0.03	-0.03	-0.04	-0.04	-0.05	-0.05	-0.05	-0.06	-0.06	-0.07	-0.07

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
5.00	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
8.00	-0.17	-0.18	-0.18	-0.18	-0.19	-0.19	-0.20	-0.20	-0.20	-0.20	-0.20
10.00	-0.11	-0.12	-0.12	-0.12	-0.13	-0.13	-0.14	-0.14	-0.14	-0.15	-0.17
12.00	-0.07	-0.07	-0.08	-0.08	-0.09	-0.09	-0.09	-0.10	-0.10	-0.11	-0.13
14.00	-0.06	-0.07	-0.07	-0.08	-0.08	-0.08	-0.09	-0.09	-0.10	-0.10	-0.12
16.00	-0.06	-0.07	-0.07	-0.07	-0.08	-0.08	-0.09	-0.09	-0.09	-0.10	-0.12
18.00	-0.06	-0.06	-0.07	-0.07	-0.08	-0.08	-0.08	-0.09	-0.09	-0.10	-0.12
20.00	-0.06	-0.06	-0.07	-0.07	-0.08	-0.08	-0.08	-0.09	-0.09	-0.10	-0.12
22.00	-0.06	-0.06	-0.07	-0.07	-0.08	-0.08	-0.08	-0.09	-0.09	-0.10	-0.12
25.00	-0.06	-0.06	-0.07	-0.07	-0.08	-0.08	-0.08	-0.09	-0.09	-0.10	-0.12

Initial Supporting table - P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit											
28.00	-0.06	-0.07	-0.07	-0.07	-0.08	-0.08	-0.09	-0.09	-0.09	-0.10	-0.12
30.00	-0.06	-0.07	-0.07	-0.08	-0.08	-0.08	-0.09	-0.09	-0.10	-0.10	-0.12
32.00	-0.07	-0.07	-0.07	-0.08	-0.08	-0.09	-0.09	-0.09	-0.10	-0.10	-0.12
34.00	-0.07	-0.07	-0.08	-0.08	-0.09	-0.09	-0.09	-0.10	-0.10	-0.11	-0.13
35.00	-0.07	-0.08	-0.08	-0.08	-0.09	-0.09	-0.10	-0.10	-0.10	-0.11	-0.13
36.00	-0.07	-0.08	-0.08	-0.09	-0.09	-0.09	-0.10	-0.10	-0.11	-0.11	-0.13
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
5.00	-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
12.00	-0.18	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
14.00	-0.17	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
16.00	-0.17	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
18.00	-0.17	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
20.00	-0.17	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
22.00	-0.17	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
25.00	-0.17	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
28.00	-0.17	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
30.00	-0.17	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
32.00	-0.17	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
34.00	-0.18	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
35.00	-0.18	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
36.00	-0.18	-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: Measured Fuel Rail Pressure (MPa)

Y Units: Injection Pulse Width (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
5.00	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
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
16.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
18.00	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
22.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
25.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
28.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
30.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
32.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
34.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
35.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
36.00	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
5.00	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
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
16.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
18.00	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
22.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
25.00	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											
28.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
30.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
32.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
34.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
35.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
36.00	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
5.00	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
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
16.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
18.00	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
22.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
25.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
28.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
30.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
32.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
34.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
35.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
36.00	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 - 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	2	3	5	5	5	5	5

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	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00

P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F - kaFULO_ _RP**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	4	5
0	3,600	3,600	3,600	3,600	3,600	3,600
1	3,000	3,000	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 2 De																	
Description: Opening Magnitude 2 Delta threshold to detect missing injection pulse																	
Value Units: Opening Magnitude 2 Delta Voltage																	
X Unit: Measured Fuel Rail Pressure																	
y/x	0.40	5.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00	25.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00

P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude 2																	
Description: Opening Magnitude 2 threshold to detect missing injection pulse																	
Value Units: Opening Magnitude 2 Voltage																	
X Unit: Measured Fuel Rail Pressure																	
y/x	0.40	5.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00	25.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00

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	5.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00	25.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00

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	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50

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	1.7305	1.7305	1.7168	1.7148	1.7188	1.7148	1.7168	1.7109	1.7188	1.6758	1.5508	1.4316	1.3008	1.3008	1.3008	1.3008	1.3008

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	2,700	2,900	3,000	3,250	3,500	3,750	4,000	4,250	4,500	4,750	5,000	5,500	6,000	6,500	7,000	7,500	8,500
1	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000

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	0.7500	0.7500	0.9355	0.9355	0.9395	0.9297	0.9395	0.9316	0.9336	0.9004	0.8379	0.7715	0.6953	0.6953	0.6953	0.6953	0.6953

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	2,700	2,900	3,000	3,250	3,500	3,750	4,000	4,250	4,500	4,750	5,000	5,500	6,000	6,500	7,000	7,500	8,500
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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_20KHz

P0325_P0330_OpenMethod_2 - Part 3

y/x	10	11	12	13	14
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 4

y/x	15	16			
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz			

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	0	0	0	0

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	0.640	0.640	0.640	0.642	0.650	0.660	0.700	0.710	0.720	0.730	0.740	0.750	0.800	0.800	0.800	0.800	0.800

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	0.117	0.117	0.119	0.127	0.141	0.150	0.166	0.174	0.182	0.184	0.211	0.225	0.229	0.229	0.229	0.229	0.229

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	0.020	0.020	0.021	0.021	0.029	0.037	0.049	0.059	0.059	0.053	0.070	0.117	0.139	0.139	0.139	0.139	0.139

DIAGNOSTIC SUMMARY TABLES - EPS (Initial DTCs)

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Steering Wheel Angle Sensor	C0460	Check for calibration flag. Emissionsneutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Calibration not learned	Fault Detected	Vehicle Operating Condition DIAGNOSTICENABLE	= Power Assist Available TRUE	10ms	Safety Emissions Neutral Diagnostic - Type C
Steering Wheel Angle Sensor	C0460	Compare steering angle from rotor position to steering angle in system ASIC. Emissionsneutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	If the difference is > 15° or 2.58mm rack position over an 80ms debounce time	x > 15° or x > 2.58mm	Vehicle Operating Condition DIAGNOSTICENABLE Steering Angle Validity	= Power Assist Available TRUE = VALID	80ms	Safety Emissions Neutral Diagnostic - Type C
Steering Wheel Angle Sensor	C0460	Internal steering angle compared to index value. Emissionsneutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Internal steering angle does not comply with index value, or maximum steering angle is exceeded	x > Mechanical Limitation	Vehicle Operating Condition DIAGNOSTICENABLE Steering Angle Validity	= Power Assist Available TRUE = VALID	1ms	Safety Emissions Neutral Diagnostic - Type C
Steering Wheel Angle Sensor	C0460	Compare steering angle to calculated wheel speed angle. Emissionsneutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Steering angle deviates from calculated wheelspeed angle by more than 150°	1° StAng° WhlSpdAng1>150°	Vehicle Operating Condition DIAGNOSTICENABLE Steering Angle Validity	= Power Assist Available TRUE = VALID	10ms	Safety Emissions Neutral Diagnostic - Type C
Steering Wheel Angle Sensor	C0460	Compare steering angle to calculated wheel speed angle. Emissionsneutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Calculated wheelspeed angle is -90° < y < 90°, and steering angle is x > 150°	-90° < XwhlSpdAng < 90° AND XStAng > 150°	Vehicle Operating Condition DIAGNOSTICENABLE Steering Angle Validity	= Power Assist Available TRUE = VALID	10ms	Safety Emissions Neutral Diagnostic - Type C
Powerpack Hardware	C056D	ECU detects ASIC functionality. Emissionsneutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Error detected in ASIC	Fault Detected	Vehicle Operating Condition DIAGNOSTICENABLE Steering Angle Validity	= Power Assist Available TRUE = VALID	1ms	Safety Emissions Neutral Diagnostic - Type C
Powerpack Hardware	C056D	ECU detects ADC frozen. Emissionsneutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	ADC frozen	Fault Detected	Vehicle Operating Condition DIAGNOSTICENABLE Steering Angle Validity	= Power Assist Available TRUE = VALID	10ms (2 failures, 5ms/sample)	Safety Emissions Neutral Diagnostic - Type C
Powerpack Hardware	C056D	ROM-CRC/ECC-Check. Emissionsneutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Corrupted ROM areas detected	Fault Detected	Vehicle Operating Condition DIAGNOSTICENABLE Steering Angle Validity	= Power Assist Available TRUE = VALID	INSTANT	Safety Emissions Neutral Diagnostic - Type C
Powerpack Hardware	C056D	RAM-CRC/ECC-Check. Emissionsneutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Corrupted RAM areas detected	Fault Detected	Vehicle Operating Condition DIAGNOSTICENABLE Steering Angle Validity	= Power Assist Available TRUE = VALID	35ms	Safety Emissions Neutral Diagnostic - Type C

DIAGNOSTIC SUMMARY TABLES - EPS (Initial DTCs)

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powerpack Hardware	C056D	Built-in self test runs check. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	BIST detects an error	Fault Detected	Vehicle Operating Condition DIAGNOSTICENABLE Steering Angle Validity	= Power Assist Available TRUE = VALID	INSTANT	Safety Emissions Neutral Diagnostic - Type C
Powerpack Hardware	C056D	Safety guardian processor register check. Emissions neutral default action: disable steering angle based auto stop inhibit and perform auto-stops.	Error detected with SGA configuration	Fault Detected	Vehicle Operating Condition DIAGNOSTICENABLE Steering Angle Validity	= Power Assist Available TRUE = VALID	INSTANT	Safety Emissions Neutral Diagnostic - Type C
Powerpack Hardware	C056D	Safety guardian processor register check. Emissions neutral default action: disable steering angle based auto stop inhibit and perform auto-stops.	Error detected with SGA	Fault Detected	Vehicle Operating Condition DIAGNOSTICENABLE Steering Angle Validity	= Power Assist Available TRUE = VALID	INSTANT	Safety Emissions Neutral Diagnostic - Type C
Powerpack Hardware	C056D	Self-test of error handler. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Error detected with self-test of error handler	Fault Detected	Vehicle Operating Condition DIAGNOSTICENABLE Steering Angle Validity	= Power Assist Available TRUE = VALID	100ms	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.
Electronic Control Unit Hardware	B101D	<p>This diagnostic monitors for multiple circuit level failures within the FCM. These include Random Access Memory (RAM), Read Only Memory (ROM), Electrically Erasable Programmable Read-Only Memory (EEPROM) and General Internal Electronic Failures.</p> <p>Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur. This applies to all malfunctions listed within B101D.</p>	<p>The RAM Test Algorithm will cycle through the RAM memory map and verify each bit within each byte of RAM is valid. This is accomplished by writing \$AA, then reading the value back, if the value is not \$AA the DTC will set. If the value is \$AA the algorithm will write \$55, then read the value back, if the value is not \$55 the DTC will set.</p>	<p>For any RAM Memory Address, the written/ready memory value + \$AA or \$55 (for the second pass test)</p>	<p>Vehicle Power Mode</p> <p>Secondary Parameters</p> <p>Virtual Network condition</p> <p>Calibration is Enabled B101D_34_ENABLE</p>	<p>= Any</p> <p>= 9 - 16 V</p> <p>= Any Virtual Network that the ECU participates in is active</p> <p>= TRUE</p>	<p>The RAM Test algorithm will RUN once on Power Up until it completes. This test is run in its entirety or until a fault is detected.</p>	<p>Safety Emissions Neutral Diagnostics - Special Type C</p>
			<p>The Flash Test Algorithm will cycle through the Flash memory map, byte by byte. The algorithm will sum each byte. If the sum is not (0) then the DTC is set.</p>	<p>Checksum # 0</p>	<p>Vehicle Power Mode</p> <p>Secondary Parameters</p> <p>Virtual Network condition</p> <p>Calibration is Enabled B101D_35_ENABLE</p>	<p>= Any</p> <p>= 9 - 16 V</p> <p>= Any Virtual Network that the ECU participates in is active</p> <p>= TRUE</p>	<p>The Flash Test algorithm will run once at Power up until it completes.</p>	
			<p>Each EEPROM block contains a checksum value, if the contents of the EEPROM Block do not evaluate to the corresponding checksum, three attempts to write to EEPROM will occur before setting the DTC.</p> <p>OR</p> <p>Secondary micro</p>	<p>Three failed Checksums</p>	<p>Vehicle Power Mode</p> <p>Secondary Parameters</p> <p>Virtual Network condition</p> <p>Calibration is enabled B101D_36_ENABLE</p>	<p>= Any</p> <p>= 9 - 16 V</p> <p>= Any Virtual Network that the ECU participates in is active</p> <p>= TRUE</p>	<p>The EEPROM Test algorithm is RUN every time EEPROM is updated.</p>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			indicates EEPROM memory failure check.					
			Power Supplies fall out of range for greater than 10 ms: 1.2 V 1.8 V 3.3 V 5.0 V Vcc1 Vcc1	 1.14 < V < 1.26 1.71 < V < 1.89 3.05 < V < 3.57 4.75 < V < 5.25 3.00 < V < 3.60 1.65 < V < 1.94	Vehicle Power Mode Secondary Parameters Virtual Network condition Calibration is enabled B101D_39_ENABLE	= Any = 9 - 16 V = Any Virtual Network that the ECU participates in is active = TRUE	The Voltage Monitoring Algorithm runs every 10 ms. I2C Communication is tested in Powerup. Memory Diagnostics are run on Powerup.	
			No I2C communication between the Imager and Vision Processing Engine then the DTC is set. Additional Failures for the Imager are monitored (Video time-out or Initization of Imager)	Loss of Communication on IC2 network	Vehicle Power Mode Secondary Parameters Virtual Network condition Calibration is enabled B101D_39_ENABLE	= Any = 9 - 16 V = Any Virtual Network that the ECU participates in is active = TRUE	I2C Communication is tested in Powerup.	
			If there is a missing or bad calibration in the Vision Processing Engine then this DTC is set.	Bad or missing calibrations or Vision Processing Engine	Vehicle Power Mode Secondary Parameters Virtual Network condition Calibration is enabled B101D_39_ENABLE	= Any = 9 - 16 V = Any Virtual Network that the ECU participates in is active = TRUE	Memory Diagnostics are run on Powerup.	
			No SPI communication (or faulty communication)	Loss of Communication on SPI	Vehicle Power Mode	= Any	SPI Communication	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			between the Microcontroller and Vision Processing Engine	network	Secondary Parameters Virtual Network condition Calibration is enabled B101D_39_ENABLE	= 9 - 16 V = Any Virtual Network that the ECU participates in is active = TRUE	is tested in Powerup.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electronic Control Unit Software	B101E	<p>This diagnostic monitors for multiple software errors within the FCM. This can include communications, calibrations, or VIN programming.</p> <p>Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur. This applies to all malfunctions listed within B101E.</p>	<p>Internal Communications Failure - No interprocessor communications</p> <p>OR</p> <p>Cyclic redundancy check failure within the Video Processing Engine internal data structure</p> <p>OR</p> <p>Video Processing Engine identifies corruption within internal input signal data storage.</p>	Fault Detected	<p>Vehicle Power Mode</p> <p>Secondary Parameters</p> <p>Virtual Network condition</p> <p>Calibration is enabled B101E_3C_ENABLE</p>	<p>= RUN</p> <p>= 9- 16 V</p> <p>= Any Virtual Network that the ECU participates in is active</p> <p>= TRUE</p>	50 seconds	Safety Emissions Neutral Diagnostics - Special Type C
			Default calibrations are still stored and have not been written	Memory space for calibrations are empty or all OxFF	<p>Vehicle Power Mode</p> <p>Secondary Parameters</p> <p>Virtual Network condition</p> <p>Calibration is enabled B101E_42_ENABLE</p>	<p>= RUN</p> <p>= 9- 16 V</p> <p>= Any Virtual Network that the ECU participates in is active</p> <p>= TRUE</p>	Once on Power Up.	
			VIN stored in EEPROM contains all bytes with OxFF.	Memory space for VINs are ALL OxFF	<p>Vehicle Power Mode</p> <p>Secondary Parameters</p> <p>Virtual Network condition</p> <p>Manufacturing requirement: MIC</p> <p>Calibration is enabled</p>	<p>= RUN</p> <p>= 9- 16 V</p> <p>= Any Virtual Network that the ECU participates in is active</p> <p>>= Manufacturing Enable Counter</p>	Once on Power Up.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					B101E_47_ENABLE	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Power Circuit	B1325	Voltage Out of Range. Upon fault detection, the emissions neutral default action of disabling adaptive cruise control will be enabled.	Supply Voltage to FCM	< 9.0V (+/- 0.5 V)	Vehicle Power Mode Virtual Network condition Calibration is enabled B1325_03_ENABLE	= RUN = Any Virtual Network that the ECU participates in is active = TRUE	1 second	Safety Emissio ns Neutral Diagnost ics - Special Type C
		Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur. This applies to all malfunctions listed within this fault.	Supply Voltage to FCM	> 16.0V (+/-0.5 V)	Vehicle Power Mode Virtual Network condition Calibration is enabled B1325_07_ENABLE	= RUN = Any Virtual Network that the ECU participates in is active = TRUE	0.5 second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Front Camera Module - Long Range Radar Objects Detected Not Plausible	B1A01	Monitors the message 'freshness' for vehicle yaw and vehicle speed provided by the chassis sub-systems. These messages are sent to the Front Camera Module via CAN. Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur.	If last valid message associated with yaw or vehicle speed is older than the defined maximum latency on this signal OR If Internal input signals storage check fails Note: This DTC is set after 3 attempts at resetting the Secondary Micro processor and not passing the DTC criteria	Fault Detected.	Vehicle Power Mode Secondary Parameters Virtual Network condition Manufacturing requirement: MIC Calibration is enabled B1A01_00_ENABLE	= Any = 9 - 16 V = Any Virtual Network that the ECU participates in is active >= Manufacturing Enable Counter = TRUE	Inputs are checked for plausibility at startup and continuously after 0.05 seconds.	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Steering Wheel Controls ACC Gap Up/Down Signal Circuit	B3623	Monitors the 'Lane Keep Assist' Buttons on the steering wheel for Short to Ground and Short to Battery/Open Circuit failures. Stuck buttons are also monitored. Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur. This applies to all malfunctions listed within B3623.	The CAN message for the Cruise Control Switches (as reported by the Body Control Module, over GM High Speed CAN) has not been received for more than 10 seconds OR if those switches are sensed to have an indeterminate value. This is monitored for the Gap switches, Speed up/ down, cancel & resume.	Fault detected (as described in the malfunction criteria)	Vehicle Power Mode Secondary Parameters Virtual Network condition Calibration is enabled B3623_08_ENABLE Five second delay after communication enable	= Run = 9- 16 V = Any Virtual Network that the ECU participates in is active = TRUE	10 seconds	Safety Emissio ns Neutral Diagnost ics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camera Misaligned	B395D	<p>The diagnostic reports the Video Processing Engine's test for Camera alignment. This diagnostic also covers end-of-line (EOL) and in-use alignment.</p> <p>Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur.</p>	<p>Camera Alignment is not successful either at EOL / Service Station</p> <p>OR</p> <p>Video Processing Engine reported camera is out of severe alignment</p>	Fault Detected by Video Processing Engine	<p>Vehicle Power Mode</p> <p>Secondary Parameters</p> <p>Virtual Network condition</p> <p>Manufacturing requirement</p> <p>Calibration is enabled B395D_08_ENABLE</p>	<p>= RUN</p> <p>= 9- 16 V</p> <p>= Any Virtual Network that the ECU participates in is active</p> <p>>= Manufacturing Enable Counter</p> <p>= TRUE</p>	At Power-up and every 0.05 seconds	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Loss of Communications or Invalid Data with Transmission Controller	DID \$05- enm_V BACC_ Manual Inhibit _Reason	This diagnostic monitors critical CAN message frames from the transmission controller to ensure it is communicating. This diagnostic also monitors Invalid data from the transmission controller. Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur. This applies to all malfunctions listed within DID \$18.	CAN message (\$1F5) from the brake control module not received	No activity of Transmission controller signals for 5 or more seconds.	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled for diagnostic	= RUN = Any Virtual Network that the ECU participates in is active = While in the ECU_COMM_Active state = TRUE	< 3.5 s	Safety Emissions Neutral Diagnostics- DID Type
			This diagnostic monitors brake controller CAN frames (\$1F5) for the following faults: - Message Invalid - Checksum Invalid - ARC Invalid - Mask Invalid	Fault detected due to one of the monitoring criteria	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled for diagnostic	= RUN = Any Virtual Network that the ECU participates in is active = While in the ECU_COMM_Active state = TRUE	< 3.5 s	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Loss of Communications or Invalid Data with Brake Control Module	DID \$18-enm_VBACC_Automaticjnhit_Reason	<p>This diagnostic monitors critical CAN message frames from the brake controller to ensure it is communicating. This diagnostic also monitors Invalid data from the brake controller.</p> <p>Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur. This applies to all malfunctions listed within DID \$18</p>	CAN message (\$0C5, \$214, \$1E9) from the brake control module not received	No activity of brake controller signals for 3 or more seconds.	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled for diagnostic	= RUN = Any Virtual Network that the ECU participates in is active = Comms enabled = TRUE	< 3 s	Safety Emissions Neutral Diagnostics- DID Type
			This diagnostic monitors brake controller CAN frames (\$0C5, \$1E9, \$214) for the following faults: - Message Invalid - Checksum Invalid -ARC Invalid - Mask Invalid	Fault detected due to one of the monitoring criteria	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled for diagnostic	= RUN = Any Virtual Network that the ECU participates in is active = Comms enabled = TRUE	< 0.5 s	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Loss of Communications or Invalid Data with Engine Control Module	DID \$18-enm_VBACC_Automaticjnhit_Reason	<p>This diagnostic monitors critical CAN message frames from the engine controller to ensure it is communicating. This diagnostic also monitors Invalid data from the brake controller.</p> <p>Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur. This applies to all malfunctions listed within DID \$18.</p>	CAN message (\$1C4) from the engine controller not received	No activity of engine controller signals for 3 or more seconds.	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled for diagnostic	= RUN = Any Virtual Network that the ECU participates in is active = While in the ECU_COMM_Active state = TRUE	< 3 s	Safety Emissions Neutral Diagnostics- DID Type
			This diagnostic monitors engine controller CAN frames (\$1C4) for the following faults: - Message Invalid - Checksum Invalid - ARC Invalid - Mask Invalid	Fault detected due to one of the monitoring criteria	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled for diagnostic	= RUN = Any Virtual Network that the ECU participates in is active = While in the ECU_COMM_Active state = TRUE	< 0.5 s	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Loss of Communications or Invalid Data with Inertial Measurement Unit	DID \$18-enm_VBACC_Automaticjnhit_Reason	<p>This diagnostic monitors critical CAN message frames from inertial measurement unit to ensure it is communicating. This diagnostic also monitors Invalid data from the inertial measurement unit.</p> <p>Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur. This applies to all malfunctions listed within DID \$18</p>	CAN message \$34C from the inertial measurement unit located within the airbag module is not received	No activity of IMU signals for 3 or more seconds.	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled for diagnostic	= RUN = Any Virtual Network that the ECU participates in is active = While in the ECU_COMM_Active state = TRUE	< 3 s	Safety Emissions Neutral Diagnostics- DID Type
			This diagnostic monitors the \$34C CAN frame for the following faults: - Message Invalid - Checksum Invalid - ARC Invalid - Mask Invalid	Fault detected due to one of the monitoring criteria	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled for diagnostic	= RUN = Any Virtual Network that the ECU participates in is active = While in the ECU_COMM_Active state = TRUE	< 0.5 s	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Loss of Communications or Invalid Data with Steering Angle Sensor	DID \$18-enm_VBACC_Automaticjnhit_Reason	This diagnostic monitors critical CAN message frames from steering angle sensor to ensure it is communicating. This diagnostic also monitors Invalid data from the steering angle sensor.	CAN message \$1E5 from the steering angle sensor located within the electronic steering sensor is not received	No activity of EPS signals for 3 or more seconds.	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled for diagnostic	= RUN = Any Virtual Network that the ECU participates in is active = While in the ECU_COMM_Active state = TRUE	< 3 s	Safety Emissions Neutral Diagnostics- DID Type
		Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur. This applies to all malfunctions listed within DID \$18	This diagnostic monitors the \$1E5 CAN frame for the following faults: - Parameter Invalid - Checksum Invalid - ARC Invalid - Mask Invalid - Calibration Invalid - SAS Type Incorrect	Fault detected due to one of the monitoring criteria	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled for diagnostic	= RUN = Any Virtual Network that the ECU participates in is active = While in the ECU_COMM_Active state = TRUE	0.5 s	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Low Speed CAN Bus Off	DID \$18- enm_V BACC_ Autom aticjn hibit_ Reaso n	Monitors the GM Low Speed CAN bus for a 'Bus-Off' Condition. Upon fault detection, the emissions neutral default action of disabling adaptive cruise control will be enabled.	CAN Bus Failure Detected	= TRUE	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled U0078_00_ENABLE	= OFF, ACCESSORY, RUN = Any Virtual Network that the ECU participates in is active = While in the ECU_COMM_Active state = TRUE	Diagnostic Runs Every 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 Illum.
High Speed CAN Bus Off	U0073	Monitors the GM High Speed CAN bus for a 'Bus-Off' Condition. Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur.	CAN Bus Failure Detected Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur.	= TRUE	Vehicle Power Mode Virtual Network condition ECU Operational condition Calibration is enabled U0073_00_ENABLE	= OFF, ACCESSORY, RUN = Any Virtual Network that the ECU participates in is active = While in the ECU_COMM_Active state = TRUE	Diagnostic Runs Every 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 Illum.
Lost Communicati on with Body Control Module	U0140	<p>This diagnostic monitors critical CAN message frames from Body Control Module to ensure it is communicating.</p> <p>Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur.</p>	Key CAN messages from the Body Control Module are not received	No activity of BCM signals for 3 seconds	<p>Vehicle Power Mode Virtual Network condition</p> <p>ECU Operational condition</p> <p>Calibration is enabled U0140_00_ENABLE</p>	<p>= RUN</p> <p>= Any Virtual Network that the ECU participates in is active</p> <p>= TRUE</p>	3 seconds	Safety Emissio ns Neutral Diagnost ics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Body Control Module	U0422	<p>This diagnostic monitors for failures in message validity, alive rolling counter, and signal protection between the Body Control Module and Front Camera Module.</p> <p>Upon fault detection the emissions neutral default action of disabling adaptive cruise control will occur. This applies to all malfunctions listed within U0422.</p>	<p>This test is considered failed when the application receives a validity bit set to Invalid for any signal that is used for normal functionality from BCM node.</p> <ul style="list-style-type: none"> -Transmission engage validity - Brake pedal Mod travel achieved Status validity - Brake pedal initial travel validity - System Power mode validity - Steering wheel angle validity - Steering wheel angle VDA 	Any signal invalid for 5 seconds	<p>Vehicle Power Mode Virtual Network condition</p> <p>ECU Operational condition</p>	<p>= RUN</p> <p>= Any Virtual Network that the ECU participates in is active</p>	5 seconds	Safety Emissions Neutral Diagnostics - Special Type C
			<p>A sliding window monitors for Alive Counters that are incorrect or not updated.</p> <p>The following messages are monitored:</p> <ul style="list-style-type: none"> -Brake Pedal Switch -Cruise Control Switches 	3 out of 10 missing or incorrect messages	<p>Vehicle Power Mode Virtual Network condition</p> <p>5 second delay after Com_enable and voltage in valid range (9 to 16V)</p> <p>Calibration is enabled U0422_72_ENABLE</p>	<p>= RUN</p> <p>= TRUE</p>	0.15 second out of 0.5 second window	
			<p>A sliding window monitors for Data Protection Calculations that are incorrect or not updated.</p> <p>The following messages are monitored:</p>	3 out of 10 missing or incorrect messages	<p>Vehicle Power Mode Virtual Network condition</p> <p>5 second delay after Com_enable and voltage in valid range (9 to 16V)</p>	= RUN	0.15 second out of 0.5 second window	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			-Brake Pedal Switch -Cruise Control Switches		Calibration is enabled U0422_74_ENABLE	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Primary (Sensor 1) IMU Sensor - Lateral Acceleration Circuit	C0186	This monitor cover various aspects of the lateral acceleration 1 sensor circuit Upon fault detection, the emissions neutral default action of disabling adaptive cruise control will be enabled	Self contious test fails on IMU Chip	Fault Detected	Comm_Enable Operating Voltage DTC Enabled SDM Configuration	= Available = 9.0 - 19.0v = True = True	0.05 s	Safety Non-MIL Emissions Neutral Diagnostic
Primary (Sensor 1) IMU Sensor - Yaw Rate Circuit	C0196	This monitor cover various aspects of the yaw acceleration 1 sensor circuit Upon fault detection, the emissions neutral default action of disabling adaptive cruise control will be enabled	Self contious test fails on IMU Chip	Fault Detected	Comm_Enable Operating Voltage DTC Enabled	= Available = 9.0 - 19.0v = True	0.05 s	Safety Non-MIL Emissions Neutral Diagnostic
		General Failure Upon fault detection, the emissions neutral default action of disabling adaptive cruise control will be enabled (this applies to all failure modes within B101D)	Stuck CPU OR Addressing Error OR Stuck ALU OR Stuck Registers (GPIO, Internal RAM) OR Stuck Clock OR Programming flow/sequence stuck OR Stuck Interrupt/Event Manager	For RAM, ROM and EEPROM errors, CRC is used.	Power Mode DTC	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled	0.02 s	Safety Non-MIL Emissions Neutral Diagnostic
		RAM Failure	Microprocessor ECC test, checksum test	Fault Detected	Power Mode DTC	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
		ROM Failure	Microprocessor ECC test, checksum test	Fault Detected	Power Mode DTC	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled	0.001 s	Safety Non-MIL Emissions Neutral Diagnostic
		Internal Electronic Failure	Sensor, Microprocessor or Power supply Failure	Fault Detected	Power Mode DTC	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled	0.2 s	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_IC_RUNCTC_START	IMU Power up self test failure	Fault Detected	SDM Power	= ON	2 occurrences	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_IC_RUNCTC_ASSERT	IMU Power up self test failure	Fault Detected	SDM Power	= ON	2 occurrences	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_IC_RUNCTC_DEASSERT	IMU Power up self test failure	Fault Detected	SDM Power	= ON	2 occurrences	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
ECU Hardware Performance	B101D	IMU_IC_RUNCAP_START	IMU Power up self test failure	Fault Detected	SDM Power	= ON	2 occurrences	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_IC_RUNCAP	IMU Power up self test failure	Fault Detected	SDM Power	= ON	2 occurrences	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_IC_RUNBIST_START	IMU Power up self test failure	Fault Detected	SDM Power	= ON	2 occurrences	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_IC_RUNBIST	IMU Power up self test failure	Fault Detected	SDM Power	= ON	2 occurrences	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_IC_WRONG_SENSOR	IMU IC reports an incorrect configuration	Fault Detected	SDM Power	= ON	1 occurrence	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_IC_INIT_STAT	IMU IC reports internal error on power up	Fault Detected	SDM Power	= ON	2 occurrences	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_IC_CONFIG	IMU does not accept configuration commands for Filter setting, etc	Fault Detected	SDM Power	= ON	2 occurrences	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_IC_TEMPERATURE	IMU temperature reading out of range	Fault Detected	SDM Power	= ON	0.1 s	Safety Non-MIL Emissions Neutral Diagnostic
		INCORRECT_HSCAN_IC_VDD	VDD outside range	= 5 +/- 0.5V	SDM Power Battery Voltage	= ON = Within normal rage	0.02 s	Safety Non-MIL Emissions Neutral Diagnostic
		IMU_VECTOR_DATA_MISMATCH	HSCAN Data to transmit does not match data requested to transmit	Fault Detected	SDM Power	= ON	0.04 s	Safety Non-MIL Emissions Neutral Diagnostic
ECU Software Performance	B101E	IMU Offset Data failure. IMUs have an offset calculated. This diagnostic will be set if the data for the offset is compromised	Checksum of offset data not correct.	Fault Detected	SDM Power IMU Configuration IMU Rezero	= ON = True = Passed	0.05 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Device Power Circuit	B1325	Voltage Below Threshold The fault will set at the 8V threshold, however the emissions neutral default action of disabling adaptive cruise control will occur until < 5V threshold. This is due to the safety case design .	V Battery	Vbatt < 8 V	Power Mode DTC	= RUN, CRANK or PROLONGATION TIME power mode. = Enabled	1 s	Safety Non-MIL Emissions Neutral Diagnostic
Control Module Communication CAN Bus	U0077	Monitoring to check if the CAN Bus is ON Upon fault detection, the emissions neutral default action of disabling adaptive cruise control will be enabled	CAN Shorted to Ground OR A fault CAN controller	Fault Detected	Power Mode DTC Calibration Comm Enabled Operating Voltage	= OFF, ACC or RUN = Enabled = Active = 9.0 to 19.0v	5 s	Safety Non-MIL Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Backup Transmission Range Command Message Counter Incorrect	C1201	This DTC monitors for an error in communication with the Backup Transmission Range Command Signals.	<p>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:</p> <p>Backup Transmission Range Command ARC and PV</p>	<p>>=8.00 counts out of >= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 5,000.00 milliseconds</p> <p>>=11.00 volts</p> <p><=32.00 volts</p>	Backup Transmission Range Command ARC and PV sample every 50.00 milliseconds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Steering Wheel Angle Sensor Signal Message Counter Incorrect (Emissions Neutral Diagnostic)	C1211	<p>This DTC monitors for an error in the Steering Wheel Angle Sensor Signal Message Counter.</p> <p>Emissions neutral default action is to disable auto-stop inhibits and perform auto-stops as originally intended.</p>	<p>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:</p> <p>Steering Wheel Angle ARC</p> <p>Steering Angle Sensor CSUM</p>	<p>>= 15.00 counts out of >= 18.00 counts</p> <p>>=2.00 counts out of >= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 5,000.00 milliseconds</p> <p>>=11.00 volts</p> <p><=32.00 volts</p>	<p>Steering Wheel Angle ARC samples every 15.00 milliseconds.</p> <p>Steering Angle Sensor CSUM samples every 15.00 milliseconds.</p>	Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lateral Acceleration Sensor Circuit Low	C124F	<p>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.</p> <p>Emission neutral default state sets lateral acceleration signal = 0.0 g.</p>	<p>raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional</p> <p>update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate</p>	<p>— -3.8500 g</p> <p>— -3.8500 g</p> <p>(< 0.5 Q impedance between signal and controller ground)</p>	<p>battery voltage run crank voltage diagnostic monitor enable</p> <p>sensor type is either directly proportional or inversely proportional</p> <p>U0073 fault active U0073 test fail this key on</p>	<p>> 11.00 volts > 11.00 volts = 1 Boolean</p> <p>= CeLATR_e_VoltageDirectProp</p> <p>= FALSE = FALSE</p>	<p>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</p>	<p>Emissions Neutral Diagnostic - Type C</p>

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lateral Acceleration Sensor Circuit High	C1250	<p>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.</p> <p>Emission neutral default state sets lateral acceleration signal = 0.0 g.</p>	<p>raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional</p> <p>update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate</p>	<p>> 3.8500 g</p> <p>< 3.8500 g</p> <p>(< 0.5 Q impedance between signal and controller power)</p>	<p>battery voltage run crank voltage diagnostic monitor enable</p> <p>sensor type is either directly proportional or inversely proportional</p> <p>U0073 fault active U0073 test fail this key on</p>	<p>> 11.00 volts > 11.00 volts = 1 Boolean</p> <p>= CeLATR_e_VoltageDirectProp</p> <p>= FALSE = FALSE</p>	<p>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</p>	<p>Emissions Neutral Diagnostic - Type C</p>

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lateral Acceleration Sensor Performance	C1251	<p>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.</p> <p>Emission neutral default state sets lateral acceleration signal = 0.0 g.</p>	<p>ABS(raw lateral acceleration signal) AND ABS(raw lateral acceleration signal)</p> <p>update raw lateral acceleration signal fail, 50 millisecond update rate</p>	<p>> 0.5300 g</p> <p>< 3.8500 g</p>	<p>battery voltage run crank voltage diagnostic monitor enable</p> <p>update raw lateral acceleration signal stability time: TOSS vehicle speed automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnotic 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</p> <p>ABS(raw lateral acceleration signal) update sample time</p> <p>U0073 fault active U0073 test fail this key on DTCs not fault active</p>	<p>> 11.00 volts > 11.00 volts = 1 Boolean</p> <p>> 15.0 KPH = TRUE</p> <p>= TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th</p> <p>< 0.5300 g</p> <p>= FALSE = FALSE VehicleSpeedSensor_FA</p>	<p>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</p>	<p>Emission Neutral Diagnostic - Type C</p>

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Longitudinal Acceleration Sensor Circuit Low	C1252	Controller specific analog circuit diagnoses the raw longitudinal acceleration signal for a short to ground or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	raw longitudinal acceleration signal when sensor type is directly proportional OR raw longitudinal acceleration signal when sensor type is inversely proportional update raw longitudinal acceleration signal stability time, fail and sample time, 50 millisecond update rate	— -3.8500 g > -3.8500 g (< 0.5 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_VoltageDirec tProp = 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	Emissio ns Neutral Diagnost ic - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Longitudinal Acceleration Sensor Circuit High	C1253	Controller specific analog circuit diagnoses the raw longitudinal acceleration signal for a short to power or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	raw longitudinal acceleration signal when sensor type is directly proportional OR raw longitudinal acceleration signal when sensor type is inversely proportional update raw longitudinal acceleration signal stability time, fail and sample time, 50 millisecond update rate	> 3.8500 g < 3.8500 g (< 0.5 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_VoltageDirec tProp = 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	Emissio ns Neutral Diagnost ic - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Longitudinal Acceleration Sensor Performance	C1254	<p>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.</p> <p>Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.</p>	<p>ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal)</p> <p>update raw longitudinal acceleration signal region 1 fail time, 50 millisecond update rate</p>	> 0.0800 g	<p>battery voltage run crank voltage diagnostic monitor enable region 1 specific enable</p> <p>update raw lateral longitudinal acceleration signal stability 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 diagnostic 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)</p> <p>update region 1 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed</p>	<p>> 11.00 volts > 11.00 volts = 1 Boolean = 1 Boolean</p> <p>> 15.0 KPH < 0.5300 g = TRUE = TRUE = TRUE = 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</p>	<p>raw lateral longitudinal acceleration signal stability time > 10.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate</p> <p>region 1 fail time > 4.0 seconds out of region 1 sample time > 5.0 seconds, 50 millisecond update rate</p>	Emission Neutral Diagnostic - Type C

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					update region 2 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	< 0.70 % > 80.0 Nm > 0.1500 g > 0.0 KPH < 0.0 KPH < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	region 2 fail time > 75.0 seconds out of region 2 sample time > 120.0 seconds, 50 millisecond update rate	
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal region 3 fail time, 50 millisecond update rate	> 0.0000 g	battery voltage run crank voltage diagnostic monitor enable region 3 specific enable update raw lateral longitudinal acceleration signal stability 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 diagnosis 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	raw lateral longitudinal acceleration signal stability time > 10.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	

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

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric Park Brake Availability Status Message Counter Incorrect	C1280	This DTC monitors for an error in the Electric Park Brake Availability Status Message Counter.	<p>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:</p> <p>Electric Park Brake Status ARC</p> <p>Electric Park Brake Availability Status PV</p>	<p>>=8.00 counts out of >= 10.00 counts</p> <p>>=2.00 counts out of >= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 5,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 32.00 volts</p>	<p>Electric Park Brake Status ARC samples every 100.00 milliseconds.</p> <p>Electric Park Brake Availability Status PV samples every 100.00 milliseconds.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric Park Brake Application Status Message Counter Incorrect	C1281	This DTC monitors for an error in Electric Park Brake Application Status Message Counter.	<p>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:</p> <p>Electric Park Brake Applied Status PV</p>	<p>>=2.00 counts out of >= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 5,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 32.00 volts</p>	Electric Park Brake Applied Status PV samples every 100.00 milliseconds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration 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. 5.00 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 Illum.
Control Module Not Programmed	P0602	This DTC will be stored if the DEC ECU has not been flash programmed with production software and calibration.	controller not flash programmed calibration	= 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 Illum.
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 Illum.
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 a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	0.40000s			When dual store updates occur.	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal 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 processors.	Time new seed not received exceeded			always running	409.594 seconds	Type A, 1 Trips
			MAIN processor receives seed in wrong order			always running	18 1 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 = 0 CPU 2 enabled = 1 CPU 3 enabled = 0 CPU 4 enabled = 0 CPU 5 enabled = 0 CPU 6 enabled = 0 CPU 7 enabled = 0 CPU 8 enabled = 0 (If 0, this test is disabled)	25 ms	
			2 fails in a row in the MAIN processor's configuration register masks versus known good data			Test is Enabled: 1 (If 0, this test is disabled)	12.5 to 25 ms	
			Checks number of stack over/under flow since last powerup reset >=	5.00		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			Voltage deviation >	0.4950		Test is Enabled: 1 (If 0, this test is disabled)	5 / 10 counts or 0.450 seconds 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 Illum.
			correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occurred 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 occurred 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 RAM variable, 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: 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:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P0606_PSW Sequence Sample f(Loop Time) counts 50 ms/count in the TCM main processor	
			MAIN processor determines a seed has not changed within a specified time period within the 50ms task.	Previous seed value equals current seed value.		Test is Enabled: 1 (If 0, this test is disabled)	Table, f(Loop Time). See supporting tables: P0606_Last Seed Timeout f (Loop Time)	

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

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

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 >= 0.50 seconds	6/12 counts or 2.00 seconds 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 Illum.
Transmission Fluid Temperature (TFT) Sensor Performance	P0711	The diagnostic monitor will verify the time to transmission fluid temperature warm up based on the raw transmission fluid temperature sensor, any intermittent signal that causes multiple unrealistic delta changes (intermittent faults) based on the raw transmission fluid temperature sensor, and, raw transmission fluid temperature sensor signal stuck in valid range.	raw transmission fluid temperature and the transmission fluid temperature warm up time has elapsed	< 15.0 °C	diagnostic monitor enable P0712 NOT fault active P0713 NOT fault active battery voltage run crank voltage warm up test enable TFT rationality diagnostic monitor enabled driver accelerator pedal position engine torque engine speed vehicle speed engine coolant temperature engine coolant temperature raw transmission fluid temperature raw transmission fluid temperature P2818 fault active P2818 test fail this key on DTCs not fault active	= 1 Boolean > 9.00 volts > 9.00 volts = 1 Boolean = VeTFSR_b_TFT_RatlEnbl > 5.0 % > 50.0 Nm > 500.0 RPM > 10.0 KPH > -40.0 °C < 150.0 °C > -273.0 °C < 150.0 °C = FALSE = FALSE	transmission fluid temperature warm up time > transmission fluid temperature warm up time seconds battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						EngineTorqueEstInaccuracy AcceleratorPedalFailure CrankSensor_FA ECT_Sensor_FA VehicleSpeedSensor_FA TFT Warmup Pass P0711 test fail this key on = FALSE = FALSE		
			current transmission fluid temperature string length = previous transmission fluid temperature transmission temperature string length + (raw transmission fluid temperature - previous raw transmission fluid temperature, update rate 100 milliseconds, increment sample count	> 80.0 °C	diagnsotic monitor enable P0712 NOT fault active P0713 NOT fault active battery voltage run crank voltage intermittent test enable	= 1 Boolean >9.00 volts > 9.00 volts = 1 Boolean	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 battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 > 300.0 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 Illum.
Transmission Fluid Temperature Sensor Circuit Low Voltage	P0712	Controller specific analog circuit diagnoses the transmission fluid temperature sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds, converted to a resistance value.	circuit resistance update fail time 1 seconds update rate	< 13.500 Q	diagnostic monitor enable battery voltage run crank voltage run crank voltage in range time	= 1 Boolean > 9.00 volts > 9.00 volts	fail time > 5.00 seconds out of sample time > 6.00 seconds 1 seconds update rate battery voltage in range time > 0.100 seconds run crank voltage in range time > 0.100 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Fluid Temperature Sensor Circuit Low Voltage	P0713	Controller specific analog circuit diagnoses the transmission fluid temperature sensor and wiring for an open circuit or short to voltage failure by comparing a voltage measurement to controller specific voltage thresholds, converted to a resistance value.	circuit resistance update fail time 1 seconds update rate	>284,177.0 Q	diagnostic monitor enable battery voltage run crank voltage run crank voltage in range time	= 1 Boolean > 9.00 volts > 9.00 volts	fail time > 5.00 seconds out of fail time > 6.00 seconds 1 seconds update rate battery voltage in range time > 0.100 seconds run crank voltage in range time > 0.100 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Input Speed Sensor Performance	P0716	Detects unrealistic drop in raw transmission input speed signal RPM. Drop events are counted up to fail threshold. A drop event is defined by a sudden delta change in RPM from one value to a lower value. The raw transmission input speed must achieve a value high enough to record an unrealistic drop sample to sample. Once the drop threshold is met, fail time is accumulated 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 stability 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 > 160.0 RPM > 160.0 RPM < 320.0 RPM > 160.0 RPM > 254.0 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 Illum.
					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 Illum.
Input Speed Sensor Circuit Low Voltage	P0717	Detects no activity in raw transmission input speed signal RPM due to open circuit 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 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	< 100.0 RPM < 475.0 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 sensor must be OBDII to use brake pedal conditional brake pedal position sensor 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_Sevent h > CeCGSR_e_CR_First > 162.0 RPM < CeCGSR_e_CR_Tenth ≥ CeCGSR_e_CR_Sevent h	fail time > 4.00 seconds run crank voltage time > 25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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</p> <p>transmission hydraulic pressure available: engine speed</p> <p>DTCs not fault active</p>	<p>> 263.0 RPM</p> <p>= FALSE = FALSE</p> <p>= 0 Boolean = 1 Boolean</p> <p>> 500.0 RPM</p> <p>EngineTorqueEstInaccuracy</p>	<p>engine speed time > engine speed time for transmission hydraulic pressure available</p>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Performance	P0721	The diagnostic monitor determines if the direction TOSS value is coherent based on the on period time of the directional sensor and TOSS raw. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow TOSS raw RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	TOSS raw direction when TOSS transitional period = FALSE AND TOSS raw direction when TOSS transitional period = FALSE OR TOSS raw when TOSS transitional period = TRUE update fail and sample time 6.26 millisecond update rate	± FORWARD ± REVERSE > 225.0 RPM	service mode \$04 active diagnostic monitor enable TOSS count sample period P0721 fault active P0721 test fail this key on TOSS transitional period detected = FALSE when: on period on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward TOSS transitional period detected = TRUE when: on period on period when direction unknown senor type is directional senor type calibration	= FALSE = 1 Boolean # 0 counts = FALSE = FALSE > 0.4434 seconds < 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds = CeTOSR_e_Directional	fail time > 3.500 seconds out of sample time > 5.000 seconds	Type A, 1 Trips

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR {{Wheel Speed Rationality Enable AND Transfer Case Range Valid AND Vehicle Speed Fault AND Tease state AND Wheel Speed Sensor Present AND Output Speed calculate from wheel speed} TISS/TOSS has single power supply calibration AND TISS AND TISS) OR TISS/TOSS has single power supply calibration AND TISS AND TISS) P0716 test fail this key on P0717 test fail this key on P07BF test fail this key on P07C0 test fail this key on PTO check: PTO enable calibration is FALSE OR	= 0.00 Boolean =TRUE = FALSE != Neutral = TRUE >= 100.00rpm = 0 Boolean < 8,191.9 RPM AND > 475.0 RPM OR = 0 Boolean < 8,191.9 RPM AND > 5,800.0 RPM = FALSE = FALSE = FALSE = FALSE # 1 Boolean	Wheel Speed Rationality met = 0 s counts down from 0.25 s	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(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 EngineTorqueEstInaccura te	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 Illum.
Output Speed Sensor Circuit Intermittent	P0723	Detects unrealistic drop in raw transmission output speed signal RPM. Drop events are counted up to fail threshold. A drop event is defined by a sudden delta change in RPM from one value to a lower value. The raw transmission output speed must achieve a value high enough to record an unrealistic drop sample to sample. Once the drop threshold is met, fail time is accumulated 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.	<p>delta raw transmission output speed = raw transmission output speed previous loop - raw transmission output speed, 25 millisecond update rate</p> <p>Failing criteria depends on below decision tree for failure threshold</p> <p>If 4WD low engaged and wheel speed usage is not enabled Else If Wheel speed usage enabled for failing TOS drop diagnostic</p> <p>Else (Not 4WD and not Wheel Speed usage)</p> <p>If 4WD low is engaged and Wheel speed usage enabled</p>	<p>> 900.0 RPM</p> <p>P0723 Wheel Speed Calc function of output speed</p> <p>> 900.0 RPM</p> <p>> Above threshold * 1.00</p>	<p>service mode \$04 active diagnostic monitor enable</p> <p>transmission engaged state</p> <p>4WD low state</p> <p>PTO check: PTO enable calibration is FALSE OR (PTO enable calibration is TRUE AND PTO active)</p> <p>run crank voltage</p> <p>service fast learn active run crank voltage P077C test fail this key on P077D test fail this key on</p> <p>when PRNDL is moved to</p>	<p>= FALSE = 1 Boolean</p> <p># not engaged</p> <p>= 4WD low state previous loop, 25 millisecond update rate</p> <p># 1 Boolean</p> <p>= 1 Boolean</p> <p>= TRUE</p> <p>> 5.00 volts</p> <p>= FALSE > 9.00 volts = FALSE = FALSE</p>	<p>fail time > 1.500 seconds updated fail event count, fail event count > 5 counts, 25 millisecond update rate</p> <p>transmission engaged state time > P0723 (MY21) transmission engaged state time threshold</p> <p>4WD low change time > 3.0 seconds</p> <p>run crank voltage time > 25 milliseconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					NEUTRAL allow transmission engaged state time before enabling fail evaluation, or, if raw raw transmission output speed is active in NEUTRAL enable fail evaluation: PRNDL OR PRNDL OR PRNDL OR raw transmission output speed OR last valid raw transmission output speed determine if raw transmission input speed is stable: ((raw transmission input speed - raw transmission input speed previous, 25 millisecond update AND raw transmission input speed) OR Wheel speed usage enabled for failing TOS drop diagnostic) OR (TISS/TOSS has single power supply calibration	= CeTRGR_e_PRNDL_Neu tral = CeTRGR_e_PRNDL_Tra nsitional1 N-D transitional = CeTRGR_e_PRNDL_Tra nsitional4 R-N transitional > 250.0 RPM > 250.0 RPM < 4,095.9 RPM > 160.0 RPM = TRUE = 0 Boolean	raw transmission input speed stability time > 2.00 seconds no time required	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND raw transmission input speed) 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 last valid raw transmission output speed OR valid raw transmission output speed (before drop event) Wheel speed usage enabled for failing TOS drop diagnostic AND TOS - Calculated TOS from Wheel Speed 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) transmission hydraulic pressure available: engine speed	= 0.0 RPM = TRUE = TRUE > 89.0 RPM > 89.0 RPM = TRUE > 190.00 rpm < 140.0 RPM > 89.0 RPM > 500.0 RPM	raw transmission output speed time > 2.00 seconds stability time > 0.100 seconds engine speed time £	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 Illum.
Pressure Control (PC) Solenoid A Stuck Off	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	<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p> <p>TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled</p> <p>TOM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled</p> <p>service fast learn active</p> <p>service solenoid cleaning</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>> 9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>> 9.00 volts</p> <p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= FALSE Boolean</p>	<p>fail time > 1.00 seconds, update fail count, fail count > 3 counts 6.25 milliscond update</p> <p>battery voltage time > 0.100 seconds</p> <p>run crank voltage time > 0.100 seconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control			procedure active hydraulic pressure available (hydraulic pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) ***** enable C1 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR accelerator pedal position OR	= FALSE Boolean = TRUE > -999.00 kPa = TRUE = TRUE ***** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 89.0 RPM > 2.00 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C1 (GF9 CB123456) clutch pressure control solenoid.			engine speed OR transmission input shaft speed) C1 clutch slip speed valid C1 clutch pressured map (enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear) range shift state ***** DTCs not fault pending DTCs not fault active	> 1,500.0 RPM > 450.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip speed calculation) = mapped to line pressure, C1 clutch pressure has reached fully applied state = 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE = range shift complete ***** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C	> 1.000 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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</p> <p>DTCs not test fail this key on</p> <p>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</p>	<p>P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P178F P17C6 P17C4 P17C7 P172A P172B</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Stuck On	P0747	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C1 clutch slip speed OR shift type is garage shift: C1 clutch slip speed ELSE shift is another type: C1 clutch slip speed update fail time 6.25 milliscond update	< 50.0 RPM < 100.00 RPM < 50.0 RPM			Base fail time: shift type is power down shift: fail time > 0.80 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time > 0.150 seconds Add fail time offset according to shift type: open throttle upshift: Clutch Stuck On Fail Offset Time PU Shifts open throttle downshift: Clutch Stuck On Fail Offset Time PD Shifts garage shift: Clutch Stuck On Fail Offset Time GS Shifts closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>>9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>> 9.00 volts</p>	<p>Clutch Stuck On Fail Offset Time CD Shifts</p> <p>negative torque upshift: Clutch Stuck On Fail Offset Time NU Shifts</p> <p>clutch staging shift: Clutch Stuck On Fail Offset Time STGR Shifts</p> <p>update fail count, fail count > 3 counts 6.25 milliscond update</p> <p>battery voltage time > 0.100 seconds</p> <p>run crank voltage time £ 0.100</p>	

23OBDG03A Part2 TCM Summary Tables

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR C1 off going clutch command pressure)	< 100.0 kPa	shift type: closed throttle upshift: C1 exhaust delay closed throttle lift foot up shift open throttle upshift: C1 exhaust delay open throttle power on up shift garage shifts: C1 exhaust delay garage shift closed throttle downshift: C1 exhaust delay closed throttle down shift negative torque upshift: C1 exhaust delay negative torque up shift open throttle downshift: C1 exhaust delay open throttle power down shift	
					(engine torque AND Primary oncoming stuck	> 8,191.8 Nm = 0 (0 is enable, 1 is		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	enable) = TRUE ± clutch fill phase > pressure clip threshold according to shift type: closed/open throttle upshifts dependent on oncoming clutch: C2 Powered Upshift Tq Based Pres Clip OR C3 Powered Upshift Tq Based Pres Clip OR C4 Powered Upshift Tq Based Pres Clip OR C5 Powered Upshift Tq Based Pres Clip OR C6 Powered Upshift Tq Based Pres Clip coasting downshift dependent on oncoming clutch: C2 Coasting Downshift Tq Based Pres Clip	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: C2_Oncoming Post-Torque Phase Delay OR C3_Oncoming Post-Torque Phase Delay OR C4_Oncoming Post-Torque Phase Delay OR C5_Oncoming Post-Torque Phase Delay OR C6_Oncoming Post-Torque Phase Delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>C1 clutch slip speed valid, all speed sensors are functional for lever node clutch slip speed calculation</p> <p>*****</p> <p>conditions needed to trigger test:</p> <p>(current shift type</p>	<p>OR C3 Coasting Downshift Tq Based Pres Clip</p> <p>OR C4 Coasting Downshift Tq Based Pres Clip</p> <p>OR C5 Coasting Downshift Tq Based Pres Clip</p> <p>OR C6 Coasting Downshift Tq Based Pres Clip</p> <p>clip thresholds for all other shift types:</p> <p>garage shifts: Clutch Clip Press GS Shifts</p> <p>negative torque upshift: Clutch Clip Press NU Shifts</p> <p>open throttle downshift: Clutch Clip Press PD Shifts</p> <p>= TRUE</p> <p>*****</p> <p>+ Garage shift</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND shift type enable cal for current shift type) OR (Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts 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	Clutch Stuck On Shift = Type Enable (0 table value will disable, 1 will enable) = FALSE = 0 (0 will enable, 1 will enable) = NEUTRAL OR commanded gear = 0 (0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 0 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to Teststate or TUT HOLD (see note		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						below about state transitions)		
					***** DTCs not fault pending	***** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 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 *****		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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:</p> <p>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.</p> <p>AND</p> <p>That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold.</p> <p>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:</p> <p>An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently</p>			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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.</p> <p>OR</p> <p>The automatic transmission shift completes, range shift state = range shift complete.</p> <p>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,</p>			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Stuck Off	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	<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p> <p>TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled</p> <p>TOM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled</p> <p>service fast learn active</p> <p>service solenoid cleaning</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>> 9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>> 9.00 volts</p> <p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= FALSE Boolean</p>	<p>fail time > 1.00 seconds, update fail count, fail count > 3 counts 6.25 milliscond update</p> <p>battery voltage time > 0.100 seconds</p> <p>run crank voltage time > 0.100 seconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control			procedure active hydraulic pressure available (hydraulic pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) ***** enable C2 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR accelerator pedal position OR	= FALSE Boolean = TRUE > -999.00 kPa = TRUE = TRUE ***** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 89.0 RPM > 2.00 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C2 (GF9 CB29) 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	> 1,500.0 RPM > 450.0 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 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C	> 1.000 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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</p> <p>DTCs not test fail this key on</p> <p>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</p>	<p>P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P178F P17C6 P17C4 P17C7 P172A P172B</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Stuck On	P0777	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C2 clutch slip speed OR shift type is garage shift: C2 clutch slip speed ELSE shift is another type: C2 clutch slip speed update fail time 6.25 milliscond update	< 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time > 0.80 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time > 0.15 seconds Add fail time offset according to shift type: open throttle upshift: Clutch Stuck On Fail Offset Time PU Shifts open throttle downshift: Clutch Stuck On Fail Offset Time PD Shifts garage shift: Clutch Stuck On Fail Offset Time GS Shifts closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>>9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>> 9.00 volts</p>	<p>Clutch Stuck On Fail Offset Time CD Shifts</p> <p>negative torque upshift: Clutch Stuck On Fail Offset Time NU Shifts</p> <p>clutch staging shift: Clutch Stuck On Fail Offset Time STGR Shifts</p> <p>update fail count, fail count > 3 counts 6.25 millisecond update</p> <p>battery voltage time > 0.100 seconds</p> <p>run crank voltage time £ 0.100</p>	

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>OR</p> <p>C2 off going clutch command pressure)</p> <p>(engine torque AND Primary oncoming stuck on torque enable cal)</p>	<p>< 171 kPa</p> <p>> 8,192 Nm = 0 (0 is enable, 1 is enable)</p>	<p>shift type:</p> <p>closed throttle upshift: C2 exhaust delay open throttle power on up shift</p> <p>open throttle upshift: C2 exhaust delay open throttle power on up shift</p> <p>garage shifts: C2 exhaust delay garage shift</p> <p>closed throttle downshift: C2 exhaust delay closed throttle down shift</p> <p>negative torque upshift: C2 exhaust delay negative torque up shift</p> <p>open throttle downshift: C2 exhaust delay open throttle power down shift</p>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	= TRUE + clutch fill phase > pressure clip threshold according to shift type: closed/open throttle upshifts dependent on oncoming clutch: C1 Powered Upshift Tq Based Pres Clip OR C3 Powered Upshift Tq Based Pres Clip OR C4 Powered Upshift Tq Based Pres Clip OR C5 Powered Upshift Tq Based Pres Clip OR C6 Powered Upshift Tq Based Pres Clip coasting downshift dependent on oncoming clutch: C1 Coasting Downshift Tq Based Pres Clip OR	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: C1 Oncoming Post-Torque Phase Delay OR C3_Oncoming Post-Torque Phase Delay OR C4_Oncoming Post-Torque Phase Delay OR C5_Oncoming Post-Torque Phase Delay OR C6_Oncoming Post-Torque Phase Delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>C2 clutch slip speed valid, all speed sensors are functional for lever node clutch slip speed calculation</p> <p>*****</p> <p>conditions needed to trigger test:</p> <p>(current shift type AND</p>	<p>C3 Coasting Downshift Tq Based Pres Clip</p> <p>OR</p> <p>C4 Coasting Downshift Tq Based Pres Clip</p> <p>OR</p> <p>C5 Coasting Downshift Tq Based Pres Clip</p> <p>OR</p> <p>C6 Coasting Downshift Tq Based Pres Clip</p> <p>clip thresholds for all other shift types:</p> <p>garage shifts: Clutch Clip Press GS Shifts</p> <p>negative torque upshift: Clutch Clip Press NU Shifts</p> <p>open throttle downshift: Clutch Clip Press PD Shifts</p> <p>= TRUE</p> <p>*****</p> <p># Garage shift</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					shift type enable cal for current shift type) OR (Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts 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	Clutch Stuck On Shift = Type Enable (0 table value will disable, 1 will enable) = FALSE = 0 (0 will enable, 1 will enable) = NEUTRAL OR commanded gear = 0 (0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 0 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to Teststate or TUT_HOLD (see note below about state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>transitions)</p> <p>*****</p> <p>DTCs not fault pending</p> <p>DTCs not fault active</p> <p>DTCs not test fail this key on</p> <p>*****</p> <p>NOTE: Clutch control</p>	<p>P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6</p> <p>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</p> <p>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</p> <p>*****</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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:</p> <p>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.</p> <p>AND</p> <p>That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold.</p> <p>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:</p> <p>An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid</p>			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete.</p> <p>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</p>			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit Low	P077C	Controller specific analog circuit diagnoses the transmission output speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission output speed sensor 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 Illum.
Output Speed Sensor Circuit High	P077D	Controller specific analog circuit diagnoses the transmission output speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission output speed sensor 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 Illum.
Pressure Control (PC) Solenoid C Stuck Off	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	<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p> <p>TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled</p> <p>TOM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled</p> <p>service fast learn active</p> <p>service solenoid cleaning</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>> 9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>> 9.00 volts</p> <p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= FALSE Boolean</p>	<p>fail time > 1.00 seconds, update fail count, fail count > 3 counts 6.25 milliscond update</p> <p>battery voltage time > 0.100 seconds</p> <p>run crank voltage time > 0.100 seconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control			procedure active hydraulic pressure available (hydraulic pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) ***** enable C3 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR accelerator pedal position OR	= FALSE Boolean = TRUE > -999.00 kPa = TRUE = TRUE ***** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 89.0 RPM > 2.00 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C3 (GF9 CB38) clutch pressure control solenoid.			engine speed OR transmission input shaft speed) C3 clutch slip speed valid C3 clutch pressured map (enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear) range shift state ***** DTCs not fault pending DTCs not fault active	> 1,500.0 RPM > 450.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip speed calculation) = mapped to line pressure, C3 clutch pressure has reached fully applied state = 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE = range shift complete ***** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C	> 1.000 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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</p> <p>DTCs not test fail this key on</p> <p>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</p>	<p>P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P178F P17C6 P17C4 P17C7 P172A P172B</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Stuck On	P0797	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C3 clutch slip speed OR shift type is garage shift: C3 clutch slip speed ELSE shift is another type: C3 clutch slip speed update fail time 6.25 milliscond update	< 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time > 0.80 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time > 0.15 seconds Add fail time offset according to shift type: open throttle upshift: Clutch Stuck On Fail Offset Time PU Shifts open throttle downshift: Clutch Stuck On Fail Offset Time PD Shifts garage shift: Clutch Stuck On Fail Offset Time GS Shifts closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>>9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>> 9.00 volts</p>	<p>Clutch Stuck On Fail Offset Time CD Shifts</p> <p>negative torque upshift: Clutch Stuck On Fail Offset Time NU Shifts</p> <p>clutch staging shift: Clutch Stuck On Fail Offset Time STGR Shifts</p> <p>update fail count, fail count > 3 counts 6.25 milliscond update</p> <p>battery voltage time > 0.100 seconds</p> <p>run crank voltage time £ 0.100</p>	

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR C3 off going clutch command pressure)	disable) < 115 kPa	shift type: 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 Illum.
					(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/open throttle upshifts dependent on oncoming clutch: C1 Powered Upshift Tq Based Pres Clip OR C2 Powered Upshift Tq Based Pres Clip OR C4 Powered Upshift Tq Based Pres Clip OR C5 Powered Upshift Tq Based Pres Clip OR C6 Powered Upshift Tq Based Pres Clip	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: C1_Oncoming Post-Torque Phase Delay OR C2_Oncoming Post-Torque Phase Delay OR C4_Oncoming Post-Torque Phase Delay OR C5_Oncoming Post-Torque Phase Delay OR C6_Oncoming Post-Torque Phase Delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						coasting downshift dependent on oncoming clutch: C1 Coasting Downshift Tq Based Pres Clip OR C2 Coasting Downshift Tq Based Pres Clip OR C4 Coasting Downshift Tq Based Pres Clip OR C5 Coasting Downshift Tq Based Pres Clip OR C6 Coasting Downshift Tq Based Pres 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 C3 clutch slip speed valid, all speed sensors are functional for lever node clutch slip speed calculation = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>*****</p> <p>conditions needed to trigger test:</p> <p>(current shift type AND shift type enable cal for current shift type)</p> <p>OR</p> <p>(Intrusive shift active AND 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)</p> <p>OR</p> <p>(stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear))</p> <p>clutch stuck off intrusive shift active</p> <p>startle mitigation active (see note on startle mitigation below)</p> <p>(new clutch controller has been initalized</p>	<p>*****</p> <p># Garage shift</p> <p>Clutch Stuck On Shift = Type Enable (0 table value will disable, 1 will enable)</p> <p>= FALSE</p> <p>= 0 (0 will enable, 1 will enable)</p> <p>= NEUTRAL OR commanded gear</p> <p>= 0 (0 to disable, 1 to enable)</p> <p>= FORWARD</p> <p>= a FORWARD gear</p> <p>= 0 (0 to disable, 1 to enable)</p> <p>= REVERSE</p> <p>= REVERSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= TRUE</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR transitioning to a different clutch controller) current clutch solenoid test state ***** DTCs not fault pending DTCs not fault active DTCs not test fail this key on	= TRUE transitions to Teststate or TUT_HOLD (see note below about state transitions) ***** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>*****</p> <p>NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST 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</p>	<p>P17C6 P17C4 P17C7 P172AP172B *****</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete.</p> <p>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</p>			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Input/Turbine Speed Sensor A Circuit Low	P07BF	Controller specific analog circuit diagnoses the transmission input/ turbine speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission input/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 Illum.
Input/Turbine Speed Sensor A Circuit High	P07C0	Controller specific analog circuit diagnoses the transmission input/ turbine speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission input/turbine speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	> 4.7500 volts (< 0.5 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 Illum.
Upshift Switch Circuit	P0815	Diagnoses the state of the upshift switch circuit, stuck in the state "tap up" (upshift) active. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	switch state update fail time 1 100 millisecond update rate	= tap up (upshift) state active	service mode \$04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active P0826 fault active P0826 test fail this key on P0826 fault pending (P0815 fault active OR P0815 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = 1 Boolean > 5.00 volts > 25 milliseconds > 9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE > 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity	fail time 1 > 1.00 seconds	Emissio ns Neutral Diagnost ics - Type C
			switch state update fail time 2 100 millisecond update rate	= tap up (upshift) state active	service mode \$04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active	= FALSE = 1 Boolean > 5.00 volts > 25 milliseconds > 9.00 volts = FALSE	fail time 2 > 120.00 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0826 fault active P0826 test fail this key on P0826 fault pending (P0815 fault active OR P0815 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = FALSE = FALSE = FALSE = FALSE > 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Downshift Switch Circuit	P0816	<p>Diagnoses the state of the downshift switch circuit, stuck in the state "tap down" (downshift) active.</p> <p>Emissions neutral default, disables tap-up tap-down or manual-up manual-down.</p>	switch state update fail time 1 100 millisecond update rate	= tap down (downshift) state active	service mode \$04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active P0826 fault active P0826 test fail this key on P0826 fault pending (P0816 fault active OR P0816 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = 1 Boolean > 5.00 volts > 25 milliseconds > 9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE > 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity	fail time 1 > 1.00 seconds	Emissio ns Neutral Diagnost ics - Type C
			switch state update fail time 2 100 millisecond update rate	= tap down (downshift) state active	service mode \$04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active	= FALSE = 1 Boolean > 5.00 volts > 25 milliseconds > 9.00 volts = FALSE	fail time 2 > 120.00 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0826 fault active P0826 test fail this key on P0826 fault pending (P0816 fault active OR P0816 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = FALSE = FALSE = FALSE = FALSE > 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Up and Down Shift Switch Circuit	P0826	Diagnoses the state of the upshift/downshift switch circuit at an illegal voltage, voltage out of range. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	switch state update fail time 100 millisecond update rate	= illegal (voltage out of range)	service mode \$04 active diagnostic monitor enable run crank voltage run crank voltage P1761 fault active (P0826 fault active OR P0826 fault active test fail this key on)	= FALSE = 1 Boolean > 5.00 volts > 9.00 volts = FALSE = FALSE = FALSE	fail time > 60.00 seconds run crank voltage time > 25 milliseconds	Emissions Neutral Diagnostics - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Control Circuit Open	P0960	Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, 8 speed CB1278R clutch, or CVT secondary pulley solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range indicates an open circuit</p> <p>Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit</p> <p>Increment fail time</p>	> 200 K Q impedance between signal and controller ground	<p>battery voltage</p> <p>(run crank voltage OR accessory voltage active OR Power Mode)</p> <p>diagnostic monitor enable calibration</p> <p>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)</p> <p>OR</p> <p>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)</p> <p>OR</p> <p>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)</p>	<p>> 9.00 volts and < 32.00 volts</p> <p>> 5.00 volts</p> <p>= TRUE</p> <p>= ACCESSORY</p> <p>= 1 (1 is enable, 0 is disable)</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)</p> <p>= ON</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)</p> <p>= ON</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)</p> <p>= ON</p>	<p>fail time > 0.30 seconds out of sample time > 0.50 seconds</p> <p>>1.00 seconds</p> <p>> 25 milliseconds</p> <p>> 12.5 milliseconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Control Circuit 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 > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Control Circuit High	P0963	Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, 8 speed CB1278R clutch, or CVT secondary pulley solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range indicates a short to voltage</p> <p>Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage</p>	<p>< 0.5 Q impedance between signal and controller voltage source</p> <p>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time</p>	<p>battery voltage</p> <p>(run crank voltage OR accessory voltage active OR Power Mode)</p> <p>diagnostic monitor enable calibration</p> <p>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)</p> <p>OR</p> <p>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)</p> <p>OR</p> <p>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)</p>	<p>> 9.00 volts and < 32.00 volts</p> <p>> 5.00 volts</p> <p>= TRUE</p> <p>= ACCESSORY</p> <p>= 1 (1 is enable, 0 is disable)</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON</p>	<p>fail time > 0.30 seconds out of sample time > 0.50 seconds</p> <p>> 1.00 seconds</p> <p>> 25 milliseconds</p> <p>> 12.5 milliseconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Control Circuit 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.	<p>Voltage measurement outside of controller specific acceptable range indicates an open circuit</p> <p>Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit</p>	<p>> 200 K Q impedance between signal and controller ground</p> <p>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time</p>	<p>battery voltage</p> <p>(run crank voltage OR accessory voltage active OR Power Mode)</p> <p>diagnostic monitor enable calibration</p> <p>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)</p> <p>OR</p> <p>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)</p> <p>OR</p> <p>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)</p>	<p>> 9.00 volts and < 32.00 volts</p> <p>> 5.00 volts</p> <p>= TRUE</p> <p>= ACCESSORY</p> <p>= 1 (1 is enable, 0 is disable)</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)</p> <p>= ON</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)</p> <p>= ON</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)</p> <p>= ON</p>	<p>fail time > 0.30 seconds out of sample time > 0.50 seconds</p> <p>6.25 millisecond update rate</p> <p>> 1.00 seconds</p> <p>> 25 milliseconds</p> <p>> 12.5 milliseconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Control Circuit Low	P0966	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch, or CVT primary pulley solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 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 Illum.
Pressure Control (PC) Solenoid B Control Circuit High	P0967	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch, or CVT primary pulley solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range indicates a short to voltage</p> <p>Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage</p>	<p>< 0.5 Q impedance between signal and controller voltage source</p> <p>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time</p>	<p>battery voltage</p> <p>(run crank voltage OR accessory voltage active OR Power Mode)</p> <p>diagnostic monitor enable calibration</p> <p>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)</p> <p>OR</p> <p>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)</p> <p>OR</p> <p>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)</p>	<p>> 9.00 volts and < 32.00 volts</p> <p>> 5.00 volts</p> <p>= TRUE</p> <p>= ACCESSORY</p> <p>= 1 (1 is enable, 0 is disable)</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON</p>	<p>fail time > 0.30 seconds out of sample time > 0.50 seconds</p> <p>> 1.00 seconds</p> <p>> 25 milliseconds</p> <p>> 12.5 milliseconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Control Circuit 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 Illum.
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 > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Control Circuit 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 Illum.
Wheel Speed Sensor Sequence Number Incorrect (Emissions Neutral Diagnostic)	P15FD	This DTC monitors wheel speed signals for an incorrect sequence Emission neutral default state sets wheel speed signals = 0.0.	Communication of the wheel speed sequence numbers from the ABS / Brake Control Module is incorrect. A complete set of sequence numbers has not been received for and this state is continuous for out of a total sample time of	> 10.00 seconds >2.00 seconds > 12.00 seconds	Sequence Number Error DTC is enabled Power Mode Run/Crank Ignition Voltage Driven and non-driven wheel rotational status is currently being received and not failsoft.	Enabled = Run or Crank >=11.00 Volts	Diagnostic executes in 25ms loop.	Emissio ns Neutral Diagnost ics - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Redundant Memory Performance	P16F3	<p>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.</p> <p>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</p>	<p>For each combination of clutches which can lead to an output lock:</p> <p>Commanded Clutch PCS Pressure</p> <p>OR</p> <p>For each combination of clutches which can lead to a multi-clutch tie-up:</p> <p>Commanded Clutch PCS Pressure</p>	<p>\geq Cmnd Tie Up Monitor Output Lock Thresh *</p> <p>Clutch PCS Pressure Gain + Clutch PCS Pressure Offset</p> <p>transfer case range is 4WD Low: \geq Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo *</p> <p>Clutch PCS Pressure Gain + Clutch PCS Pressure Offset</p> <p>Else \geq Cmnd Tie Up Monitor Multi-Clutch Thresh *</p> <p>Clutch PCS Pressure Gain +</p>				Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>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.</p> <p>The command gear/shift fault detection is designed to verify the commanded gear will not induce a downshift resulting in a gear state that is erroneous given vehicle operating conditions. The detection rationalizes the command gear against a minimum gear, highest gear ratio, for given vehicle speed and transfer case range</p>	<p>if above criteria met, increment fail timer by 3.125 6.25 ms update rate</p>	<p>Clutch PCS Pressure Offset</p>	<p>commanded tie up monitor enable calibration</p> <p>vehicle speed OR commanded tie up fault pending OR (vehicle speed AND monitor enabled in previous loop)</p> <p>High Side Driver 1 On High Side Driver 2 On</p> <p>Service Fast Learn OR (Service Fast Learn AND Vehicle Speed)</p> <p>Number of fill factor conditions below which need to be met</p> <p>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)</p> <p>output shaft deceleration</p>	<p>= 1 (1 to enable, 0 to disable)</p> <p>> 5.0 KPH</p> <p>= TRUE</p> <p>> 5.0 KPH</p> <p>= TRUE</p> <p>= TRUE = TRUE</p> <p>= FALSE = TRUE</p> <p>> 8.0 KPH</p> <p>= 2 Filled Clutches</p> <p>> 1.00 > 1.00 > 1.00 > 1.00 > 1.00 > 1.00 > 1.00</p> <p>Transfer case range is 4WD Lo: < -183.1 RPM/sec</p>	<p>when fail timer reaches 100, set DTC</p> <p>>2.50 sec</p>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 < -183.1 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 Illum.
			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 Incorrecct 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	

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Incorrect reverse enable calibration	= 1 (1 to enable, 0 to disable)	Current driver requested range	= previous driver requested range	≥	
			Incrorrect reverse disable calibration	= 0 (0 to enable, 1 to enable)				
		Neutral:			(vehicle speed AND vehicle speed OR Fail Timer)	> -6.00 KPH		
		An invalid combinatio of neutral clutches commanded on*	=	Illegal Park-Neutral Clutch Combinations		> 6.00 KPH		
						> 0.0		
		driver requested range	= Neutral		clutch connectivity detection enable calibration	= 1 (1 to enable, 0 to disable)		
		Incorrect neural enable calibration	= 1 (1 to enable, 0 to disable)		clutch connectivity monitor enable	= 1 (1 to enable, 0 to disable)		
		Incrorrect neutral disable calibration	= 0 (0 to enable, 1 to disable)		OR clutch connectivity monitor disable	= 0 (0 to enable, 1 to disable)		
		Park:						
		An invalid combination of reverse clutches commanded on*	=	Illegal Park-Neutral Clutch Combinations	Service Fast Learn OR (Service Fast Learn AND Vehicle Speed)	= FALSE = TRUE > 8.0 KPH	>2.50 sec	
		driver requested range	= Park		High Side Driver 1 On High Side Driver 2 On	= TRUE = TRUE		
		Incorrect park enable calibration	= 1 (1 to enable, 0 to disable)		DTCs Not Fault Active	P077C, P077D, P0721		
		Incrorrect park disable calibration	= 0 (0 to enable, 1 to disable)		DTCs Not Test Failed This Key On	P0723, P0722, P172A, P172B		
					* Note, clutch is considered "on" when the following conditions are met:			
					Clutch commanded	≥		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					pressure	Clutch Connectivity C1 On Threshold OR \geq Clutch Connectivity C2 On Threshold OR \geq Clutch Connectivity C3 On Threshold OR \geq Clutch Connectivity C4 On Threshold OR \geq Clutch Connectivity C5 On Threshold OR \geq Clutch Connectivity C6 On Threshold OR \geq Clutch Connectivity C7 On Threshold		
					AND 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 > 0.00 kPa		
			ratio monitor fault pending	= TRUE			increment fail timer by	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Output speed direction OR Output speed direction Plus following criteria based on driver requested range: Drive: driver requested range Incorrect drive enable calibration Incorrecr drive disable calibration Reverse: driver requested range Incorrect reverse enable calibration Incorrecr reverse disable calibration Neutral: driver requested range Incorrect neural enable calibration Incorrecr neutral disable calibration Park: driver requested range	= FORWARD = REVERSE = Drive = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable) = Reverse = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to enable) = Neutral = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable) = Park	***** If all conditions below are met, increment ratio monitor fault pending timer: vehicle speed OR vehicle speed (note: fault pending will remain latched if vehicle speed max thresholds are exceeded) Monitor Armed	***** > 0.50 AND < 6.00 KPH <-0.50 AND >-6.00 KPH = TRUE	Ratio Monitor Fail Increment Rate (Percent per Loop) when timer reaches 100, set fault pending Fail time based on driver requested range (once fault pending has matured): 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 Illum.
			Incorrect park enable calibration Incorroct park disable calibration	= 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable)	Measured output speed direction Input speed default 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	= REVERSE or FORWARD = 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)	≥ Incorrect Direction Range Change Delay Time	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Range Shift State OR if Attained Gear enable cal: THEN Attained Gear ALSO Engine Speed Ratio Monitor enable cal OR Ratio Monitor disable cal ***** Direction By Ratio: 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	= Range Shift Complete = 0 (1 to enable, 0 to disable) # Neutral AND # Park > 400 RPM = 0 (1 to enable, 0 to disable) = 1 (0 to enable, 1 to disable) ***** = 1 (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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					***** Direction by Clutch Slip: C1 clutch slip valid C2 clutch slip valid C5 clutch slip valid C3C4 dual clutch slip valid C3C6 dual clutch slip valid C4C6 dual clutch slip valid Direction by Clutch Slip Enable cal (vehicle speed OR vehicle speed) for each clutch: current clutch slip clutch held combination matches a valid gear in: ***** General enables: Genral Ratio Monitor Detection enable cal Transmission Type Service Fast Learn OR (Service Fast Learn AND Vehicle Speed) High Side Driver 1 On	***** = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = 1 (1 to enable, 0 to disable) > 0.50 KPH < -0.50 KPH Ratio Monitor Slip < Threshold (if slip condition met, clutch held = 1, else held = 0) Ratio Monitor Clutch States ***** = 0 (1 to enable, 0 to disable) = RWD 10 Spd Automatic = FALSE = TRUE = TRUE = TRUE = TRUE	>2.50 sec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					High Side Driver 2 On DTCs Not Fault Pending DTCs Not Fault Active DTCs Not Test Failed This Key On	= TRUE P0716, P0717, P07BF, P07C0, P0721, P0722, P0723, P077C, P077D, P172A, P172B, P1783, P17CE P0716, P0717, P07BF, P07C0, P077C, P077D, P0721, P17CE, P1783 P0721, P0722, P0723, P172A, P172B		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Surge Solenoid Circuit Low	P171B	Controller specific transmission surge accumulator control circuit diagnoses the transmission surge accumulator and wiring for a ground short circuit fault by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short Increment fail time	< 0.5 Q impedance between signal and controller ground	battery voltage battery voltage battery enable time run/crank voltage run crank voltage time > diagnostic monitor enable	> 9.00 volts < 32.00 volts > 1.00 seconds > 5.00 volts 25 milliseconds = 1 Boolean	fail time > 0.300 seconds out of sample time > 0.500 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Surge Solenoid Circuit High	P171C	Controller specific transmission surge accumulator control circuit diagnoses the transmission surge accumulator and wiring for a short to voltage circuit fault 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 Increment fail time	< 0.5 Q impedance between signal and controller voltage source	battery voltage battery voltage battery enable time run/crank voltage run crank voltage time diagnostic monitor enable	> 9.00 volts < 32.00 volts > 1.00 seconds > 5.00 volts time > 25 milliseconds = 1 Boolean	fail time >0.100 seconds out of > 0.166 seconds sample time	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Surge Accumulator System Performance	P171D	Detects when the surge accumulator system, used to provide transmission hydraulic pressure, is not capable of supplying adequate hydraulic pressure during an engine auto-start. The transmission holding clutch pressures are commanded to meet the engine crank shaft torque output, to prevent clutch slip to those holding clutches, during the engine auto-start. The diagnostic monitors transmission input shaft speed during the auto-start event as the primary malfunction criteria. Measured input shaft speed that is excessive is an indication the holding clutches are slipping due to inadequate hydraulic pressure, as a result of a failed surge accumulator system.	Transmission turbine speed is greater than predicted turbine speed during autostart event, update initial fail count	P171D predicted > turbine speed error Refer to "Transmission Supporting Tables" for details	PRNDL state defaulted Transmission shift lever position Propulsion system active Ignition voltage Ignition voltage Transmission fluid temp Transmission fluid temp Hybrid state AutoStop duration min During autostop Engine speed was ***** If above conditions are met then the following must occur: Turbine speed Engine speed Hydraulic pressure delay time If above conditions are met then increment time-out timer. Time-out timer Note: The initial fail	= False = Forward range A = True > 9.00 volts < 31.99 volts > 0.00 °C < 110.00 °C = Engine off > 1.200 seconds < 5.0 RPM > 80.0 RPM > 450.0 RPM P171D hydraulic > pressure delay Refer to "Transmission Supporting Tables" for details < 0.38 seconds	> 8 counts (initial fail count) Frequency =12.5ms Once the above counts are achieved then increment the final fail counter once. The final fail counter can only increment once per autostart event > 3 counts (final fail counter) If above counter is greater than threshold then report DTC failed. Frequency = 12.5ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>counter must achieve it's fail threshold in less than the time-out time.</p> <p>*****</p> <p>If vehicle is launched then:</p> <p>Transmission gear ratio</p> <p>Trans 1st gear ratio</p> <p>Trans 1st gear ratio</p> <p>Trans gear ratio not 1st gear</p> <p>Trans gear ratio not 1st gear</p> <p>Valid transmission gear ratio achieved time</p> <p>OR</p> <p>If vehicle is not launched but autostart occurs then:</p> <p>Turbine speed</p> <p>Turbine speed less then above threshold for</p> <p>Note: During an autostart event the lack of hydraulic pressure will result in momentary clutch slip in</p>	<p>= 4.689 1st gear ratio</p> <p>= 3.306 2nd gear ratio</p> <p>= 3.012 3rd gear ratio</p> <p>= 2.446 4th gear ratio</p> <p>= 1.923 5th gear ratio</p> <p>= 1.446 6th gear ratio</p> <p>< 1.120 % of 1st gear ratio</p> <p>> 0.880 % of 1st gear ratio</p> <p>< 1.070 % of gear ratio</p> <p>> 0.930 % of gear ratio</p> <p>> 0.500 seconds</p> <p>< 5.00 RPM</p> <p>> 0.500 seconds</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>the C1234 clutch. After the clutch slip event, the main transmission pump and clutch will gain capacity, clutch slip will go to zero. If the vehicle is launching (moving) then a valid transmission ratio can be achieved. Or if the brake is continually applied and an autostart occurs naturally, then no ratio can be measured. In this case turbine speed will return to near zero rpm.</p> <p>*****</p> <p>DTCs not fault active</p>	<p>CrankSensor_FA Transmission Output Shaft Angular Velocity Validity Transmission Turbine Angular Velocity Validity Transmission Oil Temperature Validity P171A P171B P171C U0101 P182E P1915</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit Forward Direction Error	P172A	The TOS sensor is a directional sensor, and raw TOS direction is rationalized based on attained gear and multiple speed sensors. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. If the raw TOS direction is not a forward gear but attained gear is a forward gear, and, TISS and intermediate speed sensors confirm consistent direction, the raw TOS direction is in error.	(raw TOS direction OR raw TIS direction OR intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	± forward ± forward intermediate speed sensor 1 or 2 # predicted direction intermediate speed sensor 1 or 2 # predicted direction > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnosic 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: diagnosic monitor enable TOSS sensor type must be directional engine speed engine speed time	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM ≥ engine speed time for transmission hydraulic pressure available	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	> 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete > 1.00 seconds		
			(raw TOS direction OR raw TIS direction OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	# forward # forward intermediate speed sensor 1 or 2 ± predicted direction > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete)	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM ≥ engine speed time for transmission hydraulic pressure available >9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					enable time	> 1.00 seconds		
			(raw TOS direction OR raw TIS direction OR intermediate speed sensor 1 direction raw) AND attained gear AND attained gear	# forward ± forward intermediate speed sensor 1 or 2 # predicted direction > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM ≥ engine speed time for transmission hydraulic pressure available > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete > 1.00 seconds	2.50 seconds	
			(raw TOS direction OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	# forward intermediate speed sensor 1 or 2 + predicted direction > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM ≥	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	engine speed time for transmission hydraulic pressure available >9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete > 1.00 seconds		
			(raw TOS direction OR intermediate speed sensor 1 direction raw) AND attained gear AND attained gear	# forward intermediate speed sensor 1 or 2 # predicted direction > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM ≥ engine speed time for transmission hydraulic pressure available > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE	2.50 seconds	

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					range shift state (auto trans shift complete) enable time	= range shift complete > 1.00 seconds		
			(raw TOS direction OR raw TIS direction) AND attained gear AND attained gear	# forward t forward > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnotic 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: diagnotic monitor enable TOSS sensor type must be directional	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional	2.50 seconds	

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Control System - Shift Limiting Active	P175E	The latent fault diagnostic monitors detects when the vehicle has been driven excessively with an emission MIL request. The DTCs requesting the emission MIL are all due to a safety critical system or component fault present in which a DTC is set fault active, test fail this key on or fault pending (fault pending is fail time # 0). The safety critical systems or safety critical components include: transmission input, output and intermediate speed sensors, transmission range sensors, clutch pressure control solenoids including unintended deceleration detected due to clutch pressure control solenoids, driver accelerator pedal position, engine crankshaft position and engine torque. The DTCs for these safety critical systems or safety critical components include both electrical fault DTCs and performance fault DTCs. The latent fault diagnostic monitor	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_WhlSpdBac kUp	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 Illum.
		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	= 200 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 > 200 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 = 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 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 > 10.0 seconds UPDATE TCM range sensor latent fault fail count SET TCM range sensor fault = TRUE TCM range sensor latent fault fail count > 200 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 Illum.
			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 = FALSE = TRUE > 18.0 KPH > 120.0 seconds = TRUE = 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 Illum.
					SET tie-up fault occur = TRUE			
			trans range fault trans range fault occur	= FALSE = TRUE	test enable calibration	= 1 Boolean	trans range fault time > 10.0 seconds	
			RunCrankVoltageMet (‘default gear option active OR (‘default gear option active AND tie-up latent fault fail count))	= TRUE = FALSE = TRUE = 100 counts	RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time	> 5.00 volts > 12.5 milliseconds	UPDATE trans range latent fault fail count SET trans range fault = TRUE	
			UPDATE trans range fault 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	= FALSE = TRUE > 18.0 KPH > 120.0 seconds	trans range latent fault fail count > 100 counts	
			‘default gear option active occurs when emission MIL active due to transmission default gear		IF [(P0717or P07C0 or P07BF fault active or P077D or P077C fault active or P723 test fail this key on or P0723 or P077D or P077C or P0722 fault pending or P0716or P07C0 or P07BF or P0717fault pending or P172B orP172Aor P0721 fault pending or P1783 or P17CE fault active or	= TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE	25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P1783 or P17CE fault pending or P172A or P172B test fail this key on or P0721 fault active) AND (safety diasble cal not FALSE OR safety enable cal TRUE)] OR [(P176C or P160E or P0963 or P078F or P0707 fault pending or P18AA fault active) AND (safety diasble cal not FALSE OR safety enable cal TRUE)] SET trans range fault occur = TRUE	= TRUE = TRUE = TRUE = 1 Boolean = 0 Boolean = TRUE = TRUE = 1 Boolean = 0 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	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Acceleration Sensor Signal Message Counter Incorrect	P175F	<p>The diagnostic monitor detects an alive rolling count error or checksum error in the CAN frame containing the lateral acceleration signal value and longitudinal acceleration sensor signal value.</p> <p>Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.</p>	<p>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:</p> <p>Acceleration Sensor Value ARC</p> <p>Acceleration Sensor CSUM</p>	<p>>= 15.00 counts out of >= 18.00 counts</p> <p>>= 2.00 counts out of >= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 5,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 32.00 volts</p>	<p>Acceleration Sensor Value ARC samples every 60.00 milliseconds.</p> <p>Acceleration Sensor Value CSUM samples every 60.00 milliseconds.</p>	Emission Neutral Diagnostic - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Up and Down Shift Switch Signal Circuit	P1761	<p>The alive rolling count normally cycles 0, 1, 2, and 3 as a serial data periodic frame is processed normally. The diagnostic monitor counts the number of times an alive rolling count error occurs over a period of time. The TCM receives a serial data frame at a periodic rate, during which, the receive data is processed the comparing the current value of the alive rolling count in the frame data to the incremented value of the diagnostic alive rolling count. When the two values of the alive rolling count do not agree, an alive rolling count error has occurred. The error indicator is saved in an array buffer, and when the number of error indicators in the buffer exceed the fail threshold the fail time is allowed to time up.</p> <p>Emissions neutral default, disables tap-up tap-down or manual-up manual-down.</p>	alive rolling count error counter update fail time 100 millisecond update rate	> 3 counts	<p>service mode \$04 active diagnostic monitor enable</p> <p>run crank voltage run crank voltage time</p> <p>up and down shift serial data frame receive occurred</p> <p>when up and down shift serial data frame receive occurred: increment the diagnosis alive rolling count data value, if the diagnosis alive rolling count data value, set alive rolling count error to TRUE,</p> <p>when alive rolling count error AND previous alive rolling count error in 10 element array buffer, increment alive rolling count error counter</p>	<p>= FALSE = 1 Boolean</p> <p>> 9.00 volts > 0.100 seconds</p> <p>= TRUE</p> <p># frame alive rolling count data value</p> <p>= TRUE = FALSE</p>	fail time > 10.00 seconds	Emissions Neutral Diagnostics - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Planetary Gearset Ring Gear Speed Sensor Circuit Range/ Performance	P176B	The diagnostic monitor rationalizes the transmission intermediate shaft speed sensor by using the transmission output shaft output speed sensor and the known ratio between the transmission intermediate shaft speed and the transmission output shaft output speed based on the commanded gear and the transmission lever node design. The estimated transmission intermediate shaft speed is equal to the gear ratio times the transmission output shaft output speed. The absolute value of the delta between the measured transmission intermediate shaft speed and the estimated transmission intermediate shaft speed is used to determine if the measured transmission intermediate shaft speed is rational.	$\text{delta} = \text{ABS}(\text{transmission input speed} - (\text{transmission output speed} * \text{gear ratio commanded}))$ update fail time 25 millisecond update rate	> 25.0 RPM	diagnostic monitor enable speed sensor configuration calibration is single OR dual ratio calibration is function of command gear and intermediate speed sensor when not REVERSE ratio calibration is function of command gear and intermediate speed sensor when REVERSE ***** delay time updates when: estimated transmission intermediate speed (transmission input	= 1 Boolean = CeTNSR_e_NSPD_SingleSpdSnr P176B ratio calibration = when not REVERSE see supporting tables P176B ratio calibration = when REVERSE see supporting tables ***** ≥ P176B minimum estimated transmission intermediate speed to enable fail evaluation	fail time > P176B intermediate speed sensor fail time threshold see supporting tables fail time threshold met increments fail count, fail count > P176B intermediate speed sensor fail count threshold see supporting tables ***** delay time >	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 ***** > 172.0 RPM > 89.0 RPM = nueutral 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 Illum.
					service fast learn active run crank voltage transmission hydraulic pressure available: engine speed	> 9.00 volts > 500.0 RPM	battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds engine speed time > engine speed time for transmission hydraulic pressure available see supporting tables	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Planetary Gearset Ring Gear Speed Sensor Circuit Low	P176C	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sensor 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 Illum.
Transmission Planetary Gearset Ring Gear Speed Sensor Circuit High	P176D	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sensor 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 Illum.
ETRS GMLAN Command Signal Message Incorrect	P1775	This DTC monitors for an error in communication with the ETRS GMLAN Command Signals.	<p>The signal value of the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSLIM) of the following signals received over serial data is incorrect for:</p> <p>ETRS Request ARC</p> <p>ETRS Request PV</p>	<p>>=8.00 counts out of >= 10.00 counts</p> <p>>=2.00 counts out of >= 18.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSLIM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 5,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 32.00 volts</p>	<p>ETRS Request ARC samples every 35.00 milliseconds.</p> <p>ETRS Request PV samples every 35.00 milliseconds.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intermediate Speed Sensor 1 Direction 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 Illum.
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	> 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds		
			intermediate speed sensor 1 direction raw AND TIS direction AND attained gear	intermediate speed sensor 1 or 2 ± predicted direction # FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete)	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM ≥ engine speed time for transmission hydraulic pressure available seconds >9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 Illum.
					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: diagnotic 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 Illum.
					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 Illum.
			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 Illum.
Intermediate Speed Sensor 1 Direction Not Plausible - Reverse	P17C4	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 Illum.
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	> 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds		
			intermediate speed sensor 1 direction raw AND TIS direction AND attained gear	intermediate speed sensor 1 or 2 ± predicted direction # FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete)	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM ≥ engine speed time for transmission hydraulic pressure available seconds >9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 Illum.
					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: diagnotic 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 Illum.
					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 Illum.
			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 Illum.
Intermediate Speed Sensor 1 Direction Error	P17D3	The diagnostic monitor determines if the direction transmission intermediate speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	intermediate speed senor raw direction when transitional period = FALSE AND intermediate speed senor raw direction when transitional period = FALSE OR intermediate speed senor 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 senor count sample period P17D3 fault active OR P17D3 test fail this key on senor type calibration (senor type is directional) transitional period detected = FALSE when: on period OR on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward transitional period detected = TRUE when: on period on period when direction unknown	= FALSE = 1 Boolean # 0 counts = FALSE = FALSE = CeTNSR_e_NSPD_Singl eSpdSnsr > 0.4434 seconds < 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds	fail time > 3.500 seconds out of sample time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission 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 > 8.00 volts > 1.00 seconds = CeTRGR_eJ nternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch A Circuit Low	P17F6	The diagnostic monitor detects a ground short or open circuit fault in the park valve position sensor circuit.	raw sensor voltage	< 0.414 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 8.00 volts > 1.00 seconds = CeTRGR_eJ nternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

23OBDG03A Part2 TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch A Circuit 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 > 8.00 volts > 1.00 seconds = CeTRGR_eJ nternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch B Circuit/Open	P17FA	The diagnostic monitor detects an illegal voltage on the park valve position sensor circuit.	raw sensor voltage raw sensor voltage	> 1.263 volts < 1.504 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 8.00 volts > 1.00 seconds = CeTRGR_eJ nternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

23OBDG03A Part2 TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch 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 battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 8.00 volts > 1.00 seconds = CeTRGR_eJ nternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmis sion 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 > 8.00 volts > 1.00 seconds = CeTRGR_eJ nternalETR S	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Stuck On	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.	<p>ETRS commanded direction AND Diagnostic Park State (see diagnostic park state definition) AND Park Servo Position</p> <p>delay time AND</p> <p>fail time</p> <p>increment fail count</p>	<p>\pm PARK</p> <p>= PARK</p> <p>= PARK</p> <p>\geq Park Valve Stk On Dly Lim</p> <p>\geq Park Valve Stk On Fail Lim</p>	<p>ETRS Performance Diag Enabl (see ETRS performance Diag Enabl description) diagnostic monitor enable High Side Driver 1 High Side Driver 2</p> <p>park servo stuck on available (see park servo stuck on definition)</p> <p>(Mode Valve A command pressure AND (((mode valve A state attained AND STGR Mode Vlv A Position AND P27EC Test Fail This Key On) OR (Mode Valve A Position AND P27EC Test Fail This Key On)) OR Mode Valve A Snsr FP)) OR (Mode Valve B command pressure AND (((mode valve B state attained AND STGR Mode Vlv B Position AND P27EC Test Fail This Key On) OR (Mode Valve B Position AND P27EC Test Fail This Key On)) OR Mode Valve B Snsr FP))</p>	<p>= TRUE</p> <p>= 1.00 Boolean</p> <p>= TRUE</p> <p>= TRUE</p> <p>= TRUE</p> <p>= TRUE</p> <p>> 195.00</p> <p>= TRUE</p> <p>= HIGH</p> <p>= TRUE</p> <p>= HIGH</p> <p>= FALSE</p> <p>= TRUE</p> <p>= TRUE</p> <p>= HIGH</p> <p>= TRUE</p> <p>= HIGH</p> <p>= FALSE</p> <p>= TRUE</p>	<p>fail count > 2.00 counts</p> <p>update rate 6.25 milliseconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					((P17F5, P17F6, P17F7 Fault Active AND P18E7 Test Fail This Key On) OR (P17FA, P17FB, P17FC Fault Active AND P18E8 Test Fail This Key On)) AND P187D, P187E Test Fail This Key On	= FALSE = FALSE = FALSE = FALSE = FALSE		
			ETRS commanded direction AND Diagnostic Park State (see diagnostic park state definition) AND Park Servo Position delay time AND fail time increment fail count	* PARK = OUT OF PARK # OUT OF PARK ≥ Park Valve Stk On Dly Lim >= Park Valve Stk On Fail Lim	ETRS Performance Diag Enabl (see ETRS performance Diag Enabl description) diagnostic monitor enable High Side Driver 1 High Side Driver 2 ((ETRS Hydraulic Pressure Avail (see ETRS Hydraulic Pressure Avail description) OR (ETRS commanded direction AND PISA Fail Count (Mode Valve A position OR Mode Valve B position))) ((P17F5, P17F6, P17F7 Fault Active AND P18E7 Test Fail This Key On AND Park Position Sensor A) AND (P17FA, P17FB, P17FC Fault Active AND P18E8 Test Fail This Key On AND	= TRUE = 1.00 Boolean = TRUE = TRUE = TRUE = NeutLo = 0 # LOW # LOW = FALSE = FALSE # OUT OF PARK = FALSE = FALSE	fail count > 2.00 counts update rate 6.25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Park Position Sensor B)) AND P187D, P187ETest Fail This Key On	# OUT OF PARK = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Stuck Off	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.	<p>ETRS commanded direction</p> <p>Diagnostic Park State (see diagnostic park state description)</p> <p>Park Servo Position</p> <p>IF</p> <p>ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description)</p> <p>(IF</p> <p>0 line pressure command</p> <p>Delay Limit</p> <p>ELSE</p> <p>Delay Limit)</p> <p>ELSE</p> <p>(IF</p> <p>(High Side Driver 1</p> <p>High Side Driver 2</p> <p>Line pressure control in use)</p> <p>Delay Limit</p> <p>ELSE</p> <p>Delay Limit)</p>	<p>= PARK</p> <p>= PARK</p> <p>#PARK</p> <p>= TRUE</p> <p>= TRUE</p> <p>=</p> <p>Park Vlv Stk Off ZL Dly Lim</p> <p>=</p> <p>Park Vlv Stk Off Dly Lim</p> <p>= TRUE</p> <p>= TRUE</p> <p># Diag Max Pressure</p> <p>=</p> <p>Park Vlv Stk Off Eng Off Lim</p> <p>=</p> <p>Park Vlv Stk Off ML Eng Off Lim</p>	<p>ETRS Performance Diag Enabl (see ETRS performance Diag Enabl description)</p> <p>diagnostic monitor enable</p> <p>High Side Driver 1</p> <p>High Side Driver 2</p> <p>(ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) OR</p> <p>ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description)</p> <p>AND</p> <p>Power Mode Prev to ACC)</p> <p>IF</p> <p>(P18E7Test Fail This Key On AND</p> <p>Park Position Sensor A</p> <p>FPAND</p> <p>P17F5, P17F6, P17F7</p> <p>Fault Active AND</p> <p>Park Position Sensor A)</p> <p>ELSE</p> <p>(P18E7Test Fail This Key On OR</p> <p>Park Position Sensor A</p> <p>FPOR</p> <p>P17F5, P17F6, P17F7</p> <p>Fault Active)</p> <p>((P17F5, P17F6, P17F7</p> <p>Fault Active AND</p> <p>P18E7Test Fail This Key On) OR</p> <p>(P17FA, P17FB, P17FC</p> <p>Fault Active AND</p>	<p>= TRUE</p> <p>= 1.00</p> <p>= TRUE</p> <p>= TRUE</p> <p>= TRUE</p> <p>= FALSE</p> <p># OFF</p> <p>= FALSE</p> <p>= FALSE</p> <p>=FALSE</p> <p>#PARK</p> <p>= TRUE</p> <p>= TRUE</p> <p>= TRUE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p>	<p>Delay Time > Delay Limit</p> <p>Increment fail time</p> <p>fail time > Park Valve Stuck Off Fail Lim</p> <p>Increment fail counter</p> <p>Fail counter > 2.00</p> <p>update rate 6.25 milliseconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P18E8 Test Fail This Key On)) AND P187D, P187ETest Fail This Key On	= FALSE = FALSE		
			ETRS commanded direction Diagnostic Park State (see diagnostic park state description) Park Servo Position Park Position Sensor A IF ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) (IF 0 line pressure command Delay Limit ELSE Delay Limit) ELSE IF (High Side Driver 1 High Side Driver 2 Line pressure control in use) Delay Limit ELSE Delay Limit	# PARK = PARK # OUT OF PARK = OUT OF PARK = TRUE = TRUE = Park Vlv Stk Off ZL Dly Lim = Park Vlv Stk Off Dly Lim = TRUE = TRUE # Diag Max Pressure = Park Vlv Stk Off Eng Off Lim = Park Vlv Stk Off ML Eng Off Lim	ETRS Performance Diag Enabl (see ETRS performance Diag Enabl description) diagnostic monitor enable High Side Driver 1 High Side Driver 2 IF P18E7 Test Fail This Key On AND Park Position Sensor A FPAND P17F5, P17F6, P17F7 Fault Active AND Park Position Sensor A ((P17F5, P17F6, P17F7 Fault Active AND P18E7 Test Fail This Key On) OR (P17FA, P17FB, P17FC Fault Active AND P18E8 Test Fail This Key On)) AND P187D, P187ETest Fail This Key On	= TRUE = 1.00 = TRUE = TRUE = FALSE = FALSE =FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE	Delay Time > Delay Limit Increment fail time fail time > Park Valve Stuck Off Fail Lim Increment fail counter Fail counter > 2.00 update rate 6.25 milliseconds	

23OBDG03A Part2 TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			ETRS commanded direction Diagnostic Park State (see diagnostic park state description) Park Servo Position	= PARK = OUT OF PARK #PARK	ETRS Performance Diag Enabl (see ETRS performance Diag Enabl description) diagnostic monitor enable High Side Driver 1 High Side Driver 2	= TRUE = 1.00 = TRUE = TRUE	Delay Time > Delay Limit Increment fail time fail time > Park Valve Stuck Off Fail Lim	
			IF ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description)	= TRUE	IF (((Mode Valve A state attained Or Mode Valve A sensor FP OR P18AB Test Fail This Key On OR P27EC Test Fail This Key On) && Mode Valve A commanded pressure) OR ((Mode Valve B state attained Or Mode Valve B sensor FP OR P18AC Test Fail This Key On OR P27F0 Test Fail This Key On) && Mode Valve B commanded pressure))) OR 0 line pressure command	= TRUE = TRUE <		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					On)) AND P187D, P187ETest Fail This Key On	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Command Message Performance	P189C	The diagnostic monitor detects a failure of the LIN serial communication failure between the TCM and the ECM/CHCM for Electronic Transmission Range Select (ETRS) vehicles.	LIN range command is undetected by TCM based on Rx LIN service function Range Command Secondary Updated	= FALSE set to FALSE as part of normal background time updates, set to TRUE as part of normal LIN service function 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 > 5 milliseconds = FALSE > 5.00 volts > 3,000 milliseconds	P189C fail time > 375 milliseconds	Type B, 2 Trips

23OBDG03A Part2 TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Inhibit Actuator Control Circuit Low	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.	<p>Voltage measurement outside of controller specific acceptable range indicates an open circuit</p> <p>Controller specific circuit voltage thresholds are set to meet the following controller specification for an short to ground circuit</p>	<p>> 200 K Q impedance between signal and controller ground</p> <p>Increment open fail time</p> <p>OR</p> <p>< 0.5 Q impedance between signal and controller ground</p> <p>Increment low fail time</p>	<p>battery voltage</p> <p>run crank voltage OR accessory voltage active</p> <p>(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))</p> <p>(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))</p> <p>solenoid open failure mapped to low DTC</p>	<p>> 9.00 volts and < 32.00 volts</p> <p>> 5.00 volts</p> <p>= TRUE</p> <p>= CeTSCR_e_HSD2</p> <p>= CeTSCR_e_HSD2</p> <p>= CeTSCR_e_HSD2</p> <p>= CeTSCR_e_HSD2</p> <p>see "P18A2 open failure enable"</p>	<p>> 1.000 seconds</p> <p>25 milliseconds</p> <p>12.5 milliseconds</p> <p>open fail time> 0.100 seconds out of open</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					enable calibration solenoid low failure mapped to low DTC enable calibration	= 0 Boolean see "P18A2 low failure enable" = 1 Boolean	sample time > 0.166 seconds low fail time > 0.100 seconds out of low sample time > 0.166 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 Illum.
Transmission Park Inhibit Actuator Control Circuit High	P18A4	Controller specific circuit diagnoses internal ETRS park solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Increment fail time	< 0.5 Q impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active ((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)) solenoid open failure mapped to low DTC enable calibration	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = CeTSCR_e_HSD2 = CeTSCR_e_HSD2 see "P18A4 high failure enable" = 1 Boolean	> 1.000 seconds 25 milliseconds 12.5 milliseconds fail time> 0.100 seconds out of sarnie time > 0.166 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Park Inhibit Solenoid Stuck Off	P18A8	This diagnostic monitor rationalizes the park inhibit solenoid based on the driver ETRS command direction and mode valve states.	((ETRS Command Direction OR ETRS Hydraulic Pressurise Avail (see ETRS hydraulic pressure avail description)) AND Diagnostic Park State (see diagnostic park state definition) AND Park Servo Position) IF (Mode Valve A position Mode Valve B position Park position sensor A Park position sensor B) ELSE IF (PISA Fail Counter Park Servo Position Prev Park Servo Position Park Position Sensor B) SET PISA Stk Off Fault Pending = TRUE IF ETRS Hydraulic Pressurise Avail (see ETRS hydraulic pressure avail description) Fail Count Lim ELSE Fail Count Lim IF PISA Stk Off Fault Pending AND	= NeutLo = FALSE = OUT OF PARK # OUT OF PARK = LOW = LOW = PARK = PARK > 0 = OUT OF PARK # OUT OF PARK = PARK = TRUE = 3.00 = 3.00 = TRUE	ETRS Performance Diag Enabl (see ETRS performance Diag Enabl description) diagnostic monitor enable High Side Driver 1 High Side Driver 2 P18A8 Test Fail This Key On AND (P187E, P187DTest Fail This Key On) AND AND (P18A2, P18A3, P18A4 Fault Active) AND (P17F5, P17F6, P17F7 Fault Active) AND (P17FA, P17FB, P17FC Fault Active) AND (P27EC, P27F0 Test Fail This Key On)	= TRUE = 1.00 = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE	PISA Fail Counter > Fail Count Lim update rate 6.25 milliseconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			PISA Stk Off Fault Pending Increment PISA Fail Counter SET PISA Stk Off Fault Pending = FALSE	= FALSE				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control Valve A Stuck On	P18AA	This diagnostic monitor detects a Mode Valve A Position Sensor State in the "on" or "high" state, which is in error, when commanded hydraulic pressure in the circuit used to move the mode valve is not sufficient to overcome the mode valve return spring force, leaving the mode valve mechanically in the "off" or "low" state.	Mode Valve A Position IF (ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) IF (Mode Valve A Trnstrn Fault Pending AND Mode Valve A St Fnl Fault Pending) MVA Fail Limit ELSE IF (Mode Valve A Trnstrn Fault Pending) MVA Fail Limit ELSE IF (Mode Valve A St Fnl Fault Pending) MVA Fail Limit ELSE	# LOW = TRUE = FALSE = FALSE = Mode Valve A Fail Lim = TRUE = ModeVlvA_TrnstrnDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift) = TRUE = ModeVlvA_FnlDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift)ModeVlvA_ ELSE	ETRS Performance Diag Enabl (see ETRS performance diag enabl description) ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) Auto-Stop Active High Side Driver 1 High Side Driver 2 ETRS commanded direction ((Driver command P2812 Fault Active P2815 Fault Active P0970 Fault Active P2720 Fault Active) OR (Driver command P2814 Fault Active (P0968 Fault Active P0971 Fault Active) OR (P2718 Fault Active P2721 Fault Active))) Mode Enbl Vlv Stk On Test P18AF Test Fail This Key On IF (((Mode Valve A St Attnd (see mode valve A st attnd description) AND Mode Valve A Trnstrn (see mode valve A trnstrn description))AND (Diagnostic Range OR Mode Valve B Trnstrn (see	= TRUE = TRUE = FALSE = TRUE = TRUE # ETRS diagnostic range = Park = FALSE = FALSE = FALSE = FALSE # Park = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = NeutShf = TRUE	When: ((Park is commanded AND fail count >= 2.00) OR (Park is not commanded AND fail count >= 2.00)) update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>IF (High Side Driver 1 AND High Side Driver 2 AND Line pressure Command)</p> <p>MVA Fail Limit</p> <p>ELSE</p> <p>MVA Fail Limit</p> <p>Increment MVA Fail Timer</p> <p>IF (MVA Fail Timer</p> <p>IF (Mode Valve A Trnstn (see mode valve A trnstn description)</p> <p>Set Mode Valve A St Fnl Fault Pending)</p> <p>ELSE</p> <p>(Set Mode Valve A Trnstn Fault Pending))</p> <p>Increment fail counter Set MVA Fail Timer = 0</p>	<p>= TRUE = TRUE # Diag Max Press</p> <p>= Mode Valve A Eng Off Dly Lim</p> <p>= Mode Valve A Eng Off ML Lim</p> <p>> MVA Fail Limit</p> <p>= TRUE</p> <p>= TRUE</p> <p>= TRUE</p> <p>ModeVlvATrnstnDly [ETRS attained range Drive, ETRS command range NeutHi]</p>	<p>mode valve B trnstn description) OR Mode Valve B St Attnd (see mode valve B st attnd description) OR (0 line pressure command AND Mode Valve A Position)))</p> <p>IF Diagnostic Enable AND Mode Valve A pressure command ((ETRS commanded direction AND ETRS diagnostic range AND 0 line pressure command) OR (ETRS commanded direction AND ETRS diagnostic range AND line pressure command)</p> <p>Increment Delay Timer</p> <p>Delay Limit</p> <p>Delay Timer</p> <p>Set Mode Valve A sensor Fault Pending</p> <p>IF</p>	<p>= TRUE</p> <p>= TRUE</p> <p>= HIGH</p> <p>= 1.00 < 25.00</p> <p>± Drive or NeutShf or Park = Drive or NeutShf</p> <p>#TRUE</p> <p>= NeutShf</p> <p>= Drive</p> <p>= 0</p> <p>= ModeVlvA_TrnstnDly [ETRS diagnostic range] [ETRS commanded direction] (see supporting tables for specific delay associated with each shift)</p> <p>> Delay Limit</p>		

[illegible]

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				ModeVlvA_TrnstnDly [ETRS attained range NeutHi, ETRS command range NeutLo] ModeVlvATrnstnDly [ETRS attained range NeutHi, ETRS command range Park] ModeVlvATrnstnDly [ETRS attained range NeutHi, ETRS command range Reverse] ModeVlvA_TrnstnDly [ETRS attained range NeutLo, ETRS command range NeutHi] ModeVlvATrnstnDly [ETRS attained range NeutLo, ETRS command range Park] ModeVlvA_TrnstnDly [ETRS attained range NeutLo, ETRS command range Reverse] ModeVlvA_TrnstnDly [ETRS attained range Park, ETRS command range NeutHi] ModeVlvA_TrnstnDly [ETRS attained range Park, ETRS command range Reverse]	OR ETRS Commanded Dirctn AND Mode Valve A pressure Delay Limit Increment Delay Timer Delay Timer Set Mode Valve A sensor Fault Pending Execute Mode Valve A Fail P18AA Test Fail This Key On P27EB Fault Active P27ED Fault Active P27EE Fault Active P18AB Test Fail This Key On P27EC Test Fail This Key On	= Drive > 195.00 = ModeVlvA_FnIDly [ETRS diagnostic range] [ETRS commanded direction] (see supporting tables for specific delay associated with each shift) > Delay Limit = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE		

23OBDG03A Part2 TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				ModeVlvA_TrnstnDly [ETRS attained range Reverse, ETRS command range NeutHi] ModeVlvATrnstnDly [ETRS attained range Reverse, ETRS command range NeutLo] ModeVlvATrnstnDly [ETRS attained range Reverse, ETRS command range Park] ModeVlvA_FnIDly [ETRS attained range Drive, ETRS command range NeutHi] ModeVlvA_FnIDly [ETRS attained range Drive, ETRS command range NeutLo] ModeVlvA_FnIDly [ETRS attained range Drive, ETRS command range NeutShf] ModeVlvA_FnIDly [ETRS attained range Drive, ETRS command range Park] ModeVlvAFnIDly [ETRS attained range Drive, ETRS command range Reverse]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				ModeVlvA_FnIDly [ETRS attained range NeutHi, ETRS command range Drive] ModeVlvAFnIDly [ETRS attained range NeutHi, ETRS command range NeutLo] ModeVlvAFnIDly [ETRS attained range NeutHi, ETRS command range NeutShf] ModeVlvA_FnIDly [ETRS attained range NeutHi, ETRS command range Park] ModeVlvA_FnIDly [ETRS attained range NeutHi, ETRS command range Reverse] ModeVlvA_FnIDly [ETRS attained range NeutLo, ETRS command range Drive] ModeVlvA_FnIDly [ETRS attained range NeutLo, ETRS command range NeutHi] ModeVlvA_FnIDly [ETRS attained range NeutLo, ETRS command range NeutShf]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				ModeVlvA_FnIDly [ETRS attained range NeutLo, ETRS command range Park] ModeVlvAFnIDly [ETRS attained range NeutLo, ETRS command range Reverse] ModeVlvAFnIDly [ETRS attained range NeutShf, ETRS command range Drive] ModeVlvA_FnIDly [ETRS attained range NeutShf, ETRS command range NeutHi] ModeVlvAFnIDly [ETRS attained range NeutShf, ETRS command range NeutLo] ModeVlvBFnIDly [ETRS attained range NeutShf, ETRS command range Park] ModeVlvB_FnIDly [ETRS attained range NeutShf, ETRS command range Reverse] ModeVlvA_FnIDly [ETRS attained range Park, ETRS command range Drive]				

23OBDG03A Part2 TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				ModeVlvA_FnIDly [ETRS attained range Park, ETRS command range NeutHi] ModeVlvAFnIDly [ETRS attained range Park, ETRS command range NeutShf] ModeVlvAFnIDly [ETRS attained range Park, ETRS command range Reverse] ModeVlvA_FnIDly [ETRS attained range Reverse, ETRS command range Drive] ModeVlvA_FnIDly [ETRS attained range Reverse, ETRS command range NeutHi] ModeVlvA_FnIDly [ETRS attained range Reverse, ETRS command range NeutLo] ModeVlvA_FnIDly [ETRS attained range Reverse, ETRS command range NeutShf] ModeVlvA_TrnstnDly [ETRS attained range Reverse, ETRS command range Park]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Mode Valve A Position ETRS commanded direction AND mode valve A pressure IF (ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail descritpion) IF (Mode Valve A Trnstn Fault Pending AND Mode Valve A St Fnl Fault Pending) MVA Fail Limit Increment MVA Fail Timer	# LOW # Drive or NeutShf <= 25.00 = TRUE = FALSE = FALSE = Mode Valve A Fail Lim	ETRS Performance Diag Enabl (see ETRS performance diag enabl description) ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) ETRS commanded direction P18AA Test Fail This Key On P27EB Fault Active P27ED Fault Active P27EE Fault Active P18AB Test Fail This Key On P27EC Test Fail This Key On IF (Mode Valve A Position OR Mode Valve A Position) Increment Steady State Delay Steady State Delay IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control))	= TRUE = TRUE = ETRS diagnostic range direction = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≠ Mode Valve A Final State # Mode Valve A Command ≥ Mode Vlv StdySt Park Dly Lim = PARK # PARK < 450.00 = Diag Min Press	MVA Fail Timer ≥ MVA Fail Limit update rate 6.25 milleseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Execute Fail ELSE IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control)) Execute Fail ELSE IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control)) Execute Fail ELSE Increment Slip Delay Slip Delay Slip Detected (see mode valve slip detected definition) Execute Fail	= NeutLo = PARK < 450.00 = Diag Min Press = DRIVE REVERSE = PARK > 450.00 # Diag Min Press ≥ ETRS Mode Valve A turbine delay = Slip Detected		
			Mode Valve A Position	# LOW	ETRS Performance Diag Enabl (see ETRS performance diag enabl description) ETRS Hydraulic Pressure Avail (see ETRS hydraulic	= TRUE	IF Mode Valve A Engine Off Fault Pending = TRUE	
			ETRS command direction AND mode valve A pressure	# NeutShf < 195.00		= FALSE	Increment MVA	

23OBDG03A Part2 TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>IF ((High Side Driver 1 AND High Side Driver 2 AND Line Pressure Control)</p> <p>MVA engine off delay lim AND MVA engine off fail lim)</p> <p>ELSE MVA engine off delay lim AND MVA engine off fail lim</p> <p>Increment MVA engine off delay</p> <p>MVA engine off delay</p> <p>Set Mode Valve A Engine Off Fault Pending</p>	<p>= TRUE = TRUE # Diag Max Pres</p> <p>= Mode Valve A Eng Off Dly Lim</p> <p>= Mode Valve A Eng Off ML Lim</p> <p>> MVA engine off delay lim</p> <p>= TRUE</p>	<p>pressure avail description) AND (hydraulic system pressure available OR auto stop active)</p> <p>GF9 engine off diagnosis enable P18AATest Fail This Key On P27EB Fault Active P27ED Fault Active P27EE Fault Active</p>	<p>= FALSE</p> <p>= TRUE</p> <p>= 1.00 Boolean</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p>	<p>engine off fail timer</p> <p>MVA engine off fail timer > MVA engine off fail lime</p> <p>update rate 6.25 milleseconds</p>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control Valve A Stuck Off	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.	Mode Valve A Position ETRS commanded direction AND mode valve A pressure IF (ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) IF (Mode Valve A Trnstrn Fault Pending AND Mode Valve A St Fnl Fault Pending) MVA Fail Limit Increment MVA Fail Timer	# HIGH = Drive OR NeutShf > 195.00 = TRUE = FALSE = FALSE = Mode Valve A Fail Lim	ETRS Performance Diag Enabl (see ETRS performance diag enabl description) ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) ETRS commanded direction P18AATest Fail This Key On P27EB Fault Active AND P27ED Fault Active AND P27EE Fault Active AND P18AB Test Fail This Key On AND P27EC Test Fail This Key On IF (Mode Valve A Position OR Mode Valve A Position) Increment Steady State Delay Steady State Delay IF (ETRS Commanded Dirctn) Execute Fail ELSE IF (ETRS Commanded Dirctn	= TRUE = TRUE = ETRS diagnostic range = FALSE = FALSE = FALSE = FALSE = FALSE ≠ Mode Valve A Final State # Mode Valve A Command ≥ Mode Vlv StdySt Park Dly Lim = NeutShf = NeutLo	MVA Fail Timer ≥ MVA Fail Limit update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					IF (Park Servo State OR Line Pressure OR Line Pressure Control)) Execute Fail ELSE IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control)) Execute Fail ELSE Increment Slip Delay Slip Delay Slip Detected (see mode valve slip detected definition) Execute Fail	= PARK < 450.00 = Diag Min Press = DRIVE REVERSE = PARK > 450.00 # Diag Min Press ≥ ETRS Mode Valve A turbine delay = Slip Detected		
			Mode Valve A Position IF (ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail descritpion) IF (Mode Valve A Trnstrn Fault Pending AND	# HIGH = TRUE = FALSE	ETRS Performance Diag Enabl (see ETRS performance diag enabl description) ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) Auto-Stop Active High Side Driver 1 High Side Driver 2	= TRUE = TRUE = FALSE = TRUE = TRUE	fail count > 2.00 update rate 6.25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Mode Valve A St Fnl Fault Pending)	= FALSE	ETRS commanded direction	t ETRS diagnostic range		
		MVA Fail Limit		=	((Driver command	= Park		
		ELSE IF		Mode Valve A Fail Lim	P2812 Fault Active	= FALSE		
		(Mode Valve A Trnstn Fault Pending)		= TRUE	P2815 Fault Active	= FALSE		
		MVA Fail Limit		= ModeVlvA_TrnstnDly	P0970 Fault Active	= FALSE		
				[ETRS diagnostic range][ETRS commanded direction]	P2720 Fault Active)	= FALSE		
				(see supporting tables for specific delay associated with each shift)	OR	# Park		
		ELSE IF			(Driver command	= FALSE		
		(Mode Valve A St Fnl Fault Pending)		= TRUE	P2814 Fault Active	= FALSE		
		MVA Fail Limit		= ModeVlvA_FnlDly	(P0968 Fault Active	= FALSE		
				[ETRS diagnostic range][ETRS commanded direction]	P0971 Fault Active)	= FALSE		
				(see supporting tables for specific delay associated with each shift)ModeVlvA_	OR	= FALSE		
		ELSE			(P2718 Fault Active	= FALSE		
		IF		= TRUE	P2721 Fault Active)	= FALSE		
		(High Side Driver 1 AND High Side Driver 2 AND Line pressure Command)		= TRUE	Mode Enbl Vlv Stk On Test	= FALSE		
				# Diag Max Press	P18AFTest Fail This Key On	= FALSE		
		MVA Fail Limit		=	IF	= FALSE		
		ELSE		Mode Valve A Eng Off Dly Lim	((Mode Valve A St AttnD (see mode valve A st attnD description) AND Mode Valve A Trnstn (see mode valve A trnstn description))AND (Diagnostic Range OR Mode Valve B Trnstn (see mode valve B trnstn description) OR Mode Valve B St AttnD (see mode valve B st attnD description) OR (0 line pressure command AND Mode Valve A Position)))	= FALSE		
		MVA Fail Limit		=		= FALSE		
						= NeutShf		
						= TRUE		
						= TRUE		
						= TRUE		
						= HIGH		
					IF			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Increment MVA Fail Timer IF (MVA Fail Timer IF (Mode Valve A Trnstn (see mode valve A trnstn description) Set Mode Valve A St Fnl Fault Pending) ELSE (Set Mode Valve A Trnstn Fault Pending)) Increment fail counter Set MVA Fail Timer = 0	Mode Valve A Eng Off ML Lim > MVA Fail Limit = TRUE = TRUE = TRUE ModeVlvA_TrnstnDly [ETRS attained range Drive, ETRS command range NeutShf] ModeVlvA_TrnstnDly [ETRS attained range NeutHi, ETRS command range Drive] ModeVlvA_TrnstnDly [ETRS attained range NeutHi, ETRS command range NeutShf]	Diagnostic Enable AND Mode Valve A pressure command ((ETRS commanded direction OR (ETRS Commanded Dirctn AND ETRS diagnostic range) AND 0 line pressure command) Increment Delay Timer Delay Limit Delay Timer Set Mode Valve A sensor Fault Pending IF (Mode Valve A sensor Fault Pending) IF (ETRS Commanded Dirctn AND ETRS Diagnostic Range) Execute Mode Valve A Fail IF (ETRS Commanded Dirctn AND ETRS Diagnostics Range)	= 1.00 > 195.00 = Drive or NeutShf = NeutLo = Park = FALSE = ModeVlvA_TrnstnDly [ETRS diagnostic range] [ETRS commanded direction] (see supporting tables for specific delay associated with each shift) > Delay Limit = TRUE = TRUE = Drive # Park = Drive or NeutLo = Park		

[illegible]

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control Valve B Stuck On	P18AC	This diagnostic monitor detects a Mode Valve B Position Sensor State in the "on" or "high" state, which is in error, when hydraulic pressure in the circuit used to move the mode valve is not sufficient to overcome the mode valve return spring force, leaving the mode valve mechanically in the "off" or "low" state.	Mode Valve B Position ETRS commanded direction AND mode valve B pressure IF (ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description)) IF (Mode Valve B Trnstn Fault Pending AND Mode Valve B St Fnl Fault Pending) MVB Fail Limit Increment MVA Fail Timer	# LOW = Drive, NeutLo, Park <= 25.00 = TRUE = FALSE = FALSE = Mode Valve B Fail Lim	ETRS Performance Diag Enabl (see ETRS performance diag enabl description) ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) ETRS commanded direction P18AC Test Fail This Key On P27EF Fault Active P27F1 Fault Active P27F2 Fault Active P18AD Test Fail This Key On P27F0 Test Fail This Key On IF (Mode Valve B Position OR Mode Valve B Position) Increment Steady State Delay Steady State Delay IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control))	= TRUE = TRUE = ETRS diagnostic range = FALSE = FALSE = FALSE = FALSE = FALSE ≠ Mode Valve B Final State ≠ Mode Valve B Command ≥ Mode Vlv StdySt Park Dly Lim = PARK # PARK < 450.00 = Diag Min Press	MVB Fail Timer ≥ MVB Fail Limit update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Execute Fail ELSE IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control)) Execute Fail ELSE IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control)) Execute Fail ELSE Increment Slip Delay Slip Delay Slip Detected (see mode valve slip detected definition) Execute Fail	= NeutLo = PARK < 450.00 = Diag Min Press = DRIVE REVERSE = PARK > 450.00 # Diag Min Press ≥ ETRS Mode Valve B turbine delay = Slip Detected		
			Mode Valve A Position IF (ETRS Hydraulic	# LOW = TRUE	ETRS Performance Diag Enabl (see ETRS performance diag enabl description)	= TRUE	When: ((Park is commanded AND	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Pressure Avail (see ETRS hydraulic pressure avail description)		ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description)	= TRUE	fail count >= 2.00)	
			IF (Mode Valve B Trnstn Fault Pending AND Mode Valve A St Fnl Fault Pending)	= FALSE	Auto-Stop Active High Side Driver 1 High Side Driver 2	= FALSE = TRUE = TRUE	OR (Park is not commanded AND fail count >= 2.00 , transition fail >	
			MVB Fail Limit	= Mode Valve B Fail Lim	ETRS commanded direction	± ETRS diagnostic range	update rate 6.25 milliseconds	
			ELSE IF (Mode Valve B Trnstn Fault Pending)	= TRUE	((Driver command P2812 Fault Active P2815 Fault Active P0970 Fault Active P2720 Fault Active) OR (Driver command P2814 Fault Active (P0968 Fault Active P0971 Fault Active) OR (P2718 Fault Active P2721 Fault Active)))	= Park = FALSE = FALSE = FALSE = FALSE		
			MVB Fail Limit	= ModeVlvB_TrnstnDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift)	Mode Enbl Vlv Stk On Test	1 Park = FALSE = FALSE = FALSE		
			ELSE IF (Mode Valve B St Fnl Fault Pending)	= TRUE	P18AFTest Fail This Key On	= FALSE		
			MVB Fail Limit	= ModeVlvB_FnlDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift)ModeVlvA_	IF (((Mode Valve B St Attnd (see mode valve B st attnd description) AND Mode Valve B Trnstn (see mode valve B trnstn description))AND (Diagnostic Range OR Mode Valve A Trnstn (see mode valve A trnstn description) OR Mode Valve A St Attnd	= FALSE = FALSE = NeutShf = TRUE		
			ELSE					
			IF (High Side Driver 1 AND High Side Driver 2 AND	= TRUE = TRUE		= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Line pressure Command) MVB Fail Limit ELSE MVB Fail Limit Increment MVA Fail Timer IF (MVB Fail Timer IF (Mode Valve B Trnstn (see mode valve A trnstn description) Set Mode Valve B St Fnl Fault Pending) ELSE (Set Mode Valve B Trnstn Fault Pending)) Increment fail counter Set MVB Fail Timer = 0	+ Diag Max Press = Mode Valve B Eng Off Dly Lim = Mode Valve B Eng Off ML Lim > MVB Fail Limit = TRUE = TRUE = TRUE ModeVlvB_TrnstnDly [ETRS attained range NeutHi, ETRS command range Drive] ModeVlvBTrnstnDly [ETRS attained range NeutHi, ETRS command range NeutLo]	(see mode valve A st attn description) OR (0 line pressure command AND Mode Valve B Position))) IF Diagnostic Enable AND Mode Valve B pressure command (ETRS commanded direction AND ETRS Diagnostic Range) Increment Delay Timer Delay Limit Delay Timer Set Mode Valve B sensor Fault Pending IF (Mode Valve B sensor Fault Pending AND (ETRS Commanded Dirctn AND (Park Servo Position OR 0 line pressure command)) Execute Mode Valve B Fail	= TRUE = HIGH = 1.00 < 25.00 = Drive, NeutLo, Park = Reverse, NeutHi, NeutShf = ModeVlvB_TrnstnDly [ETRS diagnostic range] [ETRS commanded direction] (see supporting tables for specific delay associated with each shift) > Delay Limit = TRUE = TRUE = Park #PARK = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				ModeVlvB_TrnstnDly [ETRS attained range NeutHi, ETRS command range Park] ModeVlvBTrnstnDly [ETRS attained range NeutShf, ETRS command range Drive] ModeVlvBTrnstnDly [ETRS attained range NeutShf, ETRS command range NeutLo] ModeVlvB_TrnstnDly [ETRS attained range NeutShf, ETRS command range Park] ModeVlvBTrnstnDly [ETRS attained range Reverse, ETRS command range Drive] ModeVlvB_TrnstnDly [ETRS attained range Reverse, ETRS command range NeutLo] ModeVlvB_TrnstnDly [ETRS attained range Reverse, ETRS command range Park] ModeVlvBFnIDly [ETRS attained range Drive, ETRS command range NeutLo]	IF ETRS Commanded Dirctn Execute Mode Valve B Fail) IF ((Mode Valve B Trnstn (see mode valve B trnstn description) AND (Mode Valve A Trnstn (see mode valve A trnstn description) OR Mode Valve A St Attnd (see mode valve A st attnd description) OR P27EC Fault Active OR Mode Valve A sensor Fault Pending) (ETRS commanded direction AND ETRS Diagnostic Range) Increment Delay Timer Final Limit Final Timer Set Mode Valve B sensor Fault Pending IF Mode Valve B sensor	= Drive or NeutLo = TRUE = TRUE = TRUE = TRUE = TRUE = Park or NeutLo = Drive or Park = ModeVlvB_FnIDly [ETRS diagnostic range] [ETRS commanded direction] (see supporting tables for specific delay associated with each shift) > Final Limit = TRUE		

23OBDG03A Part2 TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				ModeVlvBFnIDly [ETRS attained range Drive, ETRS command range Park] ModeVlvBFnIDly [ETRS attained range Park, ETRS command range NeutLo] ModeVlvB_TrnstnDly [ETRS attained range NeutLo, ETRS command range Drive] ModeVlvB_TrnstnDly [ETRS attained range NeutLo, ETRS command range Park] ModeVlvB_TrnstnDly [ETRS attained range Park, ETRS command range Drive] ModeVlvBFnIDly [ETRS attained range Drive, ETRS command range NeutHi] ModeVlvB_FnIDly [ETRS attained range Drive, ETRS command range NeutLo] ModeVlvBFnIDly [ETRS attained range Drive, ETRS command range NeutShf]	Fault Pending Execute Mode Valve B Fail) P18AC Test Fail This Key On P27EF Fault Active P27F1 Fault Active P27F2 Fault Active P18AD Test Fail This Key On P27F0 Test Fail This Key On	 = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				ModeVlvBFnIDly [ETRS attained range Drive, ETRS command range Reverse] ModeVlvBFnIDly [ETRS attained range NeutHi, ETRS command range Drive] ModeVlvBFnIDly [ETRS attained range NeutHi, ETRS command range NeutLo] ModeVlvB_FnIDly [ETRS attained range NeutHi, ETRS command range NeutShf] ModeVlvBFnIDly [ETRS attained range NeutHi, ETRS command range Park] ModeVlvBFnIDly [ETRS attained range NeutHi, ETRS command range Reverse] ModeVlvB_FnIDly [ETRS attained range NeutLo, ETRS command range Drive] ModeVlvBFnIDly [ETRS attained range NeutLo, ETRS command range NeutHi]				

23OBDG03A Part2 TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				ModeVlvBFnIDly [ETRS attained range NeutLo, ETRS command range NeutShf] ModeVlvBFnIDly [ETRS attained range NeutLo, ETRS command range Park] ModeVlvBFnIDly [ETRS attained range NeutLo, ETRS command range Reverse] ModeVlvB_FnIDly [ETRS attained range NeutShf, ETRS command range Drive] ModeVlvB_FnIDly [ETRS attained range NeutShf, ETRS command range NeutHi] ModeVlvBFnIDly [ETRS attained range NeutShf, ETRS command range NeutLo] ModeVlvB_FnIDly [ETRS attained range NeutShf, ETRS command range Park] ModeVlvBFnIDly [ETRS attained range NeutShf, ETRS command range Reverse]				

23OBDG03A Part2 TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				ModeVlvBFnIDly [ETRS attained range Park, ETRS command range Drive] ModeVlvBFnIDly [ETRS attained range Park, ETRS command range NeutHi] ModeVlvBFnIDly [ETRS attained range Park, ETRS command range NeutShf] ModeVlvB_FnIDly [ETRS attained range Park, ETRS command range Reverse] ModeVlvB_FnIDly [ETRS attained range Reverse, ETRS command range Drive] ModeVlvBFnIDly [ETRS attained range Reverse, ETRS command range NeutHi] ModeVlvB_FnIDly [ETRS attained range Reverse, ETRS command range NeutLo] ModeVlvBFnIDly [ETRS attained range Reverse, ETRS command range NeutShf]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				ModeVlvBFnIDly [ETRS attained range Reverse, ETRS command range Park]				
			Mode Valve A Position ETRS command direction AND mode valve B pressure IF ((High Side Driver 1 AND High Side Driver 2 AND Line Pressure Control) MVB engine off delay lim AND MVB engine off fail lim) ELSE MVB engine off delay lim AND MVB engine off fail lim Increment MVB engine off delay MV engine off delay Set Mode Valve B Engine Off Fault Pending	# LOW ± NeutShf, NeutHi, Reverse < 295.00 = TRUE = TRUE # Diag Max Press ≥ Mode Valve B Eng Off Dly Lim ≥ Mode Valve B Eng Off ML Lim > MVB engine off delay lim	ETRS Performance Diag Enabl (see ETRS performance diag enabl description) ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) AND (hydraulic system pressure available OR auto stop active) GF9 engine off diagnsotic enable P18AC Test Fail This Key On P27EF Fault Active P27F1 Fault Active P27F2 Fault Active	= TRUE = FALSE = FALSE = TRUE = 1.00 = FALSE = FALSE = FALSE	IF Mode Valve B Engine Off Fault Pending = TRUE Increment MVB engine off fail timer MVB engine off fail timer > MVB engine off fail lime update rate 6.25 milleseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control Valve B Stuck Off	P18AD	This diagnostic monitor detects a Mode Valve B 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 B Position Sensor State changes correctly with mode valve state command.	<p>Mode Valve B Position</p> <p>ETRS commanded direction AND mode valve B pressure</p> <p>IF (ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description))</p> <p>IF (Mode Valve B Trnstn Fault Pending AND Mode Valve B St Fnl Fault Pending)</p> <p>MVB Fail Limit</p> <p>Increment MVB Fail Timer</p>	<p># HIGH</p> <p>= Reverse, NeutHi, NeutShf > 295.00</p> <p>= TRUE</p> <p>= FALSE</p> <p>= FALSE</p> <p>=</p> <p>Mode Valve B Fail Lim</p>	<p>ETRS Performance Diag Enabl (see ETRS performance diag enabl description)</p> <p>ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description)</p> <p>ETRS commanded direction</p> <p>P18AC Test Fail This Key On</p> <p>P27EF Fault Active</p> <p>P27F1 Fault Active</p> <p>P27F2 Fault Active</p> <p>P18AD Test Fail This Key On</p> <p>P27F0 Test Fail This Key On</p> <p>IF (Mode Valve B Position OR Mode Valve B Position)</p> <p>Increment Steady State Delay</p> <p>Steady State Delay</p> <p>IF (ETRS Commanded Dirctn</p> <p>IF (Park Servo State OR Line Pressure OR Line Pressure Control))</p> <p>Execute Fail</p>	<p>= TRUE</p> <p>= TRUE</p> <p>= ETRS diagnostic range</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>≠</p> <p>Mode Valve B Final State</p> <p># Mode Valve B Command</p> <p>≥</p> <p>Mode Vlv StdySt Park Dly Lim</p> <p>= PARK</p> <p># PARK</p> <p>< 450.00</p> <p>= Diag Min Press</p>	<p>MVB Fail Timer ≥ MVB Fail Limit</p> <p>update rate 6.25 milliseconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>ELSE IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control))</p> <p>Execute Fail</p> <p>ELSE IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control))</p> <p>Execute Fail</p> <p>ELSE Increment Slip Delay Slip Delay</p> <p>Slip Detected (see mode valve slip detected definition)</p> <p>Execute Fail</p>	<p>= NeutLo</p> <p>= PARK < 450.00 = Diag Min Press</p> <p>= DRIVE REVERSE</p> <p>= PARK > 450.00 # Diag Min Press</p> <p>≥ ETRS Mode Valve B turbine delay = Slip Detected</p>		
			<p>Mode Valve A Position</p> <p>IF (ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail descriptpion)</p>	<p># HIGH</p> <p>= TRUE</p>	<p>ETRS Performance Diag Enabl (see ETRS performance diag enabl description)</p> <p>ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description)</p>	<p>= TRUE</p> <p>= TRUE</p>	<p>mode valve B fail count PARK > 2.00 counts</p> <p>mode valve B fail count OUT OF PARK > 2.00 counts</p>	

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			IF (Mode Valve B Trnstn Fault Pending AND Mode Valve A St Fnl Fault Pending) MVB Fail Limit	= FALSE = FALSE = Mode Valve B Fail Lim	Auto-Stop Active High Side Driver 1 High Side Driver 2 ETRS commanded direction	= FALSE = TRUE = TRUE + ETRS diagnostic range	update rate 6.25 milleseconds	
			ELSE IF (Mode Valve B Trnstn Fault Pending) MVB Fail Limit	= TRUE = ModeVlvB_TrnstnDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift)	((Driver command P2812 Fault Active P2815 Fault Active P0970 Fault Active P2720 Fault Active) OR (Driver command P2814 Fault Active (P0968 Fault Active P0971 Fault Active) OR (P2718 Fault Active P2721 Fault Active))) Mode Enbl Vlv Stk On Test P18AFTest Fail This Key On	= Park = FALSE = FALSE = FALSE = FALSE # Park = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE		
			ELSE IF (Mode Valve B St Fnl Fault Pending) MVB Fail Limit	= TRUE = ModeVlvB_FnlDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift)ModeVlvIA_	IF ((((Mode Valve B St Attnd (see mode valve B st attnd description) AND Mode Valve B Trnstn (see mode valve B trnstn description))AND (Diagnostic Range OR Mode Valve A Trnstn (see mode valve A trnstn description) OR Mode Valve A St Attnd (see mode valve A st attnd description) OR (0 line pressure command AND Mode Valve B Position)))	= FALSE = FALSE = NeutShf = TRUE = TRUE = TRUE = TRUE = HIGH		
			ELSE IF (High Side Driver 1 AND High Side Driver 2 AND Line pressure Command) MVB Fail Limit	 = TRUE = TRUE # Diag Max Press = Mode Valve B Eng Off Dly Lim				
			ELSE MVB Fail Limit	 =				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>Increment MVB Fail Timer</p> <p>IF (MVB Fail Timer</p> <p>IF (Mode Valve B Trnstn (see mode valve A trnstn description) Set Mode Valve B St Fnl Fault Pending)</p> <p>ELSE (Set Mode Valve B Trnstn Fault Pending))</p> <p>Increment fail counter</p> <p>Set MVB Fail Timer = 0</p> <p>ModeVlvB_TrnstnDly [ETRS attained range Drive, ETRS command range NeutHi] ModeVlvBTrnstnDly [ETRS attained range Drive, ETRS command range NeutLo] ModeVlvB_TrnstnDly [ETRS attained range Drive, ETRS command range NeutShf] ModeVlvBTrnstnDly [ETRS attained range Drive, ETRS command range Park]</p>	<p>Mode Valve B Eng Off ML Lim</p> <p>> MVB Fail Limit</p> <p>= TRUE</p> <p>= TRUE</p> <p>= TRUE</p> <p>ModeVlvB_TrnstnDly [ETRS attained range Drive, ETRS command range NeutHi] ModeVlvBTrnstnDly [ETRS attained range Drive, ETRS command range NeutLo] ModeVlvB_TrnstnDly [ETRS attained range Drive, ETRS command range NeutShf] ModeVlvBTrnstnDly [ETRS attained range Drive, ETRS command range Park]</p>	<p>IF Diagnostic Enable AND Mode Valve B pressure command</p> <p>(ETRS Commanded Dirctn OR (ETRS Commanded Dirctn AND ETRS Diagnostic Range)</p> <p>Increment Delay Timer</p> <p>Delay Limit</p> <p>Delay Timer</p> <p>Set Mode Valve B sensor Fault Pending</p> <p>IF (Mode Valve B sensor Fault Pending AND (ETRS Commanded Dirctn AND (Park Servo Position OR 0 line pressure command))</p> <p>Execute Mode Valve B Fail</p> <p>IF ((ETRS Commanded Dirctn AND ETRS Commanded</p>	<p>= 1.00 > 295.00</p> <p>+ Drive or Park</p> <p>= Park</p> <p>= Drive</p> <p>= ModeVlvB_TrnstnDly [ETRS diagnostic range] [ETRS commanded direction] (see supporting tables for specific delay associated with each shift) > Delay Limit</p> <p>= TRUE</p> <p>= TRUE</p> <p>= Park</p> <p>#PARK = TRUE</p> <p># Drive or Park</p> <p># Park</p>		

23OBDG03A Part2 TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				ModeVlvB_TrnstnDly [ETRS attained range Drive, ETRS command range Reverse] ModeVlvBTrnstnDly [ETRS attained range NeutLo, ETRS command range NeutHi] ModeVlvBTrnstnDly [ETRS attained range NeutLo, ETRS command range NeutShf] ModeVlvB_TrnstnDly [ETRS attained range NeutLo, ETRS command range Reverse] ModeVlvBTrnstnDly [ETRS attained range Park, ETRS command range NeutHi] ModeVlvB_TrnstnDly [ETRS attained range Park, ETRS command range NeutLo] ModeVlvB_TrnstnDly [ETRS attained range Park, ETRS command range NeutShf] ModeVlvB_TrnstnDly [ETRS attained range Park, ETRS command range Reverse]	Dlrctn) Execute Mode Valve B Fail IF (ETRS Diagnostic Range AND Park Servo Position Execute Mode Valve B Fail)) P18AC Test Fail This Key On P27EF Fault Active P27F1 Fault Active P27F2 Fault Active P18AD Test Fail This Key On P27F0 Test Fail This Key On	= Park # OUT OF PARK = FALSE = FALSE = FALSE = FALSE = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				ModeVlvB_TrnstnDly [ETRS attained range NeutHi, ETRS command range NeutShf] ModeVlvBTrnstnDly [ETRS attained range NeutHi, ETRS command range Reverse] ModeVlvBTrnstnDly [ETRS attained range NeutShf, ETRS command range NeutHi] ModeVlvB_TrnstnDly [ETRS attained range NeutShf, ETRS command range Reverse] ModeVlvBTrnstnDly [ETRS attained range Reverse, ETRS command range NeutShf]				

[illegible]

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					IF Mode Valve A Command OR 0 line pressure command OR Test Delay Execute Mode Enable Valve Stuck On Test	= LOW = TRUE ≥ Mode Enable Valve Test Delay Lim		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch "A" Performance	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.	Park Position Sensor A P17FC fault active P17FA fault active P17FB fault active P18E7Test Fail This Key On Park positin sensor A FP IF (ETRS commanded direction AND ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) IF 0 Line Pressure Command Delay Limit ELSE Delay Limit) ELSE IF ((High Side Driver 1 High Side Driver 2 Line pressure control) Delay Limit ELSE	+ Park Position Sensor B = FALSE = FALSE = FALSE = FALSE = FALSE = PARK = TRUE = TRUE ≥ Park Vlv Stk Off ZL Dly Lim ≥ Park Vlv Stk Off Dly Lim = TRUE = TRUE # Diag Max Line ≥ Park Vlv Stk Off Eng Off Lim ELSE	ETRS Performance Diag Enabl (see ETRS performance Diag Enabl description) High Side Driver 1 High Side Driver 2 diagnostic monitor enable IF (ETRS Commanded Dirctn Diagnostic Park State (see diagnostic park state definition) Park Servo Position IF ((ETRS Hydraulic Pressure Avail (see ETRS Hydraulic Pressure Avail description) OR (ETRS commanded direction AND PISA Fail Count (Mode Valve A position OR Mode Valve B position)) IF P17E7 fault active AND P17F5 fault active AND P17F6 fault active AND Park position sensor B FP AND P18E8 Test Fail This Key On AND Park Position Sensor B) OR	= TRUE = TRUE = TRUE = 1.00 # Park = OUT OF PARK # OUT OF PARK = TRUE = NeutLo = 0 # LOW t LOW = FALSE = FALSE = FALSE = FALSE = FALSE = OUT OF PARK	Fail Count > 2.00 update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Delay Limit) ELSE Delay Limit Increment Delay Timer Delay Timer Increment Fail Timer Fail Timer Increment Fail Counter	\geq Park Vlv Stk Off ML Eng Off Lim \geq Park Servo Stk On Delay Lim $>$ Delay Limit $>$ 0.25	IF (ETRS Commanded Dirctn Diagnostic Park State (see diagnostic park state definition) Park Servo Position P17E7 fault active AND P17F5 fault active AND P17F6 fault active AND Park position sensor B FP AND P18E8Test Fail This Key On Park Position Sensor B AND Park Position Sensor A) Execute Park Position Sensor A Performance	# Park = PARK # Park = FALSE = FALSE = FALSE = FALSE = FALSE = OUT OF PARK = PARK		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/Switch "B" Performance	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.	Park Position Sensor B P17FC fault active P17FA fault active P17FB fault active P18E7Test Fail This Key On Park positin sensor A FP IF (ETRS commanded direction AND ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) IF 0 Line Pressure Command Delay Limit ELSE Delay Limit) ELSE IF ((High Side Driver 1 High Side Driver 2 Line pressure control) Delay Limit	+ Park Position Sensor A = FALSE = FALSE = FALSE = FALSE = FALSE = PARK = TRUE = TRUE ≥ Park Vlv Stk Off ZL Dly Lim ≥ Park Vlv Stk Off Dly Lim = TRUE = TRUE # Diag Max Line ≥	ETRS Performance Diag Enabl (see ETRS performance Diag Enabl description) High Side Driver 1 High Side Driver 2 diagnostic monitor enable IF ((ETRS Commanded Dirctn Diagnostic Park State (see diagnostic park state definition) Park Servo Position IF (ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) OR (ETRS Hydraulic Pressure Avail AND Power Mode Prev to ACC)) P17FC fault active AND P17FA fault active AND P17FB fault active AND P18E7Test Fail This Key On AND Park positin sensor A FP AND Park Positin Sensor A) OR IF ((ETRS Commanded Dirctn AND	= TRUE = TRUE = TRUE = TRUE = 1.00 = Park = PARK + PARK = TRUE = FALSE # OFF = FALSE = FALSE = FALSE = FALSE = FALSE = Park = Park	Fail Count > 2.00 update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			ELSE Delay Limit)	Park Vlv Stk Off Eng Off Lim	Diagnostic Park State (see diagnostic park state definition) AND Park Position Sensor A	= OUT OF PARK		
		ELSE Delay Limit		\geq Park Vlv Stk Off ML Eng Off Lim	AND P17FC fault active AND P17FA fault active AND P17FB fault active AND P18E7 Test Fail This Key On AND Park positin sensor A FP)	= PARK = FALSE = FALSE = FALSE = FALSE = FALSE		
		Increment Delay Timer		\geq Park Servo Stk On Delay Lim	OR			
		Delay Timer		> Delay Limit	IF ((ETRS Commanded Dirctn	# Park		
		Increment Fail Timer			Diagnostic Park State (see diagnostic park state definition)	= OUT OF PARK		
		Fail Timer		> 0.25	Park Servo Position	# OUT OF PARK		
		Increment Fail Counter			IF (ETRS commanded direction AND PISA Fail Count (Mode Valve A position OR Mode Valve B position))	= NeutLo = 0 # LOW # LOW		
					IF (Park Position Sensor A AND P17FC fault active AND P17FA fault active AND P17FB fault active AND P18E7 Test Fail This Key On AND Park positin sensor A FP))	= OUT OF PARK = FALSE = FALSE = FALSE = FALSE =FALSE		
					Execute Park Position Sensor B Performance			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cabin Warm Up Request Signal Message Counter Incorrect (Emissions Neutral Diagnostic)	P18F2	<p>This DTC monitors for an error in communication with the Cabin Warm Up Request Signals.</p> <p>Emissions neutral default action is to disable Cabin Warm Up shift-point and TCC modifications.</p>	<p>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:</p> <p>Cabin Warm Up Request ARC</p>	<p>>= 8 counts out of</p> <p>>= 10 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 5,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 32.00 volts</p>	Cabin Warm Up Request ARC samples every 1,000 milliseconds.	Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Run/ Start Position Circuit Low	P2534	Detects a low ignition switch run/start position circuit. This diagnostic reports the DTC when this circuit 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

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Run/ Start Position Circuit High	P2535	Detects a high ignition switch run/start position circuit. This diagnostic reports the DTC when this circuit 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	280 failures out of 280 samples 25 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Accessory Position Circuit Low	P2537	Detects a low ignition switch accessory position circuit. This diagnostic reports the DTC when this circuit is low. Monitoring occurs when the propulsion system has been active for a calibrated duration.	<p>The TCM detects that the state of the accessory line is low when it should be high.</p> <p>The diagnostic is evaluated when Propulsion System Active time is > 8,191.9 seconds.</p> <p>Diagnostic fails when pass counts are</p>	< 1 counts.			<p>12.5 ms / sample</p> <p>Once per trip</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Actuator Supply Voltage B Circuit Low	P2670	Controller specific output driver circuit diagnoses the high sided driver circuit for a short to ground failure, or where controller H/W cannot differentiate, diagnoses the high sided driver circuit for a short to ground failure or open circuit failure, when the output is powered on, by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground or an open circuit.	< 0.5 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 > 6 counts within sample count of 2,400 counts 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Stuck Off	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	<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p> <p>TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled</p> <p>TOM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled</p> <p>service fast learn active</p> <p>service solenoid cleaning</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>> 9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>> 9.00 volts</p> <p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= FALSE Boolean</p>	<p>fail time > 1.00 seconds, update fail count, fail count > 3 counts 6.25 milliscond update</p> <p>battery voltage time > 0.100 seconds</p> <p>run crank voltage time > 0.100 seconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control			procedure active hydraulic pressure available (hydraulic pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) ***** enable C4 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR accelerator pedal position OR	= FALSE Boolean = TRUE > -999.00 kPa = TRUE = TRUE ***** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 89.0 RPM > 2.00 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C4 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	> 1,500.0 RPM > 450.0 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 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C	> 1.000 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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</p> <p>DTCs not test fail this key on</p> <p>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</p>	<p>P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P178F P17C6 P17C4 P17C7 P172A P172B</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Stuck On	P2715	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C4 clutch slip speed OR shift type is garage shift: C4 clutch slip speed ELSE shift is another type: C4 clutch slip speed update fail time 6.25 milliscond update	< 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time > 0.80 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time > 0.15 seconds Add fail time offset according to shift type: open throttle upshift: Clutch Stuck On Fail Offset Time PU Shifts open throttle downshift: Clutch Stuck On Fail Offset Time PD Shifts garage shift: Clutch Stuck On Fail Offset Time GS Shifts closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>>9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>> 9.00 volts</p>	<p>Clutch Stuck On Fail Offset Time CD Shifts</p> <p>negative torque upshift: Clutch Stuck On Fail Offset Time NU Shifts</p> <p>clutch staging shift: Clutch Stuck On Fail Offset Time STGR Shifts</p> <p>update fail count, fail count > 3 counts 6.25 millisecond update</p> <p>battery voltage time > 0.100 seconds</p> <p>run crank voltage time £ 0.100</p>	

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[illegible]

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR C4 off going clutch command pressure)	< 113 kPa	shift type: 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 Illum.
					(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/open throttle upshifts dependent on oncoming clutch: C1 Powered Upshift Tq Based Pres Clip OR C2 Powered Upshift Tq Based Pres Clip OR C3 Powered Upshift Tq Based Pres Clip OR C5 Powered Upshift Tq Based Pres Clip OR C6 Powered Upshift Tq Based Pres Clip	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: C1_Oncoming Post-Torque Phase Delay OR C2_Oncoming Post-Torque Phase Delay OR C3_Oncoming Post-Torque Phase Delay OR C5_Oncoming Post-Torque Phase Delay OR C6_Oncoming Post-Torque Phase Delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						coasting downshift dependent on oncoming clutch: C1 Coasting Downshift Tq Based Pres Clip OR C2 Coasting Downshift Tq Based Pres Clip OR C3 Coasting Downshift Tq Based Pres Clip OR C5 Coasting Downshift Tq Based Pres Clip OR C6 Coasting Downshift Tq Based Pres 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		
					C4 clutch slip speed valid, all speed sensors are functional for lever node clutch slip speed			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 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	***** + Garage shift Clutch Stuck On Shift = Type Enable (0 table value will disable, 1 will enable) = FALSE = 0 (0 will enable, 1 will enable) = NEUTRAL OR commanded gear = 0 (0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 0 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>been initialized OR transitioning to a different clutch controller)</p> <p>current clutch solenoid test state</p> <p>*****</p> <p>DTCs not fault pending</p> <p>DTCs not fault active</p> <p>DTCs not test fail this key on</p>	<p>= TRUE</p> <p>= TRUE</p> <p>transitions to Teststate or TUT_HOLD (see note below about state transitions)</p> <p>*****</p> <p>P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6</p> <p>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</p> <p>P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>*****</p> <p>NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST 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</p>	<p>P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B *****</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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.</p> <p>OR</p> <p>The automatic transmission shift completes, range shift state = range shift complete.</p> <p>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</p>			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Control Circuit Open	P2718	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range indicates an open circuit</p> <p>Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit</p>	<p>> 200 K Q impedance between signal and controller ground</p> <p>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time</p>	<p>battery voltage</p> <p>(run crank voltage OR accessory voltage active OR Power Mode)</p> <p>diagnostic monitor enable calibration</p> <p>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)</p> <p>OR</p> <p>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)</p> <p>OR</p> <p>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)</p>	<p>> 9.00 volts and < 32.00 volts</p> <p>> 5.00 volts</p> <p>= TRUE</p> <p>= ACCESSORY</p> <p>= 1 (1 is enable, 0 is disable)</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)</p> <p>= ON</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)</p> <p>= ON</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)</p> <p>= ON</p>	<p>fail time > 0.30 seconds out of sample time > 0.50 seconds</p> <p>6.25 millisecond update rate</p> <p>> 1.00 seconds</p> <p>> 25 milliseconds</p> <p>> 12.5 milliseconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Control Circuit Low	P2720	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch, solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 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 Illum.
Pressure Control (PC) Solenoid D Control Circuit High	P2721	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch, solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 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 Illum.
Pressure Control (PC) Solenoid E Stuck Off	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	<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p> <p>TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled</p> <p>TOM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled</p> <p>service fast learn active</p> <p>service solenoid cleaning</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>> 9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>> 9.00 volts</p> <p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= FALSE Boolean</p>	<p>fail time > 1.00 seconds, update fail count, fail count > 3 counts 6.25 milliscond update</p> <p>battery voltage time > 0.100 seconds</p> <p>run crank voltage time > 0.100 seconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control			procedure active hydraulic pressure available (hydraulic pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) ***** enable C5 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR accelerator pedal position	= FALSE Boolean = TRUE > -999.00 kPa = TRUE = TRUE ***** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 89.0 RPM > 2.00 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C5 (GF9 C57R) clutch pressure control solenoid.			OR engine speed OR transmission input shaft speed) C5 clutch slip speed valid C5 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	> 1,500.0 RPM > 450.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip speed calculation) = mapped to line pressure, C5 clutch pressure has reached fully applied state = 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE = range shift complete ***** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716P0717 P07C0	> 1.000 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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</p> <p>DTCs not test fail this key on</p> <p>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</p>	<p>P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P178F P17C6 P17C4 P17C7 P172A P172B</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Stuck On	P2724	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C5 clutch slip speed OR shift type is garage shift: C5 clutch slip speed ELSE shift is another type: C5 clutch slip speed update fail time 6.25 milliscond update	< 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time > 0.40 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time > 0.15 seconds Add fail time offset according to shift type: open throttle upshift: Clutch Stuck On Fail Offset Time PU Shifts open throttle downshift: Clutch Stuck On Fail Offset Time PD Shifts garage shift: Clutch Stuck On Fail Offset Time GS Shifts closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>>9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>> 9.00 volts</p>	<p>Clutch Stuck On Fail Offset Time CD Shifts</p> <p>negative torque upshift: Clutch Stuck On Fail Offset Time NU Shifts</p> <p>clutch staging shift: Clutch Stuck On Fail Offset Time STGR Shifts</p> <p>update fail count, fail count > 3 counts 6.25 milliscond update</p> <p>battery voltage time > 0.100 seconds</p> <p>run crank voltage time £ 0.100</p>	

23OBDG03A Part2 TCM Summary Tables

[illegible]

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR C5 off going clutch command pressure)	< 145 kPa	shift type: 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 Illum.
					(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/open throttle upshifts dependent on oncoming clutch: C1 Powered Upshift Tq Based Pres Clip OR C2 Powered Upshift Tq Based Pres Clip OR C3 Powered Upshift Tq Based Pres Clip OR C4 Powered Upshift Tq Based Pres Clip OR C6 Powered Upshift Tq Based Pres Clip coasting downshift	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: C1_Oncoming Post-Torque Phase Delay OR C2_Oncoming Post-Torque Phase Delay OR C3_Oncoming Post-Torque Phase Delay OR C4_Oncoming Post-Torque Phase Delay OR C6_Oncoming Post-Torque Phase Delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						<p>dependent on oncoming clutch:</p> <p>C1 Coasting Downshift Tq Based Pres Clip</p> <p>OR</p> <p>C2 Coasting Downshift Tq Based Pres Clip</p> <p>OR</p> <p>C3 Coasting Downshift Tq Based Pres Clip</p> <p>OR</p> <p>C4 Coasting Downshift Tq Based Pres Clip</p> <p>OR</p> <p>C6 Coasting Downshift Tq Based Pres Clip</p> <p>clip thresholds for all other shift types:</p> <p>garage shifts: Clutch Clip Press GS Shifts</p> <p>negative torque upshift: Clutch Clip Press NU Shifts</p> <p>open throttle downshift: Clutch Clip Press PD Shifts</p> <p>C5 clutch slip speed valid, all speed sensors are functional for lever node clutch slip speed calculation</p> <p>= TRUE</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					*****	*****		
					<p>conditions needed to trigger test:</p> <p>(current shift type AND shift type enable cal for current shift type)</p> <p>OR</p> <p>(Intrusive shift active AND 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))</p> <p>clutch stuck off intrusive shift active</p> <p>startle mitigation active (see note on startle mitigation below)</p> <p>(new clutch controller has been initalized OR</p>	<p>+ Garage shift</p> <p>Clutch Stuck On Shift = Type Enable (0 table value will disable, 1 will enable)</p> <p>= FALSE</p> <p>= 0 (0 will enable, 1 will enable)</p> <p>= NEUTRAL OR commanded gear</p> <p>= 0 (0 to disable, 1 to enable)</p> <p>= FORWARD</p> <p>= a FORWARD gear</p> <p>= 0 (0 to disable, 1 to enable)</p> <p>= REVERSE</p> <p>= REVERSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= TRUE</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					transitioning to a different clutch controller) current clutch solenoid test state ***** DTCs not fault pending DTCs not fault active DTCs not test fail this key on	= TRUE transitions to Teststate or TUT_HOLD (see note below about state transitions) ***** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>*****</p> <p>NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST 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:</p>	P172AP172B *****		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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.</p> <p>OR</p> <p>The automatic transmission shift completes, range shift state = range shift complete.</p> <p>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</p>			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Control Circuit Open	P2727	Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, 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_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid 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_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Control Circuit High	P2730	Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, 8 speed C45678R, or CVTTCC 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	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.30 seconds out of sample time > 0.50 seconds > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Stuck On	P2731	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 transmission input shaft	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 Attained Gear OR Attained Gear	< 50.00 RPM < 100.00 RPM < 50.00 RPM = First Lock = First Freewheel			Base fail time: shift type is power down shift: fail time > 0.80 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time > 0.15 seconds Add fail time offset according to shift type: open throttle upshift: Clutch Stuck On Fail Offset Time PU Shifts open throttle downshift: Clutch Stuck On Fail Offset Time PD Shifts garage shift: Clutch Stuck On Fail Offset Time GS Shifts closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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 a clutch pressure control solenoid stuck on test is disabled. This			<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p> <p>TOM output driver high side driver 1, clutch pressure control solenoid</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>>9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>>9.00 volts</p> <p>= TRUE Boolean</p>	<p>Clutch Stuck On Fail Offset Time CD Shifts</p> <p>negative torque upshift: Clutch Stuck On Fail Offset Time NU Shifts</p> <p>clutch staging shift: Clutch Stuck On Fail Offset Time STGR Shifts</p> <p>update fail count, fail count > 3 counts 6.25 milliscond update</p> <p>battery voltage time > 0.100 seconds</p> <p>run crank voltage time > 0.100 seconds</p>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		diagnostic monitor is relative to the GF9 C6 C6789/Selectable One Way Clutch (SOWC) CBR1, or, GR10C6 C45678910R, clutch pressure control solenoid.			driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active hydraulic pressure available (hydraulic pressure OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable) ***** range shift state diagnostic clutch test transmission output shaft speed ((C6 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable) OR C6 off going clutch	= TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE > -999 kPa =TRUE =TRUE ***** # range shift complete = OFF GOING CLUTCH TEST > 89.0 RPM = TRUE = 1 (1 to enable, 0 to disable) exhaust delay by		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					command pressure)	< 235 kPa	shift type: closed throttle upshift: C6 exhaust delay closed throttle lift foot up shift open throttle upshift: C6 exhaust delay open throttle power on up shift garage shifts: C6 exhaust delay garage shift closed throttle downshift: C6 exhaust delay garage shift negative torque upshift: C6 exhaust delay negative torque up shift open throttle downshift: C6 exhaust delay open throttle power down shift	
					(engine torque AND Primary oncoming stuck on torque enable cal) OR	> 8,192 Nm = 0 (0 is enable, 1 is enable)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	= TRUE + clutch fill phase > pressure clip threshold according to shift type: closed/open throttle upshifts dependent on oncoming clutch: C1 Powered Upshift Tq Based Pres Clip OR C2 Powered Upshift Tq Based Pres Clip OR C3 Powered Upshift Tq Based Pres Clip OR C4 Powered Upshift Tq Based Pres Clip OR C5 Powered Upshift Tq Based Pres Clip coasting downshift dependent on oncoming clutch: C1 Coasting Downshift Tq Based Pres Clip OR C2 Coasting Downshift Tq Based Pres Clip	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: C1_Oncoming Post-Torque Phase Delay OR C2_Oncoming Post-Torque Phase Delay OR C3_Oncoming Post-Torque Phase Delay OR C4_Oncoming Post-Torque Phase Delay OR C5_Oncoming Post-Torque Phase Delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>C6 clutch slip speed valid, all speed sensors are functional for lever node clutch slip speed calculation</p> <p>*****</p> <p>conditions needed to trigger test:</p> <p>(current shift type AND shift type enable cal for current shift type)</p>	<p>OR C3 Coasting Downshift Tq Based Pres Clip</p> <p>OR C4 Coasting Downshift Tq Based Pres Clip</p> <p>OR C5 Coasting Downshift Tq Based Pres Clip</p> <p>clip thresholds for all other shift types:</p> <p>garage shifts: Clutch Clip Press GS Shifts</p> <p>negative torque upshift: Clutch Clip Press NU Shifts</p> <p>open throttle downshift: Clutch Clip Press PD Shifts</p> <p>= TRUE</p> <p>*****</p> <p>+ Garage shift</p> <p>Clutch Stuck On Shift = Type Enable (0 table value will disable,</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR (Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts AND 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	1 will enable) = FALSE = 0 (0 will enable, 1 will enable) = NEUTRAL OR commanded gear = 0 (0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 0 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to Teststate or TUT_HOLD (see note below about state transitions)		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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:</p> <p>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.</p> <p>AND</p> <p>That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold.</p> <p>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:</p> <p>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</p>			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute.</p> <p>OR</p> <p>The automatic transmission shift completes, range shift state = range shift complete.</p> <p>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</p>			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			
			Intrusive Neutral Event Timer AND C6 Fail counter has already achieved 1 fail count (as determined from previous C6 pressure control solenoid stuck on logic)	> 5 counts	Previous Binary clutch control abort reason Binary clutch Neutral release time Active Clutch Controller Binary Clutch control state Vehicle speed source: Wheel speed sensors present (Wheel speed error OR Neutral release state timer)	= No Abort Binary Clutch Neutral > Release Time Out = Garage Shift = SOWC Release # Trans Output Speed AND # Average Driven wheel AND # Single Driven wheel AND # Trans Internal Speed # Non Driven = TRUE Binary Clutch C1 Neutral Release Time > Out		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Clutch 1 percent filled OR (Clutch slip source AND Clutch 1 slip speed AND Selected Range) Attained Gear Direction OR Cmnd Gear Direction OR Attained Gear OR Scheduled Gear OR (Transmission Oil Temp Sensor FA AND Trans Oil Temp) ***** The following DTCs not FAorFP: P176B, P176C, P176D	< 1.00 % # NO SOURCE AVAILABLE Binary Clutch C1 Slip > Threshold # PARK, REVERSE, Or NEUTRAL # Forward # Forward # 1st Lock < 1st Lock = FALSE Binary Clutch Cold > Inhibit Thresh *****	Binary Clutch C1 FEM Neutral Release Thresh	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Stuck Off	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	<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p> <p>TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled</p> <p>TOM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled</p> <p>service fast learn active</p> <p>service solenoid cleaning</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>> 9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>> 9.00 volts</p> <p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= FALSE Boolean</p>	<p>fail time > 1.00 seconds, update fail count, fail count > 3 counts 6.25 milliscond update</p> <p>battery voltage time > 0.100 seconds</p> <p>run crank voltage time > 0.100 seconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch pressure control			procedure active hydraulic pressure available (hydraulic pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) ***** enable C6 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR accelerator pedal position OR	= FALSE Boolean = TRUE > -999.00 kPa = TRUE = TRUE ***** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 89.0 RPM > 2.00 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C6 (GF9 C6789/SOWC) clutch pressure control solenoid.			engine speed OR transmission input shaft speed) C6 clutch slip speed valid C6 clutch pressured map (enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear) range shift state ***** DTCs not fault pending DTCs not fault active	> 1,500.0 RPM > 450.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip speed calculation) = mapped to line pressure, C6 clutch pressure has reached fully applied state = 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE = range shift complete ***** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C	> 1.000 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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</p> <p>DTCs not test fail this key on</p> <p>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</p>	<p>P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P178F P17C6 P17C4 P17C7 P172A P172B</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Stuck On (GF9)	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 > 0.80 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time > 0.15 seconds Add fail time offset according to shift type: open throttle upshift: Clutch Stuck On Fail Offset Time PU Shifts open throttle downshift: Clutch Stuck On Fail Offset Time PD Shifts garage shift: Clutch Stuck On Fail Offset Time GS Shifts closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>>9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>> 9.00 volts</p>	<p>Clutch Stuck On Fail Offset Time CD Shifts</p> <p>negative torque upshift: Clutch Clip Press NU Shifts</p> <p>clutch staging shift: Clutch Stuck On Fail Offset Time STGR Shifts</p> <p>update fail count, fail count > 3 counts 6.25 millisecond update</p> <p>battery voltage time > 0.100 seconds</p> <p>run crank voltage time > 0.100 seconds</p>	

23OBDG03A Part2 TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		is disabled. This diagnostic monitor is relative to the GF9 C6 C6789 clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active hydraulic pressure available (hydraulic pressure OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable) ***** range shift state diagnostic clutch test transmission output shaft speed ((C6 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)	= TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE > -999 kPa =TRUE =TRUE ***** # range shift complete = OFF GOING CLUTCH TEST > 89.0 RPM = TRUE = 1 (1 to enable, 0 to disable)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR C6 off going clutch command pressure)	< 235 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	
					(engine torque AND Primary oncoming stuck	> 8,192 Nm = 0 (0 is enable, 1 is		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	enable) = TRUE ± clutch fill phase > pressure clip threshold according to shift type: closed/open throttle upshifts dependent on oncoming clutch: C1 Powered Upshift Tq Based Pres Clip OR C2 Powered Upshift Tq Based Pres Clip OR C3 Powered Upshift Tq Based Pres Clip OR C4 Powered Upshift Tq Based Pres Clip OR C5 Powered Upshift Tq Based Pres Clip coasting downshift dependent on oncoming clutch: C1 Coasting Downshift Tq Based Pres Clip	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: C1_Oncoming Post-Torque Phase Delay OR C2_Oncoming Post-Torque Phase Delay OR C3_Oncoming Post-Torque Phase Delay OR C4_Oncoming Post-Torque Phase Delay OR C5_Oncoming Post-Torque Phase Delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						OR C2 Coasting Downshift Tq Based Pres Clip OR C3 Coasting Downshift Tq Based Pres Clip OR C4 Coasting Downshift Tq Based Pres Clip OR C5 Coasting Downshift Tq Based Pres 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 C6 clutch slip speed valid, all speed sensors are functional for lever node cluth slip speed calculation ***** conditions needed to trigger test: (current shift type AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					shift type enable cal for current shift type) OR (Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts 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	Clutch Stuck On Shift = Type Enable (0 table value will disable, 1 will enable) = FALSE = 0 (0 will enable, 1 will enable) = NEUTRAL OR commanded gear = 0 (0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 0 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to Teststate or TUT_HOLD (see note below about state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>transitions)</p> <p>*****</p> <p>DTCs not fault pending</p> <p>P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6</p> <p>DTCs not fault active</p> <p>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</p> <p>DTCs not test fail this key on</p> <p>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</p> <p>*****</p> <p>NOTE: Clutch control</p>	<p>*****</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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:</p> <p>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.</p> <p>AND</p> <p>That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold.</p> <p>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:</p> <p>An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid</p>			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete.</p> <p>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</p>			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Control Circuit Open	P2736	Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1) clutch, 10 speed C45678910R clutch, 8 speed Line Pressure Control Circuit, or CVT binary pump, solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K 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 Illum.
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 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 Illum.
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	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 Illum.
Pressure Control (PC) Solenoid A Calibration Incorrect	P27A7	The diagnostic monitor verifies that the pressure control solenoid A (GF9 line or GR10C1 C123456R clutch or CVT secondary pulley) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid A electrical characteristics of the device currently installed in the transmission valve body assembly.	<p>pressure control solenoid characterization data programming complete</p> <p>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.</p> <p>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:</p> <p>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</p>	= FALSE	<p>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.</p> <p>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.</p>		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Calibration Incorrect	P27A8	The diagnostic monitor verifies that the pressure control solenoid B (GF9 TCC or GR10 C2 C128910R clutch or CVT primary pulley) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid B electrical characteristics of the device currently installed in the transmission valve body assembly.	<p>pressure control solenoid characterization data programming complete</p> <p>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.</p> <p>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:</p> <p>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</p>	= FALSE	<p>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.</p> <p>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.</p>		execution of monitor occurs once per controller normal power event during the controller initialization before normal time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Calibration Incorrect	P27A9	The diagnostic monitor verifies that the pressure control solenoid C (GF9 C1 CB123456 clutch or GR10C3 C23457910 clutch or CVT line) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid C electrical characteristics of the device currently installed in the transmission valve body assembly.	<p>pressure control solenoid characterization data programming complete</p> <p>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.</p> <p>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:</p> <p>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</p>	= FALSE	<p>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.</p> <p>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.</p>		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Calibration Incorrect	P27AA	The diagnostic monitor verifies that the pressure control solenoid D (GF9 C2 CB29 clutch or GR10 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.	<p>pressure control solenoid characterization data programming complete</p> <p>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.</p> <p>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:</p> <p>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</p>	= FALSE	<p>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.</p> <p>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.</p>		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Calibration Incorrect	P27AB	The diagnostic monitor verifies that the pressure control solenoid E (GF9 C3 CB38 clutch or GR10 C4 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.	<p>pressure control solenoid characterization data programming complete</p> <p>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.</p> <p>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:</p> <p>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</p>	= FALSE	<p>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.</p> <p>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.</p>		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Calibration Incorrect	P27AC	The diagnostic monitor verifies that the pressure control solenoid F (GF9 C4 C4 clutch or GR10 C6 C45678910R clutch or CVT binary pump) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid F electrical characteristics of the device currently installed in the transmission valve body assembly.	<p>pressure control solenoid characterization data programming complete</p> <p>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.</p> <p>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:</p> <p>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</p>	= FALSE	<p>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.</p> <p>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.</p>		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid G Calibration Incorrect	P27AD	The diagnostic monitor verifies that the pressure control solenoid G (GF9 C5 C57R clutch or GR10 line or CVT mode valve A ETRS only) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid G electrical characteristics of the device currently installed in the transmission valve body assembly.	<p>pressure control solenoid characterization data programming complete</p> <p>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.</p> <p>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:</p> <p>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</p>	= FALSE	<p>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.</p> <p>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.</p>		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid H Calibration Incorrect	P27AE	The diagnostic monitor verifies that the pressure control solenoid H (GF9 C6 C6789 clutch or GR10 TCC or CVT mode valve B ETRS only) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid H electrical characteristics of the device currently installed in the transmission valve body assembly.	<p>pressure control solenoid characterization data programming complete</p> <p>Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry.</p> <p>pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present:</p> <p>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</p>	= FALSE	<p>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.</p> <p>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.</p>		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control A Position Sensor/ Switch Circuit/Open	P27EB	The diagnostic monitor detects an illegal voltage on the mode valve A position sensor circuit.	raw sensor voltage raw sensor voltage	> 1.263 volts < 1.504 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 8.00 volts > 1.00 seconds = CeTRGR_eJ nternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control A Position Sensor/Switch Circuit Range/Performance	P27EC	Sensor signal fails to transition when solenoid mode valve control commands to PARK, DRIVE or REVERSE occur.	Mode Valve A Position ETRS Commanded Dirctn AND mode valve A pressure ETRS Commanded Dirctn AND mode valve A pressure IF (Mode Valve A Steady State Fault Pending) MVA Sensor Fail Limit Increment MVA Sensor Fail Timer	≠ Mode Valve A Final State = Drive > 195.00 ± Drive < 25.00 = TRUE = Mode Valve A Steady State Fail Lim	ETRS Performance Diag Enabl (see ETRS performance diag enabl description) ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) ETRS commanded direction P18AA Test Fail This Key On P27EB Fault Active AND P27ED Fault Active AND P27EE Fault Active AND P18AB Test Fail This Key On AND P27EC Test Fail This Key On IF (Mode Valve A Position OR Mode Valve A Position) Increment Steady State Delay Steady State Delay IF (ETRS Commanded Dirctn IF (Park Servo State AND Line Pressure AND Line Pressure Control))	= TRUE = TRUE = ETRS diagnostic range = FALSE = FALSE = FALSE = FALSE = FALSE ≠ Mode Valve A Final State # Mode Valve A Command ≥ Mode Vlv StdySt Park Dly Lim = PARK = PARK > 450.00 # Diag Min Press	IF MVA Sensor Fail > MVA Sensor Fail Limit update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Execute Sensor Fail ELSE IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control)) Execute Sensor Fail ELSE IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control)) Execute Slip Determination Increment Slip Delay Slip Delay Slip Detected (see mode valve slip detected definition) Execute Sensor Fail	= NeutLo 1 OUT OF PARK > 450.00 t Diag Min Press = Drive or Reverse # PARK < 450.00 = Diag Min Press ≥ ETRS Mode Valve A turbine delay = No Slip Detected		
			Mode Valve A Position	≠ Mode Valve A Final State	ETRS Performance Diag Enabl (see ETRS performance diag enabl	= TRUE	IF MVA Sensor Fail > MVA Sensor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			ETRS Commanded Dirctn AND mode valve A pressure ETRS Commanded Dirctn AND mode valve A pressure IF (Mode Valve A Steady State Fault Pending) MVA Sensor Fail Limit Increment MVA Sensor Fail Timer	= Drive > 195.00 = Park < 25.00 = FALSE = Mode Valve A Fail Lim	description) ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) Auto-Stop Active High Side Driver 1 High Side Driver 2 ETRS commanded direction ((Driver command P2812 Fault Active P2815 Fault Active P0970 Fault Active P2720 Fault Active) OR (Driver command P2814 Fault Active (P0968 Fault Active P0971 Fault Active) OR (P2718 Fault Active P2721 Fault Active))) Mode Enbl Vlv Stk On Test P18AFTest Fail This Key On IF (((Mode Valve A St Attn (see mode valve A st attn description) AND Mode Valve A Trnstn (see mode valve A trnstn description))AND (Diagnostic Range OR Mode Valve B Trnstn (see mode valve B trnstn	= TRUE = FALSE = TRUE = TRUE # ETRS diagnostic range = Park = FALSE = FALSE = FALSE = FALSE # Park = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = NeutShf = TRUE	Fail Limit update rate 6.25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					description) OR Mode Valve B St Attnd (see mode valve B st attnd description) OR (0 line pressure command AND Mode Valve A Position))) IF Diagnostic Enable AND ((ETRS commanded direction AND Mode Valve A pressure OR 0 line pressure command) OR (ETRS commanded direction AND ETRS diagnostic range AND Mode Valve A pressure)) Increment Delay Timer Delay Limit Delay Timer Set Mode Valve A sensor Fault Pending P18AA Test Fail This Key On P27EB Fault Active P27ED Fault Active P27EE Fault Active P18AB Test Fail This Key	= TRUE = TRUE = HIGH = 1.00 = Park < 25.00 = TRUE = Drive = Park > 195.00 = ModeVlvA_TrnstnDly [ETRS diagnostic range] [ETRS commanded direction] (see supporting tables for specific delay associated with each shift) > Delay Limit = FALSE = FALSE = FALSE = FALSE = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					On P27EC Test Fail This Key On Execute Sensor Fault	= FALSE		

23OBDG03A Part2 TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control A Position Sensor/Switch Circuit Low	P27ED	The diagnostic monitor detects a ground short or open circuit fault on the mode valve A position sensor circuit.	raw sensor voltage	< 0.414 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 8.00 volts > 1.00 seconds = CeTRGR_eJ nternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control A Position Sensor/ Switch Circuit High	P27EE	The diagnostic monitor detects a short to voltage on the mode valve A position sensor circuit.	raw sensor voltage	> 2.538 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 8.00 volts > 1.00 seconds = CeTRGR_eJ nternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control B Position Sensor/Switch Circuit/Open (GF9 and CVT Only)	P27EF	The diagnostic monitor detects an illegal voltage on the mode valve B 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 > 8.00 volts > 1.00 seconds = CeTRGR_eJ nternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control B Position Sensor/Switch Circuit Range/Performance	P27F0	Sensor signal fails to transition when solenoid mode valve control commands to PARK, REVERSE, NEUTRAL HI, NEUTRAL LO, NEUTRAL SHIFT or DRIVE occur.	<p>Mode Valve B Position</p> <p>ETRS Commanded Dirctn AND mode valve B pressure OR ETRS Commanded Dirctn AND mode valve A pressure</p> <p>IF (Mode Valve A Steady State Fault Pending) MVB Sensor Fail Limit</p> <p>Increment MVB Sensor Fail Timer</p>	<p>≠ Mode Valve B Final State</p> <p>= Reverse</p> <p>> 295.00</p> <p>= Park, NeutLo, Drive</p> <p>< 25.00</p> <p>= TRUE</p> <p>= Mode Valve B Steady State Fail Lim</p>	<p>ETRS Performance Diag Enabl (see ETRS performance diag enabl description)</p> <p>ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description)</p> <p>ETRS commanded direction</p> <p>P18AC Test Fail This Key On</p> <p>P27EF Fault Active</p> <p>P27F1 Fault Active</p> <p>P27F2 Fault Active</p> <p>P18AD Test Fail This Key On</p> <p>P27F0 Test Fail This Key On</p> <p>IF (Mode Valve B Position OR Mode Valve B Position) Increment Steady State Delay</p> <p>Steady State Delay</p> <p>IF (ETRS Commanded Dirctn</p> <p>IF (Park Servo State AND Line Pressure AND Line Pressure Control))</p>	<p>= TRUE</p> <p>= TRUE</p> <p>= ETRS diagnostic range</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>= FALSE</p> <p>≠ Mode Valve B Final State</p> <p>± Mode Valve B Command</p> <p>≥ Mode Vlv StdySt Park Dly Lim</p> <p>= PARK</p> <p>= PARK</p> <p>< 450.00</p> <p># Diag Min Press</p>	<p>IF MVB Sensor Fail > MVB Sensor Fail Limit</p> <p>update rate 6.25 milliseconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Execute Sensor Fail ELSE IF (ETRS Commanded Dirctn IF (Park Servo State AND Line Pressure AND Line Pressure Control)) Execute Sensor Fail ELSE IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control)) Execute Slip Determination Increment Slip Delay Slip Delay Slip Detected (see mode valve slip detected definition) Execute Sensor Fail	= NeutLo 1 OUT OF PARK > 450.00 t Diag Min Press = Drive or Reverse # PARK < 450.00 = Diag Min Press ≥ ETRS Mode Valve B turbine delay = Slip Detected		
			Mode Valve B Position	≠ Mode Valve B Final State	ETRS Performance Diag Enabl (see ETRS performance diag enabl description)	= TRUE	IF MVB Sensor Fail > MVB Sensor Fail Limit	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			ETRS Commanded Dirctn AND mode valve B pressure ETRS Commanded Dirctn AND mode valve A pressure IF (Mode Valve A Steady State Fault Pending) MVB Sensor Fail Limit Increment MVB Sensor Fail Timer	= Reverse, NeutLo, NeutHi, NeutShf > 295.00 = Park < 25.00 = TRUE = Mode Valve B Steady State Fail Lim	ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) Auto-Stop Active High Side Driver 1 High Side Driver 2 ETRS commanded direction ((Driver command P2812 Fault Active P2815 Fault Active P0970 Fault Active P2720 Fault Active) OR (Driver command P2814 Fault Active (P0968 Fault Active P0971 Fault Active) OR (P2718 Fault Active P2721 Fault Active))) Mode Enbl Vlv Stk On Test P18AFTest Fail This Key On IF (((Mode Valve B St Attn (see mode valve B st attn description) AND Mode Valve B Trnstn (see mode valve B trnstn description))AND (Diagnostic Range OR Mode Valve A Trnstn (see mode valve A trnstn description) OR Mode Valve A St Attn (see mode valve A st	= TRUE = FALSE = TRUE = TRUE t ETRS diagnostic range = Park = FALSE = FALSE = FALSE = FALSE # Park = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = NeutShf = TRUE = TRUE	update rate 6.25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					atnd description) OR (0 line pressure command AND Mode Valve B Position))) IF Diagnostic Enable ((ETRS Commanded Dirctn AND Mode Valve B pressure AND Park Servo Position) OR (ETRS Commanded Dirctn AND ETRS Diagnostic Range AND Park Servo Position AND Mode Valve B pressure)) Increment Delay Timer Delay Limit Delay Timer Set Mode Valve B sensor Fault Pending P18AC Test Fail This Key On P27EF Fault Active P27F1 Fault Active P27F2 Fault Active P18AD Test Fail This Key	= TRUE = HIGH = 1.00 = Park < 25.00 = PARK = Reverse, NeutLo, NeutHi, NeutShf = Park = OUT OF PARK > 295.00 = ModeVlvB_TrnstnDly [ETRS diagnostic range] [ETRS commanded direction] (see supporting tables for specific delay associated with each shift) > Delay Limit = TRUE = FALSE = FALSE = FALSE = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					On P27F0 Test Fail This Key On Execute Sensor Fault	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control B Position Sensor/ Switch Circuit Low (GF9 and CVT Only)	P27F1	The diagnostic monitor detects a ground short or open circuit fault on the mode valve B 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 > 8.00 volts > 1.00 seconds = CeTRGR_eJ nternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control B Position Sensor/ Switch Circuit High (GF9 and CVT Only)	P27F2	The diagnostic monitor detects a short to voltage on the mode valve B 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 > 8.00 volts > 1.00 seconds = CeTRGR_eJ nternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid G Control Circuit Open	P2812	Controller specific circuit diagnoses 9 speed Line Pressure Control Circuit, 10 speed Line Pressure Control Circuit, 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.	<p>Voltage measurement outside of controller specific acceptable range indicates an open circuit</p> <p>Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit</p>	<p>> 200 K Q impedance between signal and controller ground</p> <p>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time</p>	<p>battery voltage</p> <p>(run crank voltage OR accessory voltage active OR Power Mode)</p> <p>diagnostic monitor enable calibration</p> <p>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)</p> <p>OR</p> <p>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)</p> <p>OR</p> <p>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)</p>	<p>> 9.00 volts and < 32.00 volts</p> <p>> 5.00 volts</p> <p>= TRUE</p> <p>= ACCESSORY</p> <p>= 1 (1 is enable, 0 is disable)</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)</p> <p>= ON</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)</p> <p>= ON</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable)</p> <p>= ON</p>	<p>fail time > 0.30 seconds out of sample time > 0.50 seconds</p> <p>6.25 millisecond update rate</p> <p>> 1.00 seconds</p> <p>> 25 milliseconds</p> <p>> 12.5 milliseconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid G Control Circuit Low	P2814	Controller specific circuit diagnoses 9 speed Line Pressure Circuit, 10 speed Line Pressure Circuit, 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	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 Illum.
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.	<p>Voltage measurement outside of controller specific acceptable range indicates a short to voltage</p> <p>Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage</p>	<p>< 0.5 Q impedance between signal and controller voltage source</p> <p>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time</p>	<p>battery voltage</p> <p>(run crank voltage OR accessory voltage active OR Power Mode)</p> <p>diagnostic monitor enable calibration</p> <p>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)</p> <p>OR</p> <p>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)</p> <p>OR</p> <p>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)</p>	<p>> 9.00 volts and < 32.00 volts</p> <p>> 5.00 volts</p> <p>= TRUE</p> <p>= ACCESSORY</p> <p>= 1 (1 is enable, 0 is disable)</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON</p> <p>= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON</p>	<p>fail time > 0.30 seconds out of sample time > 0.50 seconds</p> <p>> 1.00 seconds</p> <p>> 25 milliseconds</p> <p>> 12.5 milliseconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Performance /Stuck Off - GF9 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.	<p>if use (TCC slip speed error OR TCC control mode)</p> <p>TCC slip speed error = TCC slip speed - TCC command slip speed</p> <p>else if TCC control mode torque convert slip = engine speed - transmission input shaft speed</p> <p>then update fail time 25 millisecond update rate</p>	<p>= 0 Boolean</p> <p>= ON mode (controlled slip mode)</p> <p>≥ P2817TCC stuck off fail TCC slip speed see supporting table</p> <p>= LOCK</p> <p>> 130.0 RPM</p>	<p>diagnostic monitor enable</p> <p>TCC command capacity</p> <p>TCC command pressure</p> <p>(TCC control mode previous TCC control mode previous TCC control mode previous) AND (TCC control mode current OR TCC control mode current)</p> <p>(TCC stuck off enable OR TCC stuck on enable)</p> <p>hydraulic pressure available: engine speed</p>	<p>= 1 Boolean</p> <p>> 0.00 %</p> <p>> 800.0 kPa</p> <p># TCC control mode current # ON mode (controlled slip mode) # LOCK</p> <p>= ON mode (controlled slip mode) = LOCK</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>> 500.0 RPM</p>	<p>fail time > 2.500 seconds increment fail count fail count > 3 counts 25 millisecond update rate</p> <p>TCC command capacity time > 0.00 seconds</p> <p>TCC command pressure time > 2.00 seconds</p> <p>engine speed time > engine speed time for transmission hydraulic pressure available</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					service fast learn active battery voltage run crank voltage (PTO active OR PTO disable calibration) accelerator pedal position accelerator pedal position range shift state transmission fluid temperature transmission fluid temperature engine torque engine torque P2817 test fail this key on (TCC control mode OR TCC control mode) attained gear attained gear slip DTCs not fault active	= FALSE > 9.00 volts >9.00 volts = FALSE = 1 Boolean > 8.0 % < 100.0 % = range shift complete > -6.66 °C < 130.0 °C > 50.0 Nm < 8,191.8 Nm = FALSE = ON mode (controlled slip mode) = LOCK > CeCGSR_e_CR_Third < 25.00 RPM AcceleratorPedalFailure EngineTorqueEstInaccura te P281B, P281D, P281E, P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D	see supporting table battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DTCs not fault pending	P0722, P0723, P0716, P0717, P07BF, P07C0		

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Stuck On - GF9 specific	P2818	The diagnostic monitor detects if the TCC Variable Force Solenoid (VFS) H is on incorrectly, the solenoid electrical circuit not damaged, but the solenoid has failed hydraulically to an on state. In this failure mode hydraulic fluid is routed wrongly to engage both the TCC Regulator Valve and the TCC Control Valve. This will allow hydraulic fluid pressure to immediately apply the TCC when the Clutch Select Valve is disabled.	When Stuck on crash detected monitor TCC Slip - torque convert slip speed = ABS(engine speed - transmission input shaft speed) WHILE TCC Slip AND TCC Slip THEN Increment TCC Stuck On fail timer 25 millisecond update rate	> -50.0 RPM < 30.0 RPM	Diagnostic monitor enable accelerator pedal position signal available hydraulic pressure available: Engine speed service fast learn active battery voltage run crank voltage P281B fault active P281D fault active P281E fault active P0716 fault active P0717 fault active P07BF fault active P07C0 fault active P0722 fault active P0723 fault active P077C fault active P077D fault active P0722 fault pending P0723 fault pending P0716 fault pending P0717 fault pending P07BF fault pending P07C0 fault pending ***** PRNDL PRNDL Commanded gear Commanded gear (PTO active OR PTO disable calibration)	= 1 (1 enable, 0 disable) = TRUE = TRUE > 500.0 RPM = FALSE > 9.00 volts > 9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ***** + NEUTRAL # REVERSE # NEUTRAL # REVERSE = FALSE = 1 Boolean	fail time > 1.500 seconds increment fail count fail count > 4 counts 25 millisecond update rate	Type A, 1 Trips

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[illegible]

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					vehicle speed accelerator pedal position accelerator pedal position hysteresis ***** when: break latch state (clutch select valve solenoid) IF previous break latch state (clutch select valve solenoid) set stuck on test time and begin time down, ELSE stuck on test time must time down from calibration value to zero (0.0) seconds break latch state (clutch select valve solenoid) AND previous break latch state (clutch select valve solenoid) THEN initialize control valve test time, control valve test time must time down from calibration value to zero (0.0) seconds WHILE control valve test time OR TCC Stuck On fail time IF	< 8.0 KPH > 4.0 % > 1.0 % ***** = disabled (clutch select valve not transitioning) = complete (clutch select valve transition complete) = P2818 stuck on test time see supporting tables = clutch select valve solenoid multiplexed to TCC hydraulic = disabled (clutch select valve not transitioning) = P2818(GF9 specific) control valve test time see supporting tables #0 #0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TCC slip Decelelation AND TCC slip Stuck on crash detected	\leq P2018GF9 TCC Stuck On Crash Decel limit \leq P2818 GF9 Establish crash slip limit = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Control Circuit Open	P281B	Controller specific circuit diagnoses 9 speed TCC Control Circuit, 10 speed TCC Control Circuit, 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_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 B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Control Circuit Low	P281D	Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit, 10 speed TCC Control Circuit, 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_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control 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	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 B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid J Stuck Off (GF9)	P2820	<p>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 clutch select valve solenoid failed hydraulically off. The clutch select valve is used to route hydraulic fluid to, either, the selectable one way clutch hydraulic circuit used to attain transmission 1st gear lock state, or, to the C6 - C6789 clutch hydraulic circuit necessary for transmission higher gear states.</p> <p>When the clutch select valve is failed hydraulically off, and transmission is in 1st gear lock state, it is possible to measure low C6 - C6789 clutch slip speed or 6th gear transmission ratio, since hydraulic fluid is routed to the clutch C6 - C6789. This can be determined based on transmission lever node design, the</p>	<p>(gear ratio AND gear ratio) OR C6 clutch slip speed</p> <p>update fail time 6.25 milliscond update</p>	<p>< 1.700 > 1.200 < 20.0 RPM</p>	<p>***** 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</p>	<p>***** = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = TRUE Boolean = TRUE Boolean = FALSE Boolean</p>	<p>fail time > 0.250 seconds, update fail count, fail count > 3 counts 6.25 milliscond update</p> <p>battery voltage time > 0.100 seconds</p> <p>run crank voltage time > 0.100 seconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>transmission input shaft speed, the transmission output shaft speed, and one transmission intermediate shaft speed, while not commanding 6th-9th gear.</p> <p>This diagnostic monitor is relative to the GF9 clutch select valve pressure control solenoid.</p>			<p>service solenoid cleaning procedure active</p> <p>hydraulic pressure available *****</p> <p>diagnostic monitor enabled</p> <p>transmission output shaft speed</p> <p>transmission fluid temperature</p> <p>transmission fluid temperature</p> <p>(command gear AND attained gear) OR (attained gear AND SOWC state)</p> <p>C6 clutch slip speed valid *****</p> <p>DTCs not fault pending</p> <p>DTCs not fault active</p>	<p>= FALSE Boolean</p> <p>= TRUE *****</p> <p>= 1 (1 to enable, 0 to disable)</p> <p>> 35 RPM</p> <p>> -256.00 °C</p> <p>< 130.0 °C</p> <p>= 1st lock</p> <p>= 1st lock</p> <p>= 2nd lock</p> <p>= APPLY COMPLETE</p> <p>= TRUE</p> <p>*****</p> <p>P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6</p> <p>P2534 P0707 P0708 P0716P0717 P07C0</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DTCs not test fail this key on	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		

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid J Stuck On (GF9)	P2821	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 select pressure control solenoid must be hydraulically off and the clutch select valve in the off state, to allow hydraulic fluid supply to the C3 (CB38) or C4 (C4) or C5 (C57R) clutches, such that when activated, commanded gear 3rd or 4th or 5th can be attained. With the clutch select valve pressure control solenoid failed hydraulically on, commanded gear 3rd or 4th or 5th cannot be attained. In the failure mode, the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM, when commanding 3rd or 4th or 5th gear, but due to the clutch select pressure control solenoid failed hydraulically on and not	<p>Cx clutch slip speed fail compare C3 (CB38) OR C4 (C4) OR C5 (C57R) update Cx clutch slip speed fail time 6.25 milliscond update</p> <p>once intrusive gear is commanded and clutch select stuck on test active remains and Cx clutch fail count limit occurs, increment clutch select valve solenoid stuck on fail count and time up clutch select stuck on test gear time 6.25 milliscond update</p>	<p>> 200.0 RPM > 200.0 RPM > 200.0 RPM</p> <p>= TRUE</p>			<p>Cx clutch slip speed fail time ></p> <p>(C3 (CB38) 1.00 seconds OR C4(C4) 1.00 seconds OR C5 (C57R) 1.00 seconds)</p> <p>update Cx fail count,</p> <p>Cx fail count > (C3 (CB38) 3 counts OR C4 (C4) 3 counts OR C5 (C57R) 3 counts)</p> <p>Cx clutch fail count limit occurs 6.25 milliscond update</p> <p>clutch select valve solenoid stuck on fail count > 2 counts OR clutch select stuck on test gear time > 9.00 seconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>individual clutch control faults. It is thus necessary, when individual clutch slip occurs in 3rd or 4th or 5th gear and counted toward the clutch pressure control solenoid stuck on failure, for an intrusive gear commanded from 3rd or 4th or 5th to verify the clutch slip in the remaining gear states. The individual clutch slip that occurs in those intrusive gears, 3rd or 4th or 5th, is also counted toward the clutch pressure control solenoid stuck on failure. As individual clutch slip is accumulated in each commanded gear 3rd or 4th or 5th, that failure time is the verification of the clutch pressure control solenoid failed hydraulically on.</p> <p>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</p>			<p>*****</p> <p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage</p> <p>TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled</p> <p>TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled</p> <p>service fast learn active service solenoid cleaning procedure active</p> <p>hydraulic pressure available</p> <p>*****</p> <p>diagnostic monitor enable</p>	<p>*****</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>>9.00 volts</p> <p>= 1 Boolean</p> <p>= 1 Boolean</p> <p>>9.00 volts</p> <p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= FALSE Boolean = FALSE Boolean</p> <p>= TRUE</p> <p>*****</p> <p>= 1 Boolean</p>	<p>6.25 milliscond update</p> <p>battery voltage time > 0.100 seconds</p> <p>run crank voltage time > 0.100 seconds</p>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>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 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 select pressure control solenoid is failed hydraulically on, C3 (CB38) or C4 (C4) or C5 (C57R) clutches cannot maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable.</p> <p>The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is</p>			<p>P2821 test fail this key on</p> <p>test trigger set to TRUE: enable forward gear AND direction request OR enable reverse gear AND direction request current loop test trigger clutch control solenoid test state range shift state</p> <p>clutch solenoid test state set to NEUTRAL TEST when: test trigger initialize range shift complete time, when range shift state, range shift complete time must time down to zero when range shift complete</p> <p>Cx indicates any one of the 3 clutches: C3 (CB38) OR C4 (C4) OR C5 (C57R)</p> <p>enable Cx clutch slip speed fail compare when: diagnostic clutch test Cx ((startle mitigation active OR (startle mitigation active</p>	<p>= FALSE</p> <p>= 1 Boolean = forward gear</p> <p>= 0 Boolean = reverse gear = FALSE # NEUTRAL TEST</p> <p>= range shift completed</p> <p>= TRUE</p> <p># range shift completed</p> <p>= HOLDING CLUTCH = FALSE = TRUE</p>	<p>initialize range shift complete time = 1.000 seconds, range shift complete time must time down to zero when range shift complete</p>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>active. 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, which, must take priority over this clutch select pressure control solenoid stuck off diagnostic monitor. All clutch pressure control 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 a clutch pressure control solenoid stuck off test is disabled.</p> <p>This diagnostic monitor is relative to the GF9 clutch select valve pressure control solenoid.</p>			<p>AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable FALSE (startle mitigation) clutch steady state adaptive active transmission output shaft speed Cx clutch slip speed valid, all speed sesnors are functional for lever node cluth slip speed calculation</p> <p>accelerator pedal position engine speed</p> <p>diagnostic clutch test Cx set to HOLDING CLUTCH when: clutch solenoid test state ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) Cx clutch pressured map</p> <p>*****</p> <p>clutch select stuck on test active set to TRUE when:</p>	<p># initial startle mitigation gear</p> <p>= FALSE</p> <p>= 0 Boolean</p> <p>= FALSE</p> <p>> 89.0 RPM</p> <p>> 2.00 % > 1,500.0 RPM</p> <p>= NEUTRAL TEST = FALSE</p> <p>= TRUE</p> <p># initial startle mitigation gear</p> <p>= mapped to line pressure, Cx clutch pressure has transtioned from off-applying-applied</p> <p>*****</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>command gear clutch control solenoid test state any Cx clutch fail count limit occurs break latch state, clutch select valve hydraulic latch fluid is applied, hydraulic latch fluid force balance acts with clutch select valve return spring, to force the clutch select valve to the off position in normal operation, allowing hydraulic fluid to C3 (CB38) C4 (C4) and C5 (C57R) clutches</p> <p>clutch select stuck on test active driver direction (PRNDL) change request, select intrusive gear to verify clutch select valve solenoid when HOLDING CLUTCH: C3 (CB38) C4 (C4) C5 (C57R) enable clutch select stuck on test gear time</p> <p>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</p>	<p>* REVERSE = NEUTRAL TEST</p> <p>= complete</p> <p>= TRUE</p> <p>= FALSE</p> <p>= CeCGSR_e_Fourth = CeCGSR_e_Fifth = CeCGSR_e_Fourth</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P2715 P2724 P2733 P2821 ***** DTCs not fault pending DTCs not test fail this key on DTCs not fault active	***** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172A P172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid J Control Circuit Low	P2826	Controller specific circuit diagnoses 9 speed Clutch Select Valve Control Circuit, 10 speed Default Disable Control Circuit, or 8 speed Boost Valve Control Circuit for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds. For T87a controllers, an open circuit on solenoid I/J will also set P2826	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 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 Illum.
Pressure Control Solenoid J Control Circuit High	P2827	Controller specific circuit diagnoses 9 speed Clutch Valve Control Circuit, 10 speed Default Disable Control Circuit, or 8 speed Boost Valve Control Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range indicates a short to voltage</p> <p>Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage</p>	<p>< 0.5 Q impedance between signal and controller voltage source</p> <p>When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time</p>	<p>battery voltage</p> <p>(run crank voltage OR accessory voltage active OR Power Mode)</p> <p>diagnostic monitor enable calibration</p> <p>(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)</p> <p>OR</p> <p>(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)</p> <p>OR</p> <p>(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)</p>	<p>> 9.00 volts and < 32.00 volts</p> <p>> 5.00 volts</p> <p>= TRUE</p> <p>= ACCESSORY</p> <p>= 1 (1 is enable, 0 is disable)</p> <p>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON</p> <p>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON</p> <p>= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON</p>	<p>fail time >0.10 seconds out of sample time > 0.17 seconds</p> <p>> 1.00 seconds</p> <p>> 25 milliseconds</p> <p>> 12.5 milliseconds</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Stall Prevention Active Signal Message Counter Incorrect	P30BD	This DTC monitors for an error in communication with the Engine Stall Prevention Active Signals.	<p>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:</p> <p>Engine Stall Saver Active ARC</p>	<p>>=8.00 counts out of >= 10.00 counts</p>	<p>Message frame containing the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) is available on the bus.</p> <p>All the following conditions are met for:</p> <p>Battery voltage</p> <p>Accessory mode to off mode transition not pending</p> <p>If controller is a non-OBD controller then battery voltage</p> <p>Controller type: OBD Controller</p>	<p>>= 5,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 32.00 volts</p>	Engine Stall Saver Active ARC samples every 35.00 milliseconds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 1	P30D6	This DTC detects intermittent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>=8.00 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the 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 Illum.
Control Module Serial Peripheral Interface Bus 2	P30D7	This DTC detects intermittent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>=8.00 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the TCM main processor	Type A, 1 Trips

23OBDG03A Part2 TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures equals or exceeds before the sample time of is reached	3 counts (equivalent to 480.01 milliseconds) 800.01 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 Controller 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 > 11.00 Volts >= 5,000.00 milliseconds >11.00 Volts ≤32.00 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 Illum.
					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 > 11.00 Volts >=8.00 Volts Enabled >=11.00 Volts		

23OBDG03A Part2 TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With ECM	U0100	This DTC monitors for a loss of communication with the Engine Control Module.	<p>Message is not received from controller for</p> <p>Message \$0BE:</p> <p>Message \$0C9:</p> <p>Message \$18E:</p> <p>Message \$191:</p> <p>Message \$1A1:</p> <p>Message \$1A3:</p> <p>Message \$1AA:</p> <p>Message \$1BA:</p> <p>Message \$1DF:</p> <p>Message \$1F7:</p> <p>Message \$287:</p> <p>Message \$3D1:</p> <p>Message \$3E9:</p>	<p>> 500.00 milliseconds</p> <p>> 500.00 milliseconds</p> <p>> 500.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>> 500.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>> 500.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p>	<p>General Enable Criteria:</p> <p>All below criteria have been met for</p> <p>If message is on Bus A: U0073 not active</p> <p>If message is on Bus B: U0074 not active</p> <p>If message is on Bus S: U0076 not active</p> <p>CAN channel is requesting full communications</p> <p>Normal CAN transmission on Bus is enabled</p> <p>If bus type is Sensor Bus, sensor bus relay is on</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Conroller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p>	<p>>= 5,000.00 milliseconds</p> <p>>11.00 Volts</p> <p><=32.00 Volts</p>	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

23OBDG03A Part2 TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Message \$4A3:	milliseconds	If calibratable low voltage disable mode is not Never Disabled			
			Message \$4C1:	>10,000.00 milliseconds	Low voltage disable mode: OBDII			
			Message \$4F1:	>10,000.00 milliseconds	If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
			Message \$589:		If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds > 11.00 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=8.00 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Enabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With Anti- Lock Brake System (ABS) Control Module (Emission MIL Diagnostic)	U0121	This DTC monitors for a loss of communication with the Anti-Lock Brake System (ABS) Control Module.	<p>Message is not received from controller for</p> <p>Message \$0C1</p> <p>Message \$0C5</p> <p>Message \$1E9</p> <p>Message \$1FC</p> <p>Message \$22A</p> <p>Message \$2F9</p>	<p>> 500.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>> 500.00 milliseconds</p> <p>>10,000.00 milliseconds</p> <p>>10,000.00 milliseconds</p>	<p>General Enable Criteria:</p> <p>All below criteria have been met for</p> <p>If message is on Bus A: U0073 not active</p> <p>If message is on Bus B: U0074 not active</p> <p>If message is on Bus S: U0076 not active</p> <p>CAN channel is requesting full communications</p> <p>Normal CAN transmission on Bus is enabled</p> <p>If bus type is Sensor Bus, sensor bus relay is on</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Conroller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p>	<p>>= 5,000.00 milliseconds</p> <p>>11.00 Volts</p> <p><=32.00 Volts</p>	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 Illum.
					<p>If calibratable low voltage disable mode is not Never Disabled</p> <p>Low voltage disable mode: OBDII</p> <p>If OBDII: Run/Crank ignition voltage</p> <p>If EOBD: Run/Crank ignition voltage</p> <p>If Secure: Starter motor engaged for Or Run/Crank ignition voltage</p> <p>If Hybrid Secure: Run/Crank ignition voltage</p> <p>If power mode = Accessory:</p> <p>Off key cycle diagnostics are enabled Or Controller is an OBD controller</p> <p>Controller shutdown is not impending</p> <p>Power Mode is not run/crank</p> <p>Battery voltage</p>	<p>>=11.00 Volts</p> <p>>=9.00 Volts</p> <p>> 15,000.00 milliseconds</p> <p>> 11.00 Volts</p> <p>>=8.00 Volts</p> <p>Enabled</p> <p>>=11.00 Volts</p>		

23OBDG03A Part2 TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Power Steering Control Module (Emissions Neutral Diagnostic)	U0131	<p>This DTC monitors for a loss of communication with the Power Steering Control Module.</p> <p>Emissions neutral default action is to disable auto-stop inhibits and perform auto-stops as originally intended.</p>	<p>Message is not received from controller for</p> <p>Message \$1E5</p>	>10,000.00 milliseconds	<p>General Enable Criteria:</p> <p>All below criteria have been met for</p> <p>If message is on Bus A: U0073 not active</p> <p>If message is on Bus B: U0074 not active</p> <p>If message is on Bus S: U0076 not active</p> <p>CAN channel is requesting full communications</p> <p>Normal CAN transmission on Bus is enabled</p> <p>If bus type is Sensor Bus, sensor bus relay is on</p> <p>Accessory mode to off mode not pending</p> <p>Battery voltage</p> <p>Conroller is an OBD controller Or Battery Voltage</p> <p>Controller type: OBD Controller</p> <p>If power mode = Run/ Crank:</p> <p>Power Mode is run</p>	<p>>= 5,000.00 milliseconds</p> <p>>11.00 Volts</p> <p><=32.00 Volts</p>	Diagnostic runs in 12.5 ms loop	Emissions Neutral Diagnostic - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>If calibratable low voltage disable mode is not Never Disabled</p> <p>Low voltage disable mode: OBDII</p> <p>If OBDII: Run/Crank ignition voltage</p> <p>If EOBD: Run/Crank ignition voltage</p> <p>If Secure: Starter motor engaged for Or Run/Crank ignition voltage</p> <p>If Hybrid Secure: Run/Crank ignition voltage</p> <p>If power mode = Accessory:</p> <p>Off key cycle diagnostics are enabled Or Controller is an OBD controller</p> <p>Controller shutdown is not impending</p> <p>Power Mode is not run/crank</p> <p>Battery voltage</p>	<p>>=11.00 Volts</p> <p>>=9.00 Volts</p> <p>> 15,000.00 milliseconds</p> <p>> 11.00 Volts</p> <p>>=8.00 Volts</p> <p>Enabled</p> <p>>=11.00 Volts</p>		

23OBDG03A Part2 TCM Summary Tables

[illegible]

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>If calibratable low voltage disable mode is not Never Disabled</p> <p>Low voltage disable mode: OBDII</p> <p>If OBDII: Run/Crank ignition voltage</p> <p>If EOBD: Run/Crank ignition voltage</p> <p>If Secure: Starter motor engaged for Or Run/Crank ignition voltage</p> <p>If Hybrid Secure: Run/Crank ignition voltage</p> <p>If power mode = Accessory:</p> <p>Off key cycle diagnostics are enabled Or Controller is an OBD controller</p> <p>Controller shutdown is not impending</p> <p>Power Mode is not run/crank</p> <p>Battery voltage</p>	<p>>=11.00 Volts</p> <p>>=9.00 Volts</p> <p>> 15,000.00 milliseconds</p> <p>> 11.00 Volts</p> <p>>=8.00 Volts</p> <p>Enabled</p> <p>>=11.00 Volts</p>		

23OBDG03A Part2 TCM Summary Tables

[illegible]

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>If calibratable low voltage disable mode is not Never Disabled</p> <p>Low voltage disable mode: OBDII</p> <p>If OBDII: Run/Crank ignition voltage</p> <p>If EOBD: Run/Crank ignition voltage</p> <p>If Secure: Starter motor engaged for Or Run/Crank ignition voltage</p> <p>If Hybrid Secure: Run/Crank ignition voltage</p> <p>If power mode = Accessory:</p> <p>Off key cycle diagnostics are enabled Or Controller is an OBD controller</p> <p>Controller shutdown is not impending</p> <p>Power Mode is not run/crank</p> <p>Battery voltage</p>	<p>>=11.00 Volts</p> <p>>=9.00 Volts</p> <p>> 15,000.00 milliseconds</p> <p>> 11.00 Volts</p> <p>>=8.00 Volts</p> <p>Enabled</p> <p>>=11.00 Volts</p>		

23OBDG03A Part2 TCM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Input Power Circuit A - Ignition Input On/Start Circuit Correlation	U3023	Detect a Power A vs RunCrank 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	0.300	0.300	0.275	0.200	0.200

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_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionReverse
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_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

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_DirectionForward	CeTNSR_e_DirectionForward	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 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionUnknown	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	

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

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

Value Units: Max Time for Last Seed Timeout (ms)

X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	500.000	500.000	1,000.000	2,000.000	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

Value Units: Fail threshold for PSW (count)

X Unit: Operating Loop (enum)

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	3	3	3	3	3	3	3	3

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	3	3	3	3	3	3	3	3

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

Description: Sample threshold for PSW per operating loop.

Value Units: Sample threshold for PSW (count)

X Unit: Operating Loop (enum)

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	4	4	4	4	4	4	4

Initial Supporting table - P171D hydraulic pressure delay

Description: Time to delay the initial x of y counter due to hydraulic transients. Thresholds are a function of transmission fluid temperature. Horizontal axis is transmission fluid temperature (DegC) and table output is delay time (seconds).

Value Units: delay time seconds

X Unit: transmission fluid temperature DegC

y/x	-40	0	20	30	40	50	60
1	0.090	0.090	0.080	0.050	0.050	0.050	0.050

Initial Supporting table - P171D predicted turbine speed error

Description: Predicted turbine speed vs actual turbine speed error. Thresholds are a function of engine speed and transmission fluid temperature. Diagnostic is considered failing above these values. Table vertical axis is engine speed (RPM), horizontal axis is transmission fluid temperature (DegC) and table output is predicted turbine speed error (RPM).

Value Units: turbine speed RPM error

X Unit: transmission fluid temperature DegC

Y Units: engine speed RPM

y/x	-40	0	10	20	40
0	300	300	300	300	300
500	300	300	300	300	300
1,100	300	300	300	300	300
1,500	300	300	300	300	300
2,500	300	300	300	300	300

Initial Supporting table - 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	1.000	1.000

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	0	1
CeCGSR_e_CR_First	0	1
CeCGSR_e_CR_Second	0	1
CeCGSR_e_CR_Third	1	1
CeCGSR_e_CR_Fourth	0	1
CeCGSR_e_CR_Fifth	0	1
CeCGSR_e_CR_Sixth	0	1
CeCGSR_e_CR_Seventh	0	1
CeCGSR_e_CR_Eighth	1	1
CeCGSR_e_CR_Ninth	0	1
CeCGSR_e_CR_Tenth	1	1

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	4	4

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	2.000	2.000

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	172.0	172.0

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	172.0	172.0

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_C2 C_ClchSpdSnsr1	1.5848	6.3694	1.0000	2.4450	1.0000	0.5227	1.0000	1.0000	1.1905	1.0000
CeTSRR_e_C2 C_ClchSpdSnsr2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

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	0	1
1	25	25

Initial Supporting table - transmission fluid temperature warm up time**Description:****Value Units:** transmission fluid temperature normal warm 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 - P0606_Last Seed Timeout f(Loop Time)

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

Value Units: Max Time for Last Seed Timeout (ms)

X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	500.000	500.000	1,000.000	2,000.000	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

Value Units: Fail threshold for PSW (count)

X Unit: Operating Loop (enum)

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	3	3	3	3	3	3	3	3

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	3	3	3	3	3	3	3	3

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

Description: Sample threshold for PSW per operating loop.

Value Units: Sample threshold for PSW (count)

X Unit: Operating Loop (enum)

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	4	4	4	4	4	4	4

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

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

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	500.000	500.000	1,000.000	2,000.000	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	3	3	3	3	3	3	3	3

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	3	3	3	3	3	3	3	3

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

Description: Sample threshold for PSW per operating loop.

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	4	4	4	4	4	4	4

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	0.300	0.300	0.275	0.200	0.200

Initial Supporting table - engine speed time for transmission hydraulic pressure available**Description:** time needed for engine speed to trigger "transmission hydraulic pressure available"**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.275	0.200	0.200

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description: intermediate speed sensor 1 or 2 predicted direction

Value Units: predicted direction: forward, reverse, unknown

X Unit: attained gear

Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1

y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionReverse
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_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

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_DirectionForward	CeTNSR_e_DirectionForward	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 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionUnknown	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	

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	1.000	1.000

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	0	1
CeCGSR_e_CR_First	0	1
CeCGSR_e_CR_Second	0	1
CeCGSR_e_CR_Third	1	1
CeCGSR_e_CR_Fourth	0	1
CeCGSR_e_CR_Fifth	0	1
CeCGSR_e_CR_Sixth	0	1
CeCGSR_e_CR_Seventh	0	1
CeCGSR_e_CR_Eighth	1	1
CeCGSR_e_CR_Ninth	0	1
CeCGSR_e_CR_Tenth	1	1

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	4	4

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	2.000	2.000

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	172.0	172.0

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	172.0	172.0

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_C2 C_ClchSpdSnsr1	1.5848	6.3694	1.0000	2.4450	1.0000	0.5227	1.0000	1.0000	1.1905	1.0000
CeTSRR_e_C2 C_ClchSpdSnsr2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

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	0	1
1	25	25

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed**Description:** TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)**Value Units:** RPM**X Unit:** engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Initial Supporting table - P2818 (GF9 specific) control valve test time

Description: Value to initialize the torque converter clutch control valve test time to after clutch select valve solenoid is turned on, window of time in which the torque converter clutch slip speed and derivative slip speed must be evaluated for failure. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	0.600	0.300	0.100

Initial Supporting table - P2818 stuck on test time

Description: Value to initialize the TCC Stuck On test time to after transition of clutch select valve allowing TCC hydraulic circuit connectivity. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	1.500	1.250	1.000

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	0.300	0.300	0.275	0.200	0.200

Initial Supporting table - engine speed time for transmission hydraulic pressure available**Description:** time needed for engine speed to trigger "transmission hydraulic pressure available"**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.275	0.200	0.200

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description: intermediate speed sensor 1 or 2 predicted direction

Value Units: predicted direction: forward, reverse, unknown

X Unit: attained gear

Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1

y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionReverse
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_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

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_DirectionForward	CeTNSR_e_DirectionForward	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 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionUnknown	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	

Initial Supporting table - P171D hydraulic pressure delay

Description: Time to delay the initial x of y counter due to hydraulic transients. Thresholds are a function of transmission fluid temperature. Horizontal axis is transmission fluid temperature (DegC) and table output is delay time (seconds).

Value Units: delay time seconds

X Unit: transmission fluid temperature DegC

y/x	-40	0	20	30	40	50	60
1	0.090	0.090	0.080	0.050	0.050	0.050	0.050

Initial Supporting table - P171D predicted turbine speed error

Description: Predicted turbine speed vs actual turbine speed error. Thresholds are a function of engine speed and transmission fluid temperature. Diagnostic is considered failing above these values. Table vertical axis is engine speed (RPM), horizontal axis is transmission fluid temperature (DegC) and table output is predicted turbine speed error (RPM).

Value Units: turbine speed RPM error

X Unit: transmission fluid temperature DegC

Y Units: engine speed RPM

y/x	-40	0	10	20	40
0	300	300	300	300	300
500	300	300	300	300	300
1,100	300	300	300	300	300
1,500	300	300	300	300	300
2,500	300	300	300	300	300

Initial Supporting table - 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	1.000	1.000

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	0	1
CeCGSR_e_CR_First	0	1
CeCGSR_e_CR_Second	0	1
CeCGSR_e_CR_Third	1	1
CeCGSR_e_CR_Fourth	0	1
CeCGSR_e_CR_Fifth	0	1
CeCGSR_e_CR_Sixth	0	1
CeCGSR_e_CR_Seventh	0	1
CeCGSR_e_CR_Eighth	1	1
CeCGSR_e_CR_Ninth	0	1
CeCGSR_e_CR_Tenth	1	1

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	4	4

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	2.000	2.000

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	172.0	172.0

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	172.0	172.0

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_C2 C_ClchSpdSnsr1	1.5848	6.3694	1.0000	2.4450	1.0000	0.5227	1.0000	1.0000	1.1905	1.0000
CeTSRR_e_C2 C_ClchSpdSnsr2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

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	0	1
1	25	25

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed**Description:** TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)**Value Units:** RPM**X Unit:** engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Initial Supporting table - P2818 (GF9 specific) control valve test time

Description: Value to initialize the torque converter clutch control valve test time to after clutch select valve solenoid is turned on, window of time in which the torque converter clutch slip speed and derivative slip speed must be evaluated for failure. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	0.600	0.300	0.100

Initial Supporting table - P2818 stuck on test time

Description: Value to initialize the TCC Stuck On test time to after transition of clutch select valve allowing TCC hydraulic circuit connectivity. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	1.500	1.250	1.000

Initial Supporting table - transmission fluid temperature warm up time**Description:****Value Units:** transmission fluid temperature normal warm up time, seconds**X Unit:** transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0

Initial Supporting table - C1 exhaust delay closed throttle down shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in closed throttle down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay closed throttle lift foot up shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	3.200	2.000	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	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay negative torque up shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C1 exhaust delay open throttle power down shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay open throttle power on up shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in open throttle power on up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	3.200	2.000	0.950	0.850	0.850

Initial Supporting table - C1_Oncoming Post-Torque Phase Delay**Description:** Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C1 is the oncoming clutch**Value Units:** time (seconds)**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-2	-1	-1	-1	-1

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	0.700	0.600

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	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C2 exhaust delay negative torque up shift**Description:** P0777 C2 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C2 exhaust delay open throttle power down shift**Description:** P0777 C2 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.212	0.212

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	3.100	1.100	0.950	0.850	0.850

Initial Supporting table - C2_Oncoming Post-Torque Phase Delay**Description:** Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C2 is the oncoming clutch**Value Units:** time (seconds)**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-2	-2	-1	-1	0

Initial Supporting table - C3 exhaust delay closed throttle down shift**Description:** P0797 C3 clutch hydraulic circuit exhaust time in closed throttle down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	3.000	2.500	1.800	0.650	0.600

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	1.900	1.100	0.950	0.900	0.900

Initial Supporting table - C3 exhaust delay garage shift**Description:** P0797 C3 clutch hydraulic circuit exhaust time in garage shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay negative torque up shift**Description:** P0797 C3 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C3 exhaust delay open throttle power down shift**Description:** P0797 C3 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.387	0.144

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	1.900	1.100	0.950	0.900	0.900

Initial Supporting table - C3_Oncoming Post-Torque Phase Delay**Description:** Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C3 is the oncoming clutch**Value Units:** time (seconds)**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-1	-1	-1	-1	-1

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	1.400	0.900	0.700	0.663	0.600

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	1.900	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay garage shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in garage shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay negative torque up shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C4 exhaust delay open throttle power down shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.119	0.119

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	1.900	1.100	0.950	0.850	0.850

Initial Supporting table - C4_Oncoming Post-Torque Phase Delay**Description:** Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C4 is the oncoming clutch**Value Units:** time (seconds)**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-2	-1	-1	-1	-1

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	3.000	2.000	1.750	1.400	1.400

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	3.500	2.300	1.100	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	2	1	1	1	1

Initial Supporting table - C5 exhaust delay negative torque up shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C5 exhaust delay open throttle power down shift**Description:** P2724 C5 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.900	0.613	0.450	0.300	0.163

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	3.500	2.300	1.100	0.850	0.850

Initial Supporting table - C5_Oncoming Post-Torque Phase Delay**Description:** Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C5 is the oncoming clutch**Value Units:** time (seconds)**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-2	-1	-1	-1	-1

Initial Supporting table - C6 exhaust delay closed throttle lift foot up shift**Description:** P2733 C6 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C6 exhaust delay garage shift**Description:** P2733 C6 clutch hydraulic circuit exhaust time in garage shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C6 exhaust delay negative torque up shift**Description:** P2733 C6 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C6 exhaust delay open throttle power down shift**Description:** P2733 C6 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.850	0.350	0.300	0.238	0.131

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	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C6_Oncoming Post-Torque Phase Delay**Description:** Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C6 is the oncoming clutch**Value Units:** time (seconds)**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-2	-1	-1	-1	-1

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	750	750	750	750	750	750

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	690	800	500	850	703	655

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	400	800	500	850	703	655

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 NU Shifts**Description:** Used for negative torque up shifts to add additional fail time based on oil temperature**X Unit:** transmission fluid temperature °C**Y Units:** time (seconds)

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	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	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	0	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	0.300	0.300	0.275	0.200	0.200

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	0.300	0.300	0.275	0.200	0.200

Initial Supporting table - engine speed time for transmission hydraulic pressure available**Description:** time needed for engine speed to trigger "transmission hydraulic pressure available"**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.275	0.200	0.200

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description: intermediate speed sensor 1 or 2 predicted direction

Value Units: predicted direction: forward, reverse, unknown

X Unit: attained gear

Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1

y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionReverse
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_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

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_DirectionForward	CeTNSR_e_DirectionForward	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 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionUnknown	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	

Initial Supporting table - P171D hydraulic pressure delay

Description: Time to delay the initial x of y counter due to hydraulic transients. Thresholds are a function of transmission fluid temperature. Horizontal axis is transmission fluid temperature (DegC) and table output is delay time (seconds).

Value Units: delay time seconds

X Unit: transmission fluid temperature DegC

y/x	-40	0	20	30	40	50	60
1	0.090	0.090	0.080	0.050	0.050	0.050	0.050

Initial Supporting table - P171D predicted turbine speed error

Description: Predicted turbine speed vs actual turbine speed error. Thresholds are a function of engine speed and transmission fluid temperature. Diagnostic is considered failing above these values. Table vertical axis is engine speed (RPM), horizontal axis is transmission fluid temperature (DegC) and table output is predicted turbine speed error (RPM).

Value Units: turbine speed RPM error

X Unit: transmission fluid temperature DegC

Y Units: engine speed RPM

y/x	-40	0	10	20	40
0	300	300	300	300	300
500	300	300	300	300	300
1,100	300	300	300	300	300
1,500	300	300	300	300	300
2,500	300	300	300	300	300

Initial Supporting table - 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	1.000	1.000

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	0	1
CeCGSR_e_CR_First	0	1
CeCGSR_e_CR_Second	0	1
CeCGSR_e_CR_Third	1	1
CeCGSR_e_CR_Fourth	0	1
CeCGSR_e_CR_Fifth	0	1
CeCGSR_e_CR_Sixth	0	1
CeCGSR_e_CR_Seventh	0	1
CeCGSR_e_CR_Eighth	1	1
CeCGSR_e_CR_Ninth	0	1
CeCGSR_e_CR_Tenth	1	1

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	4	4

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	2.000	2.000

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	172.0	172.0

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	172.0	172.0

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_C2 C_ClchSpdSnsr1	1.5848	6.3694	1.0000	2.4450	1.0000	0.5227	1.0000	1.0000	1.1905	1.0000
CeTSRR_e_C2 C_ClchSpdSnsr2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

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	0	1
1	25	25

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM

X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Initial Supporting table - P2818 (GF9 specific) control valve test time

Description: Value to initialize the torque converter clutch control valve test time to after clutch select valve solenoid is turned on, window of time in which the torque converter clutch slip speed and derivative slip speed must be evaluated for failure. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	0.600	0.300	0.100

Initial Supporting table - P2818 stuck on test time

Description: Value to initialize the TCC Stuck On test time to after transition of clutch select valve allowing TCC hydraulic circuit connectivity. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	1.500	1.250	1.000

Initial Supporting table - speed sensor directional rationality enable calibration**Description:** speed sensor directional rationality enable calibration**Value Units:** Boolean**X Unit:** scheduled gear**Y Units:** unitless

y/x	CeCGSR_FwdCmded	CeCGSR_NeutCmded	CeCGSR_RvrsCmded	CeCGSR_ParkCmded
1	1	0	0	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 - 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	150	150	150	150	150

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	150	150	150	150	150

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	150	150	150	150	150

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	150	150	150	150	150

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	150	150	150	150	150

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	150	150	150	150	150

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	150	150	150	150	150

Initial Supporting table - Clutch Connectivity Wrong Direction FP**Description:** Fault pending time for clutch 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	2	2	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	177	160	0	0

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

Description: Maximum pressure command allowed for each combination of clutches which can lead to a multi-clutch tie up**Value Units:** Pressure (kPa)**X Unit:** Commanded Gear**Y Units:** Clutch

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5
CeTRMR_e_C1_Clutch	115	115	4,096	297	353	4,096	115
CeTRMR_e_C2_Clutch	310	310	310	4,096	1,924	696	423
CeTRMR_e_C3_Clutch	214	214	214	1,115	4,096	614	214
CeTRMR_e_C4_Clutch	378	378	427	898	1,367	4,096	378
CeTRMR_e_C5_Clutch	124	124	124	223	278	561	4,096
CeTRMR_e_C6_Clutch	157	157	157	247	288	438	221
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

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	297	115	4,096	4,096	4,096	4,096	50
CeTRMR_e_C2_Clutch	310	447	4,096	2,103	696	423	50
CeTRMR_e_C3_Clutch	214	214	1,243	4,096	614	312	50
CeTRMR_e_C4_Clutch	792	378	1,001	1,494	4,096	1,536	50
CeTRMR_e_C5_Clutch	593	124	223	278	561	4,096	50
CeTRMR_e_C6_Clutch	4,096	157	247	288	438	898	50
CeTRMR_e_C7_Clutch	50	4,096	50	50	50	50	50

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 3

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

y/x	CeCGSR_e_NeutralC 2C4	CeCGSR_e_NeutralC 2C5	CeCGSR_e_NeutralC 2C6	CeCGSR_e_NeutralC 3C4	CeCGSR_e_NeutralC 3C5	CeCGSR_e_NeutralC 3C6	CeCGSR_e_NeutralC 4C5
CeTRMR_e_C1_Clutch	50	50	297	50	50	353	115
CeTRMR_e_C2_Clutch	50	50	4,096	50	50	1,924	310
CeTRMR_e_C3_Clutch	50	50	1,115	50	50	4,096	214
CeTRMR_e_C4_Clutch	50	50	898	50	50	1,367	378
CeTRMR_e_C5_Clutch	50	50	673	50	50	1,025	124
CeTRMR_e_C6_Clutch	50	50	4,096	50	50	4,096	157
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 4

y/x	CeCGSR_e_NeutralC 4C6	CeCGSR_e_NeutralC 1C2C3C6	CeCG SR_e_Park_wN C	CeCG SR_e_Park_wN C1	CeCGSR_e_Park_wN C2	CeCG SR_e_Park_wN C3	CeCGSR_e_Park_wN C4
CeTRMR_e_C1_Clutch	115	50	115	4,096	297	353	4,096
CeTRMR_e_C2_Clutch	310	50	310	310	4,096	1,924	696
CeTRMR_e_C3_Clutch	214	50	214	214	1,115	4,096	614
CeTRMR_e_C4_Clutch	378	50	378	427	898	1,367	4,096
CeTRMR_e_C5_Clutch	124	50	124	124	223	278	561
CeTRMR_e_C6_Clutch	157	50	157	157	247	288	438
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 5

y/x	CeCG SR_e_Park_wN C5	CeCGSR_e_Park_wN C6	CeCGSR_e_Park_wN C7	CeCGSR_e_Park_wN C1C2	CeCGSR_e_Park_wN C2C3	CeCGSR_e_Park_wN C2C4	CeCGSR_e_Park_wN C2C5
CeTRMR_e_C1_Clutch	115	297	115	4,096	50	50	50
CeTRMR_e_C2_Clutch	423	310	447	4,096	50	50	50
CeTRMR_e_C3_Clutch	214	214	214	1,243	50	50	50

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

CeTRMR_e_C4_Clutch	378	792	378	1,001	50	50	50
CeTRMR_e_C5_Clutch	4,096	593	124	223	50	50	50
CeTRMR_e_C6_Clutch	221	4,096	157	247	50	50	50
CeTRMR_e_C7_Clutch	50	50	4,096	50	50	50	50

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	297	50	50	353	115	115	50
CeTRMR_e_C2_Clutch	4,096	50	50	1,924	310	310	50
CeTRMR_e_C3_Clutch	1,115	50	50	4,096	214	214	50
CeTRMR_e_C4_Clutch	898	50	50	1,367	378	378	50
CeTRMR_e_C5_Clutch	673	50	50	1,025	124	124	50
CeTRMR_e_C6_Clutch	4,096	50	50	4,096	157	157	50
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

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	115	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C2_Clutch	447	504	504	4,096	4,096	2,103	696
CeTRMR_e_C3_Clutch	214	242	242	1,243	1,243	4,096	614
CeTRMR_e_C4_Clutch	378	427	427	1,001	1,001	1,494	4,096
CeTRMR_e_C5_Clutch	4,096	124	124	223	223	278	561
CeTRMR_e_C6_Clutch	221	157	157	247	247	288	438
CeTRMR_e_C7_Clutch	4,096	4,096	50	50	50	50	50

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_C 1_C lutc h	4,096	4,096	557	353	297	50	
CeTRMR_e_C2_Clutc h	423	310	660	1,924	4,096	50	
CeTRMR_e_C3_Clutc h	312	214	582	4,096	1,115	50	
CeTRMR_e_C4_Clutc h	1,536	792	2,130	1,367	898	50	
CeTRMR_e_C5_Clutc h	4,096	593	4,096	1,025	673	50	
CeTRMR_e_C6_Clutc h	898	4,096	4,096	4,096	4,096	50	
CeTRMR_e_C7_Clutc h	50	50	50	50	50	50	

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	115	115	4,096	297	353	4,096	115
CeTRMR_e_C2_Clutch	310	310	310	4,096	1,924	696	423
CeTRMR_e_C3_Clutch	214	214	214	1,115	4,096	614	214
CeTRMR_e_C4_Clutch	378	378	427	898	1,367	4,096	378
CeTRMR_e_C5_Clutch	124	124	124	223	278	561	4,096
CeTRMR_e_C6_Clutch	157	157	157	247	288	438	221
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

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	297	115	4,096	4,096	4,096	4,096	50
CeTRMR_e_C2_Clutch	310	447	4,096	2,103	696	423	50
CeTRMR_e_C3_Clutch	214	214	1,243	4,096	614	312	50
CeTRMR_e_C4_Clutch	792	378	1,001	1,494	4,096	1,536	50
CeTRMR_e_C5_Clutch	593	124	223	278	561	4,096	50
CeTRMR_e_C6_Clutch	4,096	157	247	288	438	898	50
CeTRMR_e_C7_Clutch	50	4,096	50	50	50	50	50

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_NeutralC 2C4	CeCGSR_e_NeutralC 2C5	CeCGSR_e_NeutralC 2C6	CeCGSR_e_NeutralC 3C4	CeCGSR_e_NeutralC 3C5	CeCGSR_e_NeutralC 3C6	CeCGSR_e_NeutralC 4C5
CeTRMR_e_C1_Clutch	50	50	297	50	50	353	115
CeTRMR_e_C2_Clutch	50	50	4,096	50	50	1,924	310
CeTRMR_e_C3_Clutch	50	50	1,115	50	50	4,096	214
CeTRMR_e_C4_Clutch	50	50	898	50	50	1,367	378
CeTRMR_e_C5_Clutch	50	50	673	50	50	1,025	124
CeTRMR_e_C6_Clutch	50	50	4,096	50	50	4,096	157
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 4

y/x	CeCGSR_e_NeutralC 4C6	CeCGSR_e_NeutralC 1C2C3C6	CeCG SR_e_Park_wN C	CeCG SR_e_Park_wN C1	CeCGSR_e_Park_wN C2	CeCG SR_e_Park_wN C3	CeCGSR_e_Park_wN C4
CeTRMR_e_C1_Clutch	115	50	115	4,096	297	353	4,096
CeTRMR_e_C2_Clutch	310	50	310	310	4,096	1,924	696
CeTRMR_e_C3_Clutch	214	50	214	214	1,115	4,096	614
CeTRMR_e_C4_Clutch	378	50	378	427	898	1,367	4,096
CeTRMR_e_C5_Clutch	124	50	124	124	223	278	561
CeTRMR_e_C6_Clutch	157	50	157	157	247	288	438
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 5

y/x	CeCG SR_e_Park_wN C5	CeCGSR_e_Park_wN C6	CeCG SR_e_Park_wN C7	CeCGSR_e_Park_wN C1C2	CeCGSR_e_Park_wN C2C3	CeCGSR_e_Park_wN C2C4	CeCGSR_e_Park_wN C2C5
CeTRMR_e_C1_Clutch	115	297	115	4,096	50	50	50
CeTRMR_e_C2_Clutch	423	310	447	4,096	50	50	50
CeTRMR_e_C3_Clutch	214	214	214	1,243	50	50	50

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

CeTRMR_e_C4_Clutch	378	792	378	1,001	50	50	50
CeTRMR_e_C5_Clutch	4,096	593	124	223	50	50	50
CeTRMR_e_C6_Clutch	221	4,096	157	247	50	50	50
CeTRMR_e_C7_Clutch	50	50	4,096	50	50	50	50

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	297	50	50	353	115	115	50
CeTRMR_e_C2_Clutch	4,096	50	50	1,924	310	310	50
CeTRMR_e_C3_Clutch	1,115	50	50	4,096	214	214	50
CeTRMR_e_C4_Clutch	898	50	50	1,367	378	378	50
CeTRMR_e_C5_Clutch	673	50	50	1,025	124	124	50
CeTRMR_e_C6_Clutch	4,096	50	50	4,096	157	157	50
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

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	115	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C2_Clutch	447	504	504	4,096	4,096	2,103	696
CeTRMR_e_C3_Clutch	214	242	242	1,243	1,243	4,096	614
CeTRMR_e_C4_Clutch	378	427	427	1,001	1,001	1,494	4,096
CeTRMR_e_C5_Clutch	4,096	124	124	223	223	278	561
CeTRMR_e_C6_Clutch	221	157	157	247	247	288	438
CeTRMR_e_C7_Clutch	4,096	4,096	50	50	50	50	50

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_C 1_C lutc h	4,096	4,096	557	353	297	50	
CeTRMR_e_C2_Clutc h	423	310	660	1,924	4,096	50	
CeTRMR_e_C3_Clutc h	312	214	582	4,096	1,115	50	
CeTRMR_e_C4_Clutc h	1,536	792	2,130	1,367	898	50	
CeTRMR_e_C5_Clutc h	4,096	593	4,096	1,025	673	50	
CeTRMR_e_C6_Clutc h	898	4,096	4,096	4,096	4,096	50	
CeTRMR_e_C7_Clutc h	50	50	50	50	50	50	

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_Out Lock1	CeTCLR_e_TUM_Out Lock2	CeTCLR_e_TUM_Out Lock3	CeTCLR_e_TUM_Out Lock4	CeTCLR_e_TUM_Out Lock5	CeTCLR_e_TUM_Out Lock6	CeTCLR_e_TUM_Out Lock7
CeTRMR_e_C1_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C2_Clutch	310	310	50	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	214	4,096	4,096	214	50	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	378	4,096	378	4,096	50	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	50
CeTRMR_e_C7_Clutch	4,096	4,096	50	4,096	50	50	50

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	0.300	0.300	0.275	0.200	0.200

Initial Supporting table - engine speed time for transmission hydraulic pressure available**Description:** time needed for engine speed to trigger "transmission hydraulic pressure available"**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.275	0.200	0.200

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 indicates 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	0	0
CeTRMR_e_C2_Clutch	0	0
CeTRMR_e_C3_Clutch	0	0
CeTRMR_e_C4_Clutch	0	0
CeTRMR_e_C5_Clutch	1	1
CeTRMR_e_C6_Clutch	0	0
CeTRMR_e_C7_Clutch	1	1

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 indicates 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	0	1	1	1	1
CeTRMR_e_C2_Clutch	0	0	0	0	0
CeTRMR_e_C3_Clutch	0	0	0	0	0
CeTRMR_e_C4_Clutch	0	0	0	0	0
CeTRMR_e_C5_Clutch	1	0	0	0	0
CeTRMR_e_C6_Clutch	0	0	0	0	0
CeTRMR_e_C7_Clutch	1	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	0	0	0	0	1
CeTRMR_e_C3_Clutch	0	0	0	0	0
CeTRMR_e_C4_Clutch	0	0	0	0	0
CeTRMR_e_C5_Clutch	0	0	0	0	0
CeTRMR_e_C6_Clutch	0	0	0	0	0
CeTRMR_e_C7_Clutch	1	1	1	1	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	0	1	0	0	0
CeTRMR_e_C4_Clutch	0	0	1	0	0
CeTRMR_e_C5_Clutch	0	0	0	1	0
CeTRMR_e_C6_Clutch	0	0	0	0	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	1	
CeTRMR_e_C2_Clutch	0	0	1	1	

Initial Supporting table - Illegal Park-Neutral Clutch Combinations

CeTRMR_e_C3_Clutch	0	1	0	1	
CeTRMR_e_C4_Clutch	0	0	0	1	
CeTRMR_e_C5_Clutch	1	0	0	1	
CeTRMR_e_C6_Clutch	1	1	1	1	
CeTRMR_e_C7_Clutch	0	0	0	1	

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 indicates 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_1 A	CeTRMR_e_IllegalRev_1 Ac	CeTRMR_e_IllegalRev_1 Ad	CeTRMR_e_IllegalRev_1 Af	CeTRMR_e_IllegalRev_1 M	CeTRMR_e_IllegalRev_1 Me
CeTRMR_e_C1_Clutch	1	1	1	1	1	1
CeTRMR_e_C2_Clutch	0	0	0	0	0	0
CeTRMR_e_C3_Clutch	0	0	0	0	0	0
CeTRMR_e_C4_Clutch	0	0	0	0	0	0
CeTRMR_e_C5_Clutch	0	0	0	0	0	0
CeTRMR_e_C6_Clutch	0	0	0	0	0	0
CeTRMR_e_C7_Clutch	0	0	0	0	1	1

Illegal Reverse Clutch Combinations - Part 2

y/x	CeTRMR_e_IllegalRev_1 Md	CeTRMR_e_IllegalRev_1 Mf	CeTRMR_e_IllegalRev_2 A	CeTRMR_e_IllegalRev_2 M	CeTRMR_e_IllegalRev_3	CeTRMR_e_IllegalRev_4
CeTRMR_e_C1_Clutch	1	1	1	1	1	1
CeTRMR_e_C2_Clutch	0	0	1	1	0	0
CeTRMR_e_C3_Clutch	0	0	0	0	1	0
CeTRMR_e_C4_Clutch	0	0	0	0	0	1
CeTRMR_e_C5_Clutch	0	0	0	0	0	0
CeTRMR_e_C6_Clutch	0	0	0	0	0	0
CeTRMR_e_C7_Clutch	1	1	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	1
CeTRMR_e_C2_Clutch	0	0	0	0	1	1
CeTRMR_e_C3_Clutch	0	0	0	1	0	1
CeTRMR_e_C4_Clutch	0	0	0	0	0	1
CeTRMR_e_C5_Clutch	1	0	1	0	0	1
CeTRMR_e_C6_Clutch	0	1	1	1	1	1
CeTRMR_e_C7_Clutch	0	0	0	0	0	1

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	0	0	0	0

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	1	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	1	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	1	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	1	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_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionReverse
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_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

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_DirectionForward	CeTNSR_e_DirectionForward	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 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionUnknown	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	

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	200	300	400	500	600
1	190	200	200	250	300

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	1.000	1.000

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	0	1
CeCGSR_e_CR_First	0	1
CeCGSR_e_CR_Second	0	1
CeCGSR_e_CR_Third	1	1
CeCGSR_e_CR_Fourth	0	1
CeCGSR_e_CR_Fifth	0	1
CeCGSR_e_CR_Sixth	0	1
CeCGSR_e_CR_Seventh	0	1
CeCGSR_e_CR_Eighth	1	1
CeCGSR_e_CR_Ninth	0	1
CeCGSR_e_CR_Tenth	1	1

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	4	4

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	2.000	2.000

Initial Supportin 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	172.0	172.0

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	172.0	172.0

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_C2 C_ClchSpdSnsr1	1.5848	6.3694	1.0000	2.4450	1.0000	0.5227	1.0000	1.0000	1.1905	1.0000
CeTSRR_e_C2 C_ClchSpdSnsr2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

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	0	1
1	25	25

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM

X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Initial Supporting table - P2818 (GF9 specific) control valve test time

Description: Value to initialize the torque converter clutch control valve test time to after clutch select valve solenoid is turned on, window of time in which the torque converter clutch slip speed and derivative slip speed must be evaluated for failure. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	0.600	0.300	0.100

Initial Supporting table - P2818 stuck on test time

Description: Value to initialize the TCC Stuck On test time to after transition of clutch select valve allowing TCC hydraulic circuit connectivity. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	1.500	1.250	1.000

Initial Supporting table - Ratio Monitor Clutch States

Description: Array of valid combinations of clutch held/off which constitutes 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	
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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_ClchSlipC3C 4	CeTRMR_e_ClchSlipC3C 6	CeTRMR_e_ClchSlipC4C 6
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	58	58
CeTGRR_e_Gear2	82	82
CeTGRR_e_Gear3	90	90
CeTGRR_e_Gear4	110	110
CeTGRR_e_Gear5	140	140
CeTGRR_e_Gear6	187	187
CeTGRR_e_Gear7	270	270
CeTGRR_e_Gear8	361	361
CeTGRR_e_Gear9	437	437
CeTGRR_e_Gear10	437	437

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	0	0	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 - Binary Clutch C1 FEM Neutral Release Thresh**Description:****Value Units:** Time (sec)**X Unit:** Transmission Oil Temperature (deg C)

y/x	-30	-15	0	10	20	40	80	110	140
1	0	0	0	0	0	0	0	0	0

Initial Supporting table - Binary Clutch C1 Neutral Release Time Out**Description:****Value Units:** Time (sec)**X Unit:** Transmission Oil Temperature (deg C)

y/x	-30	-15	0	10	20	40	80	110	140
1	0	0	0	0	0	0	0	0	0

Initial Supporting table - Binary Clutch C1 Slip Threshold

Description:

Value Units: RPM

X Unit: Transmission Oil Temperature (deg C)

y/x	-30	-15	0	10	20	40	80	110	140
1	50	50	50	50	50	50	50	50	50

Initial Supporting table - Binary Clutch Cold Inhibit Thresh**Description:** Transmission Oil temperature above which SOWC can be commanded on**Value Units:** Temperature
X Unit: Gear Selection Mode

y/x	CeCGSI_e_TFT_NormMode	CeCGSI_e_TFT_TUTD_Mode
1	40	15

Initial Supporting table - Binary Clutch Neutral Release Time Out**Description:****Value Units:** Time (sec)**X Unit:** Transmission Oil Temperature (deg C)

y/x	-30	-15	0	10	20	40	80	110	140
1	2	2	2	2	2	2	2	2	2

Initial Supporting table - C1 Coasting Downshift Tq Based Pres Clip**Description:****Value Units:** Clutch Pressure (kPa)**X Unit:** C1 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	300
1	681	681	681	681	681

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	3.200	2.000	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	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay negative torque up shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C1 exhaust delay open throttle power down shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay open throttle power on up shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in open throttle power on up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	3.200	2.000	0.950	0.850	0.850

Initial Supporting table - C1 Powered Upshift Tq Based Pres Clip**Description:****Value Units:** Clutch Pressure (kPa)**X Unit:** C1 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	500
1	2,100	2,100	2,100	2,100	2,100

Initial Supporting table - C1_Oncoming Post-Torque Phase Delay**Description:** Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C1 is the oncoming clutch**Value Units:** time (seconds)**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-2	-1	-1	-1	-1

Initial Supporting table - C2 Coasting Downshift Tq Based Pres Clip**Description:****Value Units:** Clutch Pressure (kPa)**X Unit:** C2 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	300
1	525	525	525	525	525

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	0.700	0.600

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	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C2 exhaust delay negative torque up shift**Description:** P0777 C2 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C2 exhaust delay open throttle power down shift**Description:** P0777 C2 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.212	0.212

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	3.100	1.100	0.950	0.850	0.850

Initial Supporting table - C2 Powered Upshift Tq Based Pres Clip**Description:****Value Units:** Clutch Pressure (kPa)**X Unit:** C2 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	500
1	550	681	813	1,075	1,863

Initial Supporting table - C2_Oncoming Post-Torque Phase Delay**Description:** Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C2 is the oncoming clutch**Value Units:** time (seconds)**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-2	-2	-1	-1	0

Initial Supporting table - C3 Coasting Downshift Tq Based Pres Clip**Description:****Value Units:** Clutch Pressure (kPa)**X Unit:** C3 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	300
1	363	363	363	363	363

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	3.000	2.500	1.800	0.650	0.600

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	1.900	1.100	0.950	0.900	0.900

Initial Supporting table - C3 exhaust delay garage shift**Description:** P0797 C3 clutch hydraulic circuit exhaust time in garage shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay negative torque up shift**Description:** P0797 C3 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C3 exhaust delay open throttle power down shift**Description:** P0797 C3 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.387	0.144

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	1.900	1.100	0.950	0.900	0.900

Initial Supporting table - C3 Powered Upshift Tq Based Pres Clip**Description:****Value Units:** Clutch Pressure (kPa)**X Unit:** C3 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	500
1	438	569	694	950	1,713

Initial Supporting table - C3_Oncoming Post-Torque Phase Delay**Description:** Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C3 is the oncoming clutch**Value Units:** time (seconds)**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-1	-1	-1	-1	-1

Initial Supporting table - C4 Coasting Downshift Tq Based Pres Clip**Description:****Value Units:** Clutch Pressure (kPa)**X Unit:** C4 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	300
1	463	463	463	463	463

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	1.400	0.900	0.700	0.663	0.600

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	1.900	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay garage shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in garage shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay negative torque up shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C4 exhaust delay open throttle power down shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.119	0.119

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	1.900	1.100	0.950	0.850	0.850

Initial Supporting table - C4 Powered Upshift Tq Based Pres Clip**Description:****Value Units:** Clutch Pressure (kPa)**X Unit:** C4 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	500
1	338	469	600	856	1,638

Initial Supporting table - C4_Oncoming Post-Torque Phase Delay**Description:** Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C4 is the oncoming clutch**Value Units:** time (seconds)**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-2	-1	-1	-1	-1

Initial Supporting table - C5 Coasting Downshift Tq Based Pres Clip**Description:****Value Units:** Clutch Pressure (kPa)**X Unit:** C5 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	300
1	356	356	356	356	356

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	3.000	2.000	1.750	1.400	1.400

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	3.500	2.300	1.100	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	2	1	1	1	1

Initial Supporting table - C5 exhaust delay negative torque up shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C5 exhaust delay open throttle power down shift**Description:** P2724 C5 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.900	0.613	0.450	0.300	0.163

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	3.500	2.300	1.100	0.850	0.850

Initial Supporting table - C5 Powered Upshift Tq Based Pres Clip**Description:****Value Units:** Clutch Pressure (kPa)**X Unit:** C5 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	500
1	569	756	944	1,319	2,431

Initial Supporting table - C5_Oncoming Post-Torque Phase Delay**Description:** Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C5 is the oncoming clutch**Value Units:** time (seconds)**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-2	-1	-1	-1	-1

Initial Supporting table - C6 Coasting Downshift Tq Based Pres Clip**Description:****Value Units:** Clutch Pressure (kPa)**X Unit:** C6 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	300
1	655	655	655	655	655

Initial Supporting table - C6 exhaust delay closed throttle lift foot up shift**Description:** P2733 C6 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C6 exhaust delay garage shift**Description:** P2733 C6 clutch hydraulic circuit exhaust time in garage shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C6 exhaust delay negative torque up shift**Description:** P2733 C6 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C6 exhaust delay open throttle power down shift**Description:** P2733 C6 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.850	0.350	0.300	0.238	0.131

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	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C6 Powered Upshift Tq Based Pres Clip**Description:****Value Units:** Clutch Pressure (kPa)**X Unit:** C6 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	500
1	506	588	669	825	1,306

Initial Supporting table - C6_Oncoming Post-Torque Phase Delay**Description:** Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C6 is the oncoming clutch**Value Units:** time (seconds)**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-2	-1	-1	-1	-1

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	750	750	750	750	750	750

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	690	800	500	850	703	655

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	400	800	500	850	703	655

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 NU Shifts**Description:** Used for negative torque up shifts to add additional fail time based on oil temperature**X Unit:** transmission fluid temperature °C**Y Units:** time (seconds)

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	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	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	0	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	0.300	0.300	0.275	0.200	0.200

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	0.300	0.300	0.275	0.200	0.200

Initial Supporting table - ETRS Mode Valve A turbine delay**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	2.300	1.800	1.000	0.500	0.300

Initial Supporting table - ETRS Mode Valve B turbine delay**Description:** ETRS Mode Valve B turbine delay**Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	2.300	1.800	1.000	0.500	0.300

Initial Supporting table - Mode Enable Valve Test Delay Lim**Description:** Test Delay for turbine speed**Value Units:** Seconds**X Unit:** Transmission fluid temp, Deg C

y/x	-40	-20	0	20	130
1	0	0	0	0	0

Initial Supporting table - Mode Valve A Eng Off Dly Lim**Description:** used for both engine off mode valve A stability delay time required to enable fail time update and fail time threshold**Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	3.000	2.400	2.000	1.000	0.500

Initial Supporting table - Mode Valve A Eng Off ML Lim

Description: Mode Valve A transition limit when the engine and one or more HSD's are off or when max line pressure is being commanded. Temp based.

Value Units: Seconds

X Unit: Degrees C

Y Units: unitless

y/x	-40	-20	0	20	130
1	15	10	5	2	2

Initial Supporting table - Mode Valve A Fail Lim**Description:** Mode valve A fail limit after delay has matured**Value Units:** Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	0	0	0	0	0

Initial Supporting table - Mode Valve A Final State

Description: mode valve A position

Value Units: mode valve position
X Unit: ETRS diagnostic range
Y Units: ETRS command direction

Mode Valve A Final State - Part 1

y/x	1	2	3
1		CeSTGR_e_ETRS_Park	CeSTGR_e_ETRS_NeutLo
2	CeSTGR_e_ETRS_Park	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
3	CeSTGR_e_ETRS_NeutLo	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
4	CeSTGR_e_ETRS_NeutHi	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
5	CeSTGR_e_ETRS_Drive	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
6	CeSTGR_e_ETRS_Rvrs	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
7	CeSTGR_e_ETRS_NeutShf	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh

Mode Valve A Final State - Part 2

y/x	4	5	6
1	CeSTGR_e_ETRS_NeutHi	CeSTGR_e_ETRS_Drive	CeSTGR_e_ETRS_Rvrs
2	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
3	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
4	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
5	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
6	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
7	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh

Mode Valve A Final State - Part 3

y/x	7		
1	CeSTGR_e_ETRS_NeutShf		
2	CePSCR_e_ModeValveLow		
3	CePSCR_e_ModeValveLow		
4	CePSCR_e_ModeValveLow		
5	CePSCR_e_ModeValveHigh		
6	CePSCR_e_ModeValveLow		
7	CePSCR_e_ModeValveHigh		

Initial Supporting table - Mode Valve A Steady State Fail Lim**Description:** Mode Valve A steady state sensor fault fail limit**Value Units:** Seconds**X Unit:** Transmissin fluid temp, deg C

y/x	-40	-20	0	20	130
1	0	0	0	0	0

Initial Supporting table - Mode Valve B Eng Off Dly Lim

Description: used for both engine off mode valve B stability delay time required to enable fail time update and fail time threshold

Value Units: seconds

X Unit: transmission fluid temperature, degrees Celsius

y/x	-40	-20	0	20	130
1	3.000	2.400	2.000	1.000	0.500

Initial Supporting table - Mode Valve B Eng Off ML Lim

Description: Mode Valve B transition limit when the engine and one or more HSD's are off or when max line pressure is being commanded. Temp based.

Value Units: Seconds

X Unit: Degrees C

Y Units: unitless

y/x	-40	-20	0	20	130
1	15	10	5	2	2

Initial Supporting table - Mode Valve B Fail Lim**Description:** Mode valve B fail limit after delay has matured**Value Units:** Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	0	0	0	0	0

Initial Supporting table - Mode Valve B Final State

Description: mode valve B position

Value Units: mode valve B position

X Unit: ETRS diagnostic range

Mode Valve B Final State - Part 1

y/x	1	2	3
1		CeSTGR_e_ETRS_Park	CeSTGR_e_ETRS_NeutLo
2	CeSTGR_e_ETRS_Park	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
3	CeSTGR_e_ETRS_NeutLo	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
4	CeSTGR_e_ETRS_NeutHi	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
5	CeSTGR_e_ETRS_Drive	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
6	CeSTGR_e_ETRS_Rvrs	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
7	CeSTGR_e_ETRS_NeutShf	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh

Mode Valve B Final State - Part 2

y/x	4	5	6
1	CeSTGR_e_ETRS_NeutHi	CeSTGR_e_ETRS_Drive	CeSTGR_e_ETRS_Rvrs
2	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
3	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
4	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
5	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
6	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
7	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh

Mode Valve B Final State - Part 3

y/x	7		
1	CeSTGR_e_ETRS_NeutShf		
2	CePSCR_e_ModeValveLow		
3	CePSCR_e_ModeValveLow		
4	CePSCR_e_ModeValveHigh		
5	CePSCR_e_ModeValveLow		
6	CePSCR_e_ModeValveHigh		
7	CePSCR_e_ModeValveHigh		

Initial Supporting table - Mode Valve B Steady State Fail Lim**Description:** Mode Valve B steady state fail limit**Value Units:** Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	0	0	0	0	0

Initial Supporting table - Mode Vlv StdySt Park Dly Lim**Description:** fail delay time**Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.00	-20.00	0.00	20.00	130.00
1	4.000	0.731	0.244	0.244	0.244

Initial Supporting table - ModeVlvA_FnIDly[ETRS attained range Drive, ETRS command range NeutHi]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range Drive, ETRS command range NeutLo]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnIDly[ETRS attained range Drive, ETRS command range NeutShf]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnIDly[ETRS attained range Drive, ETRS command range Park]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range Drive, ETRS command range Reverse]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnIDly[ETRS attained range NeutHi, ETRS command range Drive]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range NeutHi, ETRS command range NeutLo]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range NeutHi, ETRS command range NeutShf]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range NeutHi, ETRS command range Park]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range NeutHi, ETRS command range Reverse]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range NeutLo, ETRS command range Drive]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range NeutLo, ETRS command range NeutHi]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnIDly[ETRS attained range NeutLo, ETRS command range NeutShf]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnIDly[ETRS attained range NeutLo, ETRS command range Park]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range NeutLo, ETRS command range Reverse]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnIDly[ETRS attained range NeutShf, ETRS command range Drive]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range NeutShf, ETRS command range NeutHi]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnIDly[ETRS attained range NeutShf, ETRS command range NeutLo]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnIDly[ETRS attained range Park, ETRS command range Drive]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnIDly[ETRS attained range Park, ETRS command range NeutHi]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnIDly[ETRS attained range Park, ETRS command range NeutLo]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	3.450	2.069	0.688	0.413	0.369

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range Park, ETRS command range NeutShf]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range Park, ETRS command range Reverse]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range Reverse, ETRS command range Drive]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range Reverse, ETRS command range NeutHi]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range Reverse, ETRS command range NeutLo]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnIDly[ETRS attained range Reverse, ETRS command range NeutShf]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Drive, ETRS command range NeutHi]**Description:****Value Units:** seconds**X Unit:** transimssion fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	7.800	6.000	3.300	0.444	0.119

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Drive, ETRS command range NeutLo]**Description:****Value Units:** seconds**X Unit:** transimssion fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	6.900	4.600	1.150	0.569	0.413

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Drive, ETRS command range NeutShf]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Drive, ETRS command range Park]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	6.900	4.600	1.150	0.462	0.413

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutHi, ETRS command range Drive]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	2.125	1.100	0.688	0.250	0.231

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutHi, ETRS command range NeutLo]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutHi, ETRS command range NeutShf]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	2.125	1.100	0.688	0.250	0.231

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutHi, ETRS command range Park]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutHi, ETRS command range Reverse]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutLo, ETRS command range Drive]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	2.125	1.100	0.688	0.250	0.231

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutLo, ETRS command range NeutHi]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutLo, ETRS command range NeutShf]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	2.125	1.100	0.688	0.250	0.231

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutLo, ETRS command range Park]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutLo, ETRS command range Reverse]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutShf, ETRS command range Drive]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	1.600	1.000	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutShf, ETRS command range NeutHi]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	2.231	1.800	0.875	0.113	0.069

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutShf, ETRS command range NeutLo]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	3.450	2.069	0.688	0.413	0.369

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutShf, ETRS command range Park]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	3.450	2.069	0.688	0.413	0.369

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutShf, ETRS command range Reverse]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	1.837	1.150	0.688	0.113	0.069

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Park, ETRS command range Drive]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	2.125	1.100	0.688	0.250	0.231

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Park, ETRS command range NeutHi]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Park, ETRS command range NeutLo]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	1.381	0.863	0.644	0.250	0.231

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Park, ETRS command range Reverse]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Reverse, ETRS command range Drive]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	2.125	1.100	0.688	0.250	0.231

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Reverse, ETRS command range NeutHi]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Reverse, ETRS command range NeutLo]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Reverse, ETRS command range NeutShf]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	2.125	1.100	0.688	0.250	0.231

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Reverse, ETRS command range Park]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnIDly[ETRS attained range Drive, ETRS command range NeutHi]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Drive, ETRS command range NeutLo]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	3.450	2.069	0.762	0.369	0.344

Initial Supporting table - ModeVlvB_FnIDly[ETRS attained range Drive, ETRS command range NeutShf]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Drive, ETRS command range Park]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	3.450	2.069	0.762	0.369	0.344

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Drive, ETRS command range Reverse]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnIDly[ETRS attained range NeutHi, ETRS command range Drive]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutHi, ETRS command range NeutLo]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutHi, ETRS command range NeutShf]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutHi, ETRS command range Park]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutHi, ETRS command range Reverse]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutLo, ETRS command range Drive]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutLo, ETRS command range NeutHi]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnIDly[ETRS attained range NeutLo, ETRS command range NeutShf]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnIDly[ETRS attained range NeutLo, ETRS command range Park]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutLo, ETRS command range Reverse]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnIDly[ETRS attained range NeutShf, ETRS command range Drive]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutShf, ETRS command range NeutHi]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnIDly[ETRS attained range NeutShf, ETRS command range NeutLo]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutShf, ETRS command range Park]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnIDly[ETRS attained range NeutShf, ETRS command range Reverse]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Park, ETRS command range Drive]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnIDly[ETRS attained range Park, ETRS command range NeutHi]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnIDly[ETRS attained range Park, ETRS command range NeutLo]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	3.450	2.069	0.762	0.369	0.344

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Park, ETRS command range NeutShf]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Park, ETRS command range Reverse]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Reverse, ETRS command range Drive]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Reverse, ETRS command range NeutHi]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Reverse, ETRS command range NeutLo]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnIDly[ETRS attained range Reverse, ETRS command range NeutShf]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Reverse, ETRS command range Park]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Drive, ETRS command range NeutHi]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	7.000	5.500	1.100	0.500	0.400

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Drive, ETRS command range NeutLo]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	7.000	5.500	1.100	0.163	0.137

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Drive, ETRS command range NeutShf]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	7.000	5.500	1.100	0.500	0.400

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Drive, ETRS command range Park]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	7.000	5.500	2.069	0.250	0.200

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Drive, ETRS command range Reverse]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	7.000	5.500	1.100	0.500	0.400

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutHi, ETRS command range Drive]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	2.331	0.950	0.512	0.212	0.137

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutHi, ETRS command range NeutLo]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	2.331	0.950	0.512	0.212	0.137

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutHi, ETRS command range NeutShf]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.725	0.688	0.344	0.163	0.137

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutHi, ETRS command range Park]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	2.331	0.950	0.512	0.212	0.137

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutHi, ETRS command range Reverse]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutLo, ETRS command range Drive]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutLo, ETRS command range NeutHi]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	7.000	5.500	1.100	0.500	0.400

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutLo, ETRS command range NeutShf]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	7.000	5.500	1.100	0.500	0.400

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutLo, ETRS command range Park]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutLo, ETRS command range Reverse]**Description:****Value Units:** seconds**X Unit:** transmission fluid temperature, degrees Celsius**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	7.000	5.500	1.100	0.500	0.400

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutShf, ETRS command range Drive]**Description:** Mode Valve B transition delay from NeutShf to Drive**Value Units:** Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	2	0	0	0	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutShf, ETRS command range NeutHi]**Description:** Mode Valve B transition delay from NeutShf to NeutHi**Value Units:** Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	1	1	1	0	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutShf, ETRS command range NeutLo]**Description:** Mode Valve B transition delay from NeutShf to NeutLo**Value Units:** Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	3	2	1	0	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutShf, ETRS command range Park]**Description:** Mode Valve B transition delay from NeutShf to Park**Value Units:** Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	3	2	1	0	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutShf, ETRS command range Reverse]**Description:** Mode Valve B transsition delay from NeutShf to Rvrs**Value Units:** Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	1	1	1	0	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Park, ETRS command range Drive]**Description:** Mode Valve B transition delay from Park to Drive**Value Units:** Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	1	1	1	0	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Park, ETRS command range NeutHi]**Description:** Mode Valve B Transition delay from Park to NeutHi**Value Units:** Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	7	6	1	1	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Park, ETRS command range NeutLo]**Description:** Mode Valve B transition delay from Park to NeutLo**Value Units:** Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	7	6	1	0	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Park, ETRS command range NeutShf]**Description:** Mode Valve B transition from Park to NeutShf**Value Units:** Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	7	6	1	1	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Park, ETRS command range Reverse]**Description:** Mode Valve B transition delay from Park to Reverse**Value Units:** Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	7	6	1	1	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Reverse, ETRS command range Drive]**Description:** Mode Valve B transition delay Reverse to Drive**Value Units:** Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	2	1	1	0	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Reverse, ETRS command range NeutLo]**Description:** Mode Valve B transtion delay Reverse to NeutLo**Value Units:** Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	2	1	1	0	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Reverse, ETRS command range NeutShf]**Description:** Mode Valve B transition delay [Rvrs][NeutShf]**Value Units:** Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	1	1	1	0	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Reverse, ETRS command range Park]**Description:** Mode valve A transition delay timer for Reverse to Park**Value Units:** seconds**X Unit:** transmission fluid tep, deg C

y/x	-40	-20	0	20	130
1	2	1	1	0	0

Initial Supporting table - P2018 GF9 TCC Stuck On Crash Decel limit

Description: TCC slopup decel limit to establish slip crashed when TCC oil became available for TCC Stuck On diagnostics

Value Units: RPM per Second

X Unit: transmission fluid temperature °C

Y Units: percent

y/x	-7	10	40
0	-600	-600	-600
15	-600	-600	-600
25	-900	-900	-900
50	-1,200	-1,200	-1,200
75	-1,500	-1,500	-1,500

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed**Description:** TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)**Value Units:** RPM**X Unit:** engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Initial Supporting table - P2818 (GF9 specific) control valve test time

Description: Value to initialize the torque converter clutch control valve test time to after clutch select valve solenoid is turned on, window of time in which the torque converter clutch slip speed and derivative slip speed must be evaluated for failure. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	0.600	0.300	0.100

Initial Supporting table - P2818 GF9 Establish crash slip limit**Description:** RPM limit used to establish slip crashed when TCC oil became available**Value Units:** RPM**X Unit:** percent

y/x	0	15	25	50	75
1	100	100	160	233	300

Initial Supporting table - P2818 stuck on test time

Description: Value to initialize the TCC Stuck On test time to after transition of clutch select valve allowing TCC hydraulic circuit connectivity. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds

X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	1.500	1.250	1.000

Initial Supporting table - Park Servo Stk On Delay Lim**Description:** Delay timer limit for Park servo to Move from P to OOP**Value Units:** Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	4	3	1	0	0

Initial Supporting table - Park Valve Stuck Off Fail Lim**Description:** Fail timer limit for Park Servo to move from OOP to P. Temp based .**Value Units:** Seconds**X Unit:** Transmission fluid temp Deg C

y/x	-40	-20	0	20	130
1	0	0	0	0	0

Initial Supporting table - Park Vlv Stk Off Dly Lim**Description:** Delay timer limit for Park Servo to move from OOP to P**Value Units:** Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	2	1	1	1	1

Initial Supporting table - Park Vlv Stk Off Dly Lim**Description:** Delay timer limit for Park Servo to move from OOP to P**Value Units:** Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	2	1	1	1	1

Initial Supporting table - Park Vlv Stk Off Eng Off Lim**Description:** Park Servo transition delay timer when engine is off**Value Units:** Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	3	3	2	1	1

Initial Supporting table - Park Vlv Stk Off Eng Off Lim**Description:** Park Servo transition delay timer when engine is off**Value Units:** Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	3	3	2	1	1

Initial Supporting table - Park Vlv Stk Off ML Eng Off Lim

Description: Park Servo transition limit when the engine and one or more HSD's are off or when max line pressure is being commanded.

Value Units: Seconds

X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	15	10	5	2	2

Initial Supporting table - Park Vlv Stk Off ML Eng Off Lim

Description: Park Servo transition limit when the engine and one or more HSD's are off or when max line pressure is being commanded.

Value Units: Seconds

X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	15	10	5	2	2

Initial Supporting table - Park Vlv Stk Off ZL DLy Lim**Description:** Delay timer limit for Park Servo to move from OOP to P. Temp based.

* Only used when ZeroLimit is active to set Park Servo Stuck Off.

Value Units: Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	6	6	3	1	1

Initial Supporting table - Park Vlv Stk Off ZL DLy Lim**Description:** Delay timer limit for Park Servo to move from OOP to P. Temp based.

* Only used when ZeroLimit is active to set Park Servo Stuck Off.

Value Units: Seconds**X Unit:** Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	6	6	3	1	1

Initial Supporting table - engine speed time for transmission hydraulic pressure available**Description:** time needed for engine speed to trigger "transmission hydraulic pressure available"**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.275	0.200	0.200

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description: intermediate speed sensor 1 or 2 predicted direction**Value Units:** predicted direction: forward, reverse, unknown**X Unit:** attained gear**Y Units:** intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1

y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionReverse
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_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

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_DirectionForward	CeTNSR_e_DirectionForward	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 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionUnknown	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	

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	1.000	1.000

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	0	1
CeCGSR_e_CR_First	0	1
CeCGSR_e_CR_Second	0	1
CeCGSR_e_CR_Third	1	1
CeCGSR_e_CR_Fourth	0	1
CeCGSR_e_CR_Fifth	0	1
CeCGSR_e_CR_Sixth	0	1
CeCGSR_e_CR_Seventh	0	1
CeCGSR_e_CR_Eighth	1	1
CeCGSR_e_CR_Ninth	0	1
CeCGSR_e_CR_Tenth	1	1

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	4	4

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	2.000	2.000

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	172.0	172.0

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	172.0	172.0

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_C2 C_ClchSpdSnsr1	1.5848	6.3694	1.0000	2.4450	1.0000	0.5227	1.0000	1.0000	1.1905	1.0000
CeTSRR_e_C2 C_ClchSpdSnsr2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

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	0	1
1	25	25

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	0	0	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